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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 prerequisites, although full voting membership is granted only to licensed amateurs.

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

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"It Seems to Us..."

RECIPROCAL LICENSING

Senator Barry Goldwater, ex-6BPI, of Arizona, and Senator Andrew F. Schoeppe of Kansas have introduced a bill into the Congress which would authorize the Federal Communications Commission to issue amateur licenses to citizens of other countries, provided such countries extend similar courtesies to U.S. amateurs when in their domains. The bill, S.2361, is printed in full on page 73 of this issue.

Purely as a courtesy, several dozen countries have been issuing amateur licenses to visiting U.S. hams. Many more withhold such privileges because the U.S. does not issue licenses to their citizens visiting here. In recent years there have been several attempts — by the League, by individual amateurs, and even by a member of Congress — to secure a favorable Government attitude toward reciprocal licensing, but all have been stalemated. At the Southwestern Division Convention in Phoenix this year, however, League officials found a champion for our cause in Senator Goldwater, who promised to investigate the matter upon his return to Washington. This bill to amend the Communications Act is the result.

Now it is up to us, the amateur body, to carry on. If no appreciable interest is expressed, the bill will surely die unnoticed in committee. But if Senators and Representatives are made acutely aware of the importance this bill has to all 220,000 of us and its goodwill effects internationally, the measure will certainly be carefully studied and sincere attempts made to iron out policy and administrative difficulties which have been obstacles in previous considerations.

Individually-composed letters, we are told, are most effective. Form letters and letters in petition or resolution style signed by a number of amateurs are of course useful, but they don’t carry quite as much weight. It is quite likely that the first session of the present Congress will have adjourned by the time you read this issue. The individual Congressmen continue their work during the recess, however, and therefore the letters should be sent now so that action can be forthcoming during the early part of the next session, before the bill gets put aside for more-burning issues.

Do you want the United States to join with Canada and most other countries of the world in granting amateur operating privileges to foreign visitors? Then — today — communicate your views to the Senators and Representatives from your state, and to the members of the Senate Committee on Interstate and Foreign Commerce, listed on page 73.

GOT YOUR BALLOT?

During the first week of October, ballots will be mailed to approximately 40,000 League members, comprising those in divisions selecting directors and vice-directors for the coming two-year term. In past elections only about two-thirds of our members have taken the time and trouble to mark and return their ballots. While this figure is perhaps comparable with some political elections, it really ought to be much higher. The men selected will be your representatives in League government the next two years. Watch for your ballot in the next couple of weeks, then, and mark and return it promptly.

OPERATING AID

One of QST’s many responsibilities is to keep League membership posted with up-to-date information to assist in legal, efficient operating. Most members are reluctant to cut up their issues of QST, however, and so they may have to hunt through several issues to find information they need in a hurry.

As a convenience to our readers, QST this month includes a tear-out card with some of the data amateurs should have quickly available at their operating positions. Hang it on the wall, or clip it to the front of your ARRL logbook. As occasional changes or additions are announced, correct the listings to keep them up-to-date.

If you find this new ARRL service as helpful as we hope it will be, please let us know — together with suggestions for subjects which might be usefully included in future such cards.
COMING A.R.R.L. CONVENTIONS

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.

GREAT LAKES DIVISION CONVENTION
Cleveland Ohio — October 13-14

The 1961 ARRL Great Lakes Division Convention, presented by the Cleveland Amateur Radio Convention, Inc., will be held on October 13-14 at the Sheraton-Cleveland Hotel, “Cleveland’s largest and finest”. A single sideband dinner will start off the convention at 1800 EDT on October 13, followed by open house and hospitality gatherings at 2000. At 2359 a Royal Order of the Wouff Hong initiation will take place.

Saturday, October 14, will feature numerous displays; technical talks; a DX session featuring Bob White, WB1IPO, DXCC Awards; meeting of the Ohio Council of Amateur Radio Clubs; Army MARS session; and a YL forum. Special attractions will include the Army MARS communications trailer and an exhibit about the modern trend of space technology presented by the Lewis Research Center of the National Aeronautics Space Administration. General Class amateur exams will be conducted by the FCC at 0930 Saturday, October 14.

The convention concludes with a banquet at 1900, October 14, in the Grand Ballroom. Convention registration is $2.00 per person; banquet tickets are $5.00; single sideband dinner tickets are $5.00 and YL luncheon tickets $2.00. Pre-registration closes at midnight, October 11. All requests should be mailed to Cleveland Amateur Radio Convention, P. O. Box 5167, Cleveland 1, Ohio.

WEST GULF DIVISION CONVENTION
Kerrville, Texas — October 13-15

The West Gulf Division Convention will feature a varied program of speakers on DX, s.a.b., semiconductors, Civil Defense, Army and Air Force MARS, Naval Reserve communications, v.h.f., and special sessions on printed circuitry. Convention site is the Kerrville Municipal Auditorium — Friday, Saturday and Sunday, October 13-15.

A code-speed contest is planned with the contestant to have the option of using his own favorite bug or electronic keyer. Three transmitter hunts are scheduled — one each day of the convention, on 75 and 6 meters. An FCC representative will be on hand to give amateur exams.

Guest speakers include Don Stoner, W6TNS; Durward J. Tucker, W5VU of Longhorn Electronics on s.a.b.; Gus Browning, W4BPD, DX; Irving S. Schlimm, W5UB, printed circuitry; Frank Cox, Texas CD Director, and Bill Bromann on Civil Defense, plus other notable speakers.

There will be a special program, including a breakfast, for YLs. Unlicensed YLs and harmonies will be treated to a variety show and a bus tour of the Texas hill country. Wayland “Soup” Groves, W5NW, is in charge of the Royal Order of the Wouff Hong ceremonies.

Convention pre-registration fee is $10.00, which includes the entire program, plus a pre-convention barbeque Friday night, a Saturday evening dance and the Sunday banquet. A special pre-registration for hams under sixteen is $3.50, which will admit them to all technical sessions. Pre-registration deadline is October 10. Registrations and requests for information should be sent to the Kerrville Radio Club, 800 Water Street, Kerrville, Texas.

KENTUCKY STATE CONVENTION
Lexington — October 28

The first annual Kentucky State ARRL Convention is to be held at the Phoenix Hotel in Lexington with convention activities beginning shortly before midnight, with initiation ceremonies for the Royal Order of the Wouff Hong.

Noted local and national figures are to conduct group meetings on such subjects as DX, antennas, v.h.f., MARS, Novice Corner, c.w., and phone nets, s.a.b., and TVI.

An ARRL Forum will be conducted by Dana Cartwright, W5UPB, Director of the Great Lakes Division, assisted by Perry Williams, W1UED, of the ARRL Headquarters staff, Elmer G. Leachman, W4BEW, newly-elected SCM, and others.

A full day for Saturday is planned with many exhibits. Ladies activities will include a tour of horse farms and other points of interest in the Blue Grass area. The banquet is set for 6:30 p.m. Talk in transmitters will operate Friday night and Saturday on 75 and 6 meters.

Hotel reservations should be made with the Phoenix Hotel, 120 East Main Street, Lexington. Convention pre-registration is $2.25, until midnight, Friday, October 27. After midnight, registration will be $2.50. Banquet will be $5.00 per person. Make all checks payable to “The Blue Grass Amateur Radio Club” and address all inquiries to Dix E. Newton, K4KJQ, Secretary-Treasurer, 108 Devine Avenue, Lexington.

OUR COVER

Summer and fall are busy seasons in the ARRL lab, with the gang working on various pieces of equipment for the Handbook. This candid (ha!) shot shows W1JKS at his bench. It'll give you an idea of how we protect the edges of gear with masking tape, and how neat the underneath side of something can look. Neat bench, too, eh? See also the photo on page 174 of this issue.
A 25-tube receiver may sound like a major undertaking. It is. But the unitized assembly described here does much to dispel any aspects of tedium. While there will be perhaps not many who will want to duplicate the complete system, almost everyone will find interest in one or more of the attractive units that go to make up the whole.

The true member of the amateur hacksaw-and-file fraternity can never be content with equipment except that which he has built himself. He is not concerned with such things as "resale value," but only with taking whatever parts are at hand, mixing them with a few of his own ideas, and trying to create something useful. Here is a description of a receiver built following this principle, which I hope may encourage others to discover for themselves the satisfaction of operating with their own "custom-built" receivers.

The set is made up of three rack-panel units: a tuner, a crystal-controlled converter, and an i.f. amplifier. Each unit was built as a separate project, which is a lot easier than building a complete receiver all at once. This method of construction allows changes to be made easily without disturbing the whole setup, and also permits you to use or test any unit with other gear that might be available. For instance, the converter can be used ahead of any receiver that tunes 3 to 4 megacycles; the tuner might be used with a low-frequency ARU-5 receiver serving as the i.f. amplifier; or the i.f. unit could be connected in place of the regular i.f. stages of a receiver.

The Tuning Section

The tuner (circuit diagram shown in Fig. 1) is built inside a 3 x 17 x 7-inch chassis, with a 3 1/2-inch panel. It consists of an r.f. stage, mixer, and oscillator, tuning the range of 3 to 4 megacycles in two steps of 500 kc. each, with an i.f. output frequency of 500 kc. It tunes the 80-meter band by itself, and serves as a tunable first i.f. amplifier on the higher-frequency bands, thus giving the same tuning rate and stability on all bands.

The main objectives in building a tuner are

The three main units that make up this tripleconversion receiver fit into a standard rack. The crystal-controlled converter is at the top. Controls, from left to right, are for r.f.-stage peaking, two controls for mixer peaking (on either side of the converter in/out switch), crystal switch, and r.f. gain.

The intermediate section contains the tunable i.f. amplifier (used alone for 80-meter reception) which covers the 3- to 4-Mc. range in two 500-kc. steps. The two large controls at the left are for r.f.-stage peaking and gain. The small controls below are for the switch that selects one of the two 500-kc. tuning ranges, and a mechanical calibration corrector. The main tuning knob is to the right of the slide-rule scale. A digital counter provides a logging scale.

The bottom section contains the 500-kc. i.f. amplifier and two complete 110-kc. i.f. amplifiers (broad and sharp), a.m. and s.s.b. detectors, audio, b.f.o. and tuning-meter circuits. Controls along the bottom, from left to right, are for 500-kc. i.f. gain, gain for each of the two 110-kc. i.f. amplifiers, audio gain, detector selector, and i.f. (broad/sharp) selector. Balancing the tuning meter on the panel is the b.f.o. frequency control.

Sectionalized Communications Receiver

Triple-Conversion Superhet Covering 80 Through 10

BY R. V. McGRAW, W2LYH, 9 Peg's Lane, Riverhead, L. I., N. Y.

October 1961
Fig. 1 — Circuit of the 3-4-Mc. tuning section. Resistances are in ohms and resistors are 1/2 watt, unless otherwise indicated. Fixed capacitors less than 0.1 μf. are mica (Sw. silver mica); others are paper or ceramic.

C₁ — Midget dual variable (two Johnson 50U12/157-4 or similar units ganged).
C₂, C₃ — Variable air padder (Johnson 100U12/157-6 or similar).
C₄, C₅ — Variable air padder (Hammarlund AFC-140 or similar).
C₆ — Tuning Capacitor — 100-μf, variable (see text).
C₇, C₈ — Air trimmer (Hammarlund HFA-108 or similar).
J₁, J₂ — Coaxial receptacle (50-239 or Jones S-101).

L₁ — Approx. 30 μh — 50 turns No. 30 enam., close-wound on 1/8-inch iron-slug form, 8-turn link.
L₂ — Same as L₁, 10-turn link.
L₃ — Approx. 20 μh — 35 turns No. 24 enam., 1/4-inch diam., 1/2 inches long, tapped at 18 turns from ground end.
R₁ — Wire-wound control.
S₁ — D.p.d.t. ceramic rotary.
T₁ — 455-kc, l.f. transformer (retuned to 500 kc).

oscillator stability, accurate calibration, and smooth tuning. Two 6C4s are used in the Franklin oscillator circuit. This circuit has the advantage of using very loose coupling between the tubes and the tank circuit (only a few μf.), which minimizes frequency variations caused by tube heating. However, oscillator stability is as much a matter of materials and mechanical construction as anything else. With this in mind, the oscillator components were solidly mounted on an aluminum plate, with ceramic insulation used throughout, and the coil was wound on a ceramic form. Openings are provided directly above and below the oscillator tubes for ventilation.

The tuning mechanism, built as a separate subassembly, contains a precision variable capacitor and worm-gear drive taken from a surplus BC-375 tuning unit, a gear train for driving the slide-rule-dial pointer, and a 3-digit counter which is used as a logging scale. The worm-gear drive, which has a 50:1 ratio, is coupled to the tuning-knob shaft through two gears having a 2:1 ratio, giving an over-all ratio of 100:1 with no detectable backlash. The counter, which is

Front panel of the 3-4-Mc. tuner unit with cover removed. The digital counter at the right is driven from the tuning shaft by means of small bevel gears. The tuning shaft has a ball bearing at each end, and the knob has a built-in friction drive to prevent damage to the gears if the shaft is turned to the end of travel. The mechanism at the left shifts a masking strip that hides the frequency scale not in use. Another shaft and arm shifts the position of the frequency scale to correct the calibration as needed.
Fig. 2—Circuit of the crystal-controlled converter section. Resistances are in ohms and resistors are 1⁄2 watt. Variable-oscillator coupling capacitor (30 μf) is a compression type. Fixed capacitors less than 0.01 μf. are mica; others are ceramic.

C₀, C₁₀, C₁₁—Midget variable (Johnson 50R1 2/149-3 or similar).
C₁₂—Fixed mica capacitor (see coil table).
J₁, J₄—Coaxial receptacle (SO-239 or Jones S-101).
L₅—See coil table.
L₇—Approx. 40 μh.—80 turns No. 30 enam., close-wound driven from the tuning-knob shaft through small bevel gears, has proved to be a very convenient type of logging scale. When you tune across a rare DX signal, just make a note of the counter reading and you can come right back to it later.

On 3/4-inch iron-slug form, 6-turn link at cold end.
R₃—Wire-wound control.
S₀—4-section 4-pole 4-position ceramic rotary switch.
S₁—1-section 2-pole 5-position ceramic rotary switch.
S₂—1-section 2-pole 2-position ceramic rotary switch.
Y₁—See coil table.

The i.f. amplifier unit. This chassis includes the circuits of Figs. 3, 4 and 5. The 500-kc. amplifier, mixers and crystal oscillator are at the left end, and the b.f.o., detector, meter and audio sections occupy the right-hand end. In between are the two (broad and sharp) 110-kc. i.f. strips. The variable capacitor at the right tunes the b.f.o.

October 1961
The 3-4-Mc. tuner. The r.f. and mixer circuits are in the subassembly at the left. All oscillator components, except the main tuning capacitor, are included in a second subassembly running along the right rear side of the chassis. The oscillator range switch $S_1$, to the right of the coil, is operated by mechanical linkage from the panel control. Screened openings above and below the oscillator tubes provide ventilation. The main tuning capacitor and driving mechanism also form a separate subassembly.

Scale for each range and the scale not in use is covered by a movable mask which is linked to the band-switch knob. A calibration control is provided which shifts the dial scales a small amount to left or right. This effectively shifts the whole tuning range to compensate for any inaccuracy in the converter-oscillator frequency.

The r.f. amplifier and mixer are built on an

![Circuit Diagram](image)

**Fig. 3**—Circuit of the 500-kc. section of the i.f./a.f. unit. Resistances are in ohms and resistors are $\frac{1}{2}$ watt unless indicated otherwise.

- $C_{13a}, C_{13b}, C_{15}$—Triple-unit fixed capacitor.
- $J_6$—Coaxial receptacle (SO-239 or Jones S-101).
- $L_s$—Slug-tuned coil—approx. 400 µh.
- $R_s$—Wire-wound control.
- $T_6, T_8$—Midgit 455-kc. i.f. transformer (returned to 500 kc.).
- $T_6, T_8$—110-kc. i.f. transformer (Miller 1890-P1, or see text).
Fig. 4—Circuit of the 110-kc. section of the i.f./a.f. unit. Resistances are in ohms, and resistors are 1/2 watt unless indicated otherwise.

C₁₀, C₁₇, C₁₈—Triple-unit fixed capacitor.
S₀—1-section 2-pole 2-position rotary switch (see Fig. 5 for second pole).
R₁, R₂—Wire-wound control.
T₀—T₁₁, incl.—110-kc. i.f. transformer (same as T₄ and T₅).

aluminum plate shown at the left side of the chassis. A 6AU6 is used in the amplifier and a 6J6 in the mixer circuit. The amplifier grid and plate circuits are tuned by C₁ which consists of two gauged units with the shaft brought out to a panel knob. The simple dual-triode mixer circuit was the best of several types tried. The midget 455-kc. i.f. transformer T₁ is tuned to 500 kc., which it reaches easily without any modification. It is connected to the i.f. unit through coaxial cable, the cable capacitance forming part of the secondary tuning capacitance.
The crystal-controlled converter. The r.f.-stage grid coils are to the left of the band switch and the plate coils to the right. A small subassembly, in rear left of the chassis, includes the r.f. and mixer tubes (protruding through holes in the rear of the chassis) and the shielded mixer output coil. A similar subassembly to the right contains the crystals and f.c.o. tube (both also protruding from the chassis), the oscillator plate coils and their padders, and the crystal-oscillator switch.

The rear end of the shaft at the center is linked mechanically outside of the chassis) to the shaft of the converter in/out switch at the rear of the r.f.-coil compartment.

**Converter**

In the converter, Fig. 2, the 40-, 30-, 15-, and 10-meter bands are heterodyned into the 3-to-1-megacycle range for tuning. Crystal frequencies are chosen so that each band starts at 3.0 megacycles on the dial. The use of this high first-i.f. frequency makes it easy to obtain a good image ratio, since the image is always at least 6 megacycles away from the signal. Two crystals are provided for the 10-meter band, since the tuner covers only a one-megacycle range. A 12AT7 cascade amplifier feeds a 6C4 triode mixer, with another 6C4 as the crystal oscillator.

B & W Miniductors were used for making the signal-frequency coils. The links are wound on small pieces of bakelite tubing which fit inside the Miniductors, and are held in place with Duco cement. The antenna-input links were adjusted to match 50 ohms with an s.w.r. bridge.

Tracking problems are avoided by the use of separate tuning controls for the r.f.-amplifier grid circuit, and the mixer grid and plate circuits. There is no inconvenience in this method, since these controls need only to be peaked up for the low, middle, or high portions of a band. A separate switch gang, $S_a$, with an extra position for the second 10-meter range, is provided for the crystal oscillator.

The oscillator is coupled to the mixer through a compression-type trimmer. The amount of coupling is not critical, and good results are obtained on all bands with one setting of the trimmer.

For tuning to 80 meters, switch $S_a$ is thrown to the "out" position, which connects the antenna directly to the tuner. The converter is built in a chassis of the same size as the tuner, with a 3 1/2-inch panel.

**I.F. Unit**

The i.f. unit is built on a 3 x 17 x 7-inch chassis, with a 7-inch panel. It contains a two-stage 500-ke. amplifier (Fig. 3), two three-stage 110-ke. amplifiers having different bandwidths (Fig. 4), and the detector, audio, and tuning-meter circuits (Fig. 5). The 500-ke. signal from the tuner is first amplified, then converted to 110 ke. by mixing it with the output of a 300-ke. crystal oscillator in the two 6BE6 mixers, each of which feeds one of the 110-ke. amplifiers. The 110-ke. transformers were obtained as surplus and are the type used in radio-compass receivers. One amplifier has its transformers peaked at 110 ke., giving a bandwidth of 380 cycles at 6 db. down, with steep sides, which seems to be just about right for c.w. The other amplifier is stagger-tuned, with a small amount of top coupling added to each transformer. This strip has a bandwidth of 3 ke. at the 6-db. point, which works out well for s.s.b., or for picking off one sideband of an a.m. signal. Only one of the 110-ke. amplifiers operates at a time, as selected by the "broad-sharp" switch, $S_b$, which also connects the 6BE6 product detector and the 6C4 diode amplifier to the chain in use.

The d.c. output voltage of the diode detector operates the tuning-meter bridge circuit. A zero-setting adjustment is provided at the rear of the chassis. $R_s$ is selected so that the meter reads full scale with the meter-amplifier tube removed from its socket. The meter operates at all times, and is quite useful for tuning or aligning the receiver.
Fig. 5—Detector, audio, b.f.o. and tuning-meter circuits of the W2LYH receiver. Resistances are in ohms and resistors are 1/2 watt unless indicated otherwise.

C₁₀—Padder for T₁₀, broadcast replacement type (see text and T₁₀ below).

M₁₁—D.C. milliammeter.

R₀—0.5-megohm control, audio taper.

R₃—Wire-wound control.

R₆—Nominally 56,000 ohms (see text for adjustment).

for giving comparative signal reports, or even for tuning the transmitter. However, it is not an S meter, because I sincerely believe that S meters are a lot of nonsense, especially since they have degenerated to the ridiculous "db. over 9" variety.

For flexibility, a separate gain control is provided for each of the three i.f. amplifiers. In normal operation, the 500-kc amplifier gain control is used mostly. No provision is made for a.g.c., since I have never found any use for a.g.c. in ham operating. In fact, the use of carrier-derived a.g.c.

is directly responsible for many mistaken ideas about such things as "audio punch" and "super-modulation." Switch S₃ selects audio from either the product detector or the diode detector. Two 6C₄ audio stages supply plenty of audio, unless you like to use your receiver as a p.a. system.

The b.f.o. transformer T₁₂ is a junk-box item marked 239 kc., padded down to reach 110 kc. A midget variable capacitor with built-in reduction drive, taken from a defunct broadcast receiver, gives smooth tuning of the b.f.o. frequency. The panel control is calibrated in kc. above and below the i.f. center frequency. Of course, 12AU7 twin triodes can be used instead of 6C₄s. However, separate tubes do make the wiring a little easier.

**Conclusion**

For a ham-band receiver the crystal-converter tunable-first-i.f. approach seems to me to be ideal, having the advantages of freedom from drift, high image ratio, and equal tuning rate on all bands. Perhaps the idea of constructing the set in several "building-block" units will make the thought of constructing your own receiver seem less formidable.

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**Converter Coil Table**

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<th>T₁</th>
<th>L₁</th>
<th>Wire</th>
<th>Turns</th>
<th>Diam. Length</th>
<th>H &amp; W</th>
<th>Link**</th>
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<td>(μh.)</td>
<td>(In.)</td>
<td>(In.)</td>
<td>(In.)</td>
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</table>

29-30  26  Same coils are used at L₁ and L₂ as for 28-29 Mc. At L₂ the coil is a duplicate of its coil for 28-29 Mc, with a slightly different slug adjustment.

* Wire-wound on 3/4-inch iron-plug form.
** Links are at low-potential ends of associated coils, see text.
Waging War on Malpelo Island

BY MAC REYNOLDS,* W9EVI

Back in the early 1700's, a lone Spanish ship bumbling about in the eastern Pacific Ocean stumbled upon an imposing basalt rock island 310 miles off the west coast of Colombia. It was named Malpelo, meaning "Bad Hair" in Spanish, and was the scene of a recent 2½-year struggle to install its first amateur station.

Background

In 1927, Scripps Institute of Oceanography landed on the island's north coast, now a sheer cliff to 600 feet; and it failed in a second attempt in 1936. The following year a Vanderbilt expedition successfully put ashore to look things over. In 1953 a Colombian naval officer, after waiting three days for a decent surf, finally got on in a rubber boat. But way back forty years ago a ship loaded with silver bars plowed mercilessly into an off-shore rock and disappeared from knowledge in 300 fathoms of salt water. Treasure hunters still search occasionally but no poor men have ever risen rich from that ocean bottom.

The late HIK7AB and a few Ws were, in 1958, dreaming of a trip to Malpelo, each group unknown to the other. When the facts were discovered, it was decided to make it a joint venture.

By September, 1959, HIK0TU was issued to an insatiably curious group and in May, 1960, a year and a half later, a group composed of HIs 31X, 5BZ, 5EV and Ws 4CVI, 6HAW, and 9DUB loaded a mountain of gear onto the Colombian naval ship Ciudad de Quibdo and sailed for Malpelo. Timing was perfect: 1960 was the 15th anniversary of Colombian independence. By mid-May and with almost heroic effort, two men and a 300-hp. generator were deposited on a 25-foot rock jutting out from the eastern shore of the island. But the Pacific Ocean churned up a storm and the group decided to withdraw rather than face further needless risks.

By this time it was impossible to give up, and another attempt was planned for 1961, now armed with good solid knowledge of what to expect and what to do about it.

The "experts" gave 50-50 chances of success and offered professional landing advice ranging from a black-powder harpoon gun of intolerable dimensions to floating hydraulic extension ladders, and even the prize idea of floating through the air from an off-shore ship to the island suspended by mammoth balloons.

Beginning in June, 1960, the Colombian lads performed miracle after miracle and by March, 1961, HIs IQQ, 2YO, 3LX, 40C, and 5EV and Ws 4DQS, 6HAW, 9EVI, and 0NWX were signed on. Boats Olsen, W6HAW, lined up a mysterious insurance policy in the name of the "DXpedition of the Century to Malpelo Island" and the Second Battle of Malpelo was begun.

The Task

A division of labor was ordered. Ed Quinones, HIK3LX, arranged through the Ministry of War for the Ciudad de Quibdo (182 feet) and a C-47 to fly lads and equipment across Colombia. Herman Olarte, HIK1QQ, somehow transported 1400 lbs. of gear from Miami to Colombia, the Ws lined up most of the radio equipment, and Carlos Valencics, HIK5EV, took care of the heavy equipment and the secret landing plans. The Colombian League obtained final clearance for us to set up shop on Malpelo, while dates and frequencies went out over W1AW, and to various DX clubs around the world. After 2½ years of work and planning, things looked really quite good for a successful trip.

Getting the Show on the Road

On March 25, with the gear and Ws in Barranquilla, Colombia, HIK1QQ threw a welcome feast and the boys v.v. buddled off to Bogota, Luis Caicedo, HIK3AO and president of the

Jaimie is seen coming ashore, assisted by ship's crew. The sea was much calmer here than during the 1960 attempt to land.

QST for
Colombian League of Radio Amateurs (LCRA), opened his home to a gracious dinner party. It seemed as though every ham in Colombia was there.

The following morning, Ed met us at the Air Force Base outside Bogota to catch a C-47 flight to Buenaventura via Cali. We left early with a load of Boy Scouts as co-passengers (plus a large piano), all to be replaced in Cali by 10 fierce-looking banditos and their armed guards. It was what you might call a nervous ride, but somehow we lumbered over the Andes at 19,000 feet without pressure or oxygen, half frozen and short of breath, and landed on a field the size of a piece of chalk in the jungle near Buenaventura.

Carlos met us at the field with three overloaded trailers of landing gear for the island. Fourteen hours later the gang put the last piece of equipment on the Quibdo and sailed at 9:30 p.m. on the 28th of March.

The Sail and How to Land

The Pacific Ocean lay at its quietest but began to stir up a bit of fuss as we neared Malpelo. Carlos and his two sons had carefully planned two ways of making a landing:

1. A 4000-lb. Kontiki-type raft, 20 x 88 feet, was fashioned on board ship with a bundle of balsa logs at one end and steel drums at the other. There was even a catwalk down the middle and a hand railing. Very plush. The idea was to pile the whole thing overboard, tow it to shore, tether it to the rocks, and Presto! a floating dock. Sounded like a dream.

2. If that plan didn't work out, eight large galvanized steel drums with cranked-sealed tops were along. All the radio gear had been chosen to fit inside these barrels. If all else failed, the HKs had four huge inner tubes and two inflatable rubber boats for special situations — whatever that means. The plans seemed well thought out and looked to be the answer to the fervent dream of putting Malpelo Island on the air. We crossed our fingers and grinned at each other.

Somewhere during the 40-hour sail, the 6-cylinder diesel dropped to 3-cylinder function and speed slowed to 3½ knots. Carlos stripped to the waist and shortly emerged from the engine room with news of success. We were elated. Porpoises and flying fish abounded. Sharks were used for target practice and the Quibdo hummed along.

The Island

Thursday at dawn proved a perfect job of navigating: the island lay ahead in the calmness of a cold moonlight, so penetrating a picture that no one cheered or spoke: we just leaned on the railing and smoked in silence.

Malpelo Island is a solid rock with absolutely no vegetation. It rises to four peaks of which the highest is 846 feet. It looked immense. The Quibdo took an excursion at dawn, showing only one spot looking like a possible beach head. The rest of the coastline is vertical up to heights of 200 to 800 feet. At the waterline, the island is about ¾ X 1¾ miles in diameter. There is no anchorage because the cliffs extend straight down hundreds of feet below the surface. A spot on the east side about 1000 feet from the southern tip showed a small 40° sloped shelf rising from 15 feet above the high-tide mark to a point about 60 feet inland. From there the cliff rose on an average slope of about 70° to the 600-foot level, where it leveled out or rose straight up.

The sharks, largely blues and hammerheads, rode in grinning packs of 10 to 20 and at times were an arm's length offshore. The ridge fire at these intruders was enough to tick off WW III, but it had been heard around the world.

Shortly after dawn on Friday, March 31 (HK Time), the captain of the Quibdo, Carlos, and his sons, Enrique and Carlitos, explored in detail the landing spot in an 18-foot aluminum outboard motor boat. The sea was heavy but a far, far cry from the year before. The report was simple — forget the Kontiki raft (it would have been smashed into toothpicks against the rocks) and concentrate on the barrels. We rubbed our rabbit's foot and swallowed hard.

The Landing

The outboard was skillfully run at high tide right up to shore. At the proper moment and with a crest of a large wave at hand, Enrique jumped on shore and scammed up the slippery rocks. Had he slipped and fallen into the surf, there was not very much that anyone could have done to

Looking down toward landing spot, while some of the gang are pulling in the equipment. The vertical distance between the men on shore and those in the outboard was about 15 feet. A shark (arrow) shadowed the outboard. Only one barrel broke loose in the landing, and luckily it floated.

The operating area was about 130 feet above the sea. The top of the island, another 500 feet up, is obscured by a lava ridge above the tents. W6-anda lies on the other side.

October 1961
Looking north to the kitchen—the Malpelo cafeteria. The cliff in the background is in line with the Mississippi river, India is the other way, while Africa is a clear shot to the right. The several huge lava rocks in the foreground teetered dangerously.

help him. Pure guts. With a rope tied to a steel pin driven into the island and the other end dangling in the surf, we had only to take the outboard to a point 20 feet offshore, jump in the surf, and pull ourselves up the lip of the island in mountain-climber fashion. Crude, yes: but it presented no casualties except a badly crushed finger on Enrique’s hand. The gear came next in the barrels. Block and tackle coupled with five hours of manpower took care of that by 3 p.m. Friday.

HK0TU Opens for Business

Malpelo was ours. We rested and explored a bit. Apparently thousands of years ago the top of the island had erupted, sending porous lava down to the sea and covering the sparse red soil that once supported plant life. Occasionally the lava had frozen and formed “caves” with protective lips of lava overhanging. We chose three of these caves for the c.w., a.m., and s.s.b. stations. They were only 30 feet apart but required up to 20 minutes climbing time between them. A kitchen area and relief area were chosen; tables and benches were brought into place, and the stations set up. It was nearly dark and very windy. The antenna crew under Jamie Restrepo, HK2YO, had been at work stringing 130-foot long wires and returned after a 7-hour job. It looked bad for transmitting west. This was the understatement of the year because of a huge cliff rising another 600 feet west of the operating positions.

By 0300 GMT on the morning of April 1 (10 p.m. EST) the three rigs on three modes were somehow ready, with the Borg-Warner Zeus generator running like a top. That everything worked was amazing. We turned on the three receivers and listened on our appointed frequencies. The band chatter was something for the books. The Ws and South American stations seemed to vie for signal honors. Once in a while some innocent soul would call CQ on our expected frequency only to be hammered into oblivion by an angry wolf pack waiting for our grand appearance. I admit the temptation was too strong at this point; we tested for a few minutes and then listened. The silence was deafening. The c.w. boys called a CQ signing HK1QQ/P and worked one lad who is just this instant discovering what he worked that evening. HK1QQ and Ws 4DQS, 6HAW, and 9NWX operated c.w. The balance of us operated various forms of phone. Bob doubled in brass by working a little relief phone.

Finally, at 0300 GMT on April 1, three stations (all on 20 meters) opened up on a mediocre band and the third battle of Malpelo was on. Between the frantic calling and inter-station interference, it was sheer bedlam. By dawn the gang had somehow knocked off 1700 QSOs. Not much DX and few WIs and 7s. Not once that night did we have to work to start a pile-up. The international DX grapevine had alerted the gang. A touch of the key and we were hosied with r.f.

The Days on Malpelo

Early the next morning Boots and Flavio took the last 1000 feet of antenna wire and started a climb to the top, figuring that if just a few feet of wire could be laid within an open shot in all directions, we would have the world in our pocket. They returned at 4 p.m. announcing they had run out of wire 150 feet from the top, but the wire was laid that far. It was a dud and we felt downright persecuted. A beam was out of the question as were antenna balloons and kites. Then Jaime, Flavio, and Harold decided a complete station should be taken to the top—eight hours away. This failed because it rained. Malpelo lies in a world area where a low-pressure, rain-bearing front oscillates back and forth producing plenty of downpours and instantly-reversing winds. Only two varieties of lizards, a few insects, many fiddler crabs and large sea birds live on the island. The latter have covered the island with guano that becomes slippery as gelatin when wet. In fact, the whole place smells like an old hen house when it rains. A climb to the top with a load of gear was out of the question.

Time Rolls On

The thousands of fiddler crabs were a constant menace, eating everything in sight, and preventing any real uninterrupted sleep. Specimens of the two lizards were brought back to the Lincoln Park Zoo in Chicago: Mariguana Assisi and Diploglossus Millipunctatus, the only ones in

QST for
The white and black sea birds were as large as a turkey and given to diving dead-stick at breakneck speed from 800 feet down to the sea in a long whoosh, sounding like a 707 jet.

Great caution had to be taken at all times not to loosen the crumbling lava and start a landslide. The walkways were lighted at night with 40-watt bulbs strung all over the place. Harold assumed the full responsibility of keeping lights and generators running 24 hours a day. Eduardo, Enrique and Carlitos performed the many tasks necessary to keep the stations running and the operators fed, fat and easy.

The equipment held up marvelously. The 32V-75A-1-TO keyer on c.w., the 200V-Drake 2A, and the Valiant-Drake 2A all hummed along. QSOs were made in Spanish, English, French, German and some unknown language with a 6U7.

The Bands and Operating Notes

As I said earlier, the bands were mediocre, flipping between the fair and the miserable. An exception was 15-meter a.m., with excellent openings. We heard many DX stations on 15 telling each other that they had set up all night on 20 and didn’t hear us and “where in tarnation did we go?” Some fun! 15 s.s.b. was a flop but c.w. on that band was superb. 10 was all but closed down. 40 c.w. was the top drawer in the middle of the night, but too many boys go to sleep at sensible hours, I guess. 20 on all modes was magnificent except that it was hard to keep the boys off the s.s.b. frequency. To move the band below 14,200 is not sportsmanlike and only aggravates a bad situation on that band.

Bob tried 160, but the r.f. stayed on the island and results were zero. 80 c.w. was surprisingly good, but not enough DX activity on that band. It was open all night, but it was hard work and took a lot of CQs. 40 and 80 are the bands to watch as the sun comes down. As an observed tip: when there is a DX station operating in your hemisphere on a 24-hour basis, break out the coffee and stay up very late on 40 and 80. Any signal you call will be welcomed by the DX. I assure you.

Our operators were slowed down a bit at times by the “Listen for my friend on phone” business and the ever-present “Good Ol Charlie Brown’s.” But as a refinement of technique, if signals are reasonably readable (R4 or R5), don’t send “HKO7TU HK7TU de W1XXX W1XXX R R RST 500 500 PSE QSL 73 HK7TU de W1XXX K”. It takes too much time, and last time when the band was good means contacts were made with deserving stations. Instead, try, after—your original call is acknowledged and the DX breaks to you—“BK de W1XXX 500 BK,” or something similarly speedy. To call or continually mention HK7TU is superfluous and only wastes time and irritates the pack and the DX operator. Similar procedure is dictated on phone. There is here a growing tendency to include your state in your report. Except in certain contests, you can easily make a manic-depressive out of the DX operator with this procedure. Phonetics are something to behold. The ARRL list can’t be misunderstood. One W1 (or W7?) wanted to act as our master of ceremonies, promising to line up the boys by serial number, like those given out in a hardware store. We laughed over that for two days. What a way to work DX!

Anything you can do to speed things up and make it clean for the DX operator is always appreciated by him, and above all, by the pack waiting for their turns. These are some observations taken on the island, and we all hope they will be of some value to you in getting on the Honor Roll.

A few tape recordings were made on Malpelo and they are family heirlooms. We rotated operators from band to band and mode to mode to offer different languages to all.

1961 was the year to work Malpelo lots of times. One lad is in the log 14 times on the same mode. A new Candidate for Rod Newkirk’s “DX Hog of the Year.” May he slay in the Aldabas.1

Early Sunday morning, Harold, Enrique, Eduardo and Carlitos planted the Colombian National Flag at the 800-ft. level together with the flag of the Cali Fire Department and a bottle containing all our names.

The Quito had been circling the island for five days and the time was up. HK7TU was closed down early in the morning of April 4 after 1400 QSOs in 66 countries. The next landing party


Luncheon time at the Malpelo cafeteria. L to r: Eduardo, Dale, Boats. The slope of the island’s shore is clearly visible. If one were caught here in the rain, it was necessary to wait till the slippery rocks were dry before proceeding.
skin, weitched our way across the Andes to Cali where we spirited our filthy selves into that beauti-
ful city under the benevolent cover of darkness.

After a party to end all parties in Cali, the gang was flown in another C-47 to Bogota where we were met by HK3AO and family. The Ws threw the dinner that night and we ended up at HK3QV's for a final victory celebration that would shame Bacchus. Finally, with the HKs in their respective cities, it was time to return to the U.S. We flew to Barranquilla with Herman. From there to Miami.

**Finally . . .**

All of us of HKOTU must thank not only the stations contacted for their help in making the Malpelo Island DXpedition a success, but also the many persons and agencies that were responsible for providing so fine an experience.

This was a trip to Colombian soil, transported by Colombian Military Forces, and licensed and approved by the necessary Ministries and agencies of that government. Without their help and the astonishing personal drive of the Colombian ama-
teurs, this trip could never have been consummated. The bigger the challenge, the more they enjoyed it, and full credit is due them.

The open friendship and hospitality offered us in Colombia was pure and honest. If you should ever be there under similar circumstances, you will never forget it, either.

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**Hamfest Calendar**

New York — The 7th Annual V.H.F. Roundup, sponsored by the Syracuse V.H.F. Club, Inc., will be held on Oct. 7. As previously, it will be at the Three Rivers Inn, Route 57, north of Syracuse, N. Y. Noted speakers, ladies' program, awards presentation to Eastern and Western New York winners in the ARRL June V.H.F. Party, Steaks dinner, and floor show with top talent. Price $3.50 in advance; $4.00 at the door. Tickets and information from Dick Benja-
mun, KE2FY, 211 Marilyn Ave., North Syracuse 12, Motel res-
ervations from Earl Witt, K3QWD, 120 Snartruck Drive, Syracuse 6.

Pennsylvania — The annual banquet of the Mahoning Valley Brice Pounders' Club will be held on October 28 in the Hometown Fire company hall, on Route 48, one mile north of Tamaqua, Pa. Talk-in frequency will be 50.64 Me. The FCC will be on hand at 1000 to give General Class examinations. A Pennsylvania Dutch-style ham and turkey dinner will be served promptly at 1800, followed by profes-
sional entertainment. All registrations ($1.00 each, including ham and chicken dinner if paid in advance) is $3.00 for adults and $2.00 for children. There will be 8- and 10-meter hidden transmitter hunts, an auction, and DX contest, women's entertainment, and mobile judging. Info and registrations available from Hank Schneider, W3KDF, 1900 Water St., Westville, Pa.

Pennsylvania — The 15th annual hamfest sponsored by the Radio Association of Erie will be held from 1100 to 1800 on Saturday, September 30, at the Cessna Battisti Club, 1102 East 16th St., Erie. Registration (including ham or chicken dinner if paid in advance) is $3.00 for adults and $2.00 for children. There will be 8- and 10-meter hidden transmitter hunts, an auction, a DX contest, women's entertainment, and mobile judging. Info and registrations available from Hank Schneider, W3KDF, 1900 Water St., Westville, Pa.

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**25 Years Ago**

October 1936

... On the technical front twenty-five years ago we had a medium-power, three-band transmitter by Grammer, a 5-meter crystal-control rig by John Reinert, a crystal filter and noise silencer for a superhet by Grammer, a k.w. rig by Etel and McCullough, and more on a test oscillator by DeSoto. In addition there were articles on Class-B modula-
tion, vertical antennas for 7- and 14-Me operation, multij
ube oscillators for the ultra-high, use of the "magic eye" tube, and the usual hints and kinks.

... It was announced that W9ERU (who is still around and using the same call) won the code speed contest at the Central Division convention, copying 522 w.p.m. The runner-up was W9KJ, who is now better known as W1LVQ.

... Results of the 4th annual Field Day were published. The high-scoring club made 143 QSOs. It appears that some 387 hams were in the field.

... This issue twenty-five years ago carried the original announcement of the publication of Two Hundred Meters and Down.

**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 ar-
ranged 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.
Stable A.C.-Operated Power Source for Transistor Circuits

This regulated supply for use with transistors is enclosed in a 4 x 4 x 2-inch aluminum utility box.

The Design of Regulated Low-Voltage Power Supplies

BY J. R. GOUGE, JR.,* W3RXL

There is no difference between the principles involved in voltage-regulated power supplies using vacuum tubes and those upon which similar circuitry using transistors operate. The only differences lie in the components used and the voltage levels involved. The block diagram of Fig. 1 shows the essential elements in a series regulator of conventional type. To analyze the operation of this circuit, consider first that the supply is operating at a preset output voltage and, for one reason or another, this voltage decreases. The voltage comparator senses the change in output voltage by comparison with a stable voltage-reference element, producing an output signal related to this change which drives the d.c. control amplifier. The control amplifier in turn amplifies this signal and, by its output, controls the resistance of the series element (in this case reducing it) to restore the output voltage to its original value. If for some reason the

* 5940 8th Ave., Carrollton, Hyattsville, Md.

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sponding decrease in the output voltage to its original value.

Since a change in output voltage is required to produce a change in the resistance of the series element, this type circuit cannot completely compensate for output changes. However, the greater the gain of the loop consisting of the voltage comparator, d.c. control amplifier, and series element, the greater will be the compensation. The upper limit of the gain usable in this loop is determined by stability considerations. If an attempt is made to use too much gain without compensating for phase shift at the higher frequencies, the circuit will become regenerative and oscillations will result, making the supply useless for most applications. The frequency response of this feedback loop normally extends well beyond the attendant ripple frequency of the unregulated power supply, hence the output voltage from this type of regulator is extremely smooth and ripple free.

**Zener Diode as Reference**

A more detailed description of a transistorized regulator can be made using the circuit diagram of Fig. 2. Although most low-priced regulators will use p-n-p transistors, Fig. 2 has been drawn with n-p-n units to facilitate the discussion and to make it easier for one who is more familiar with vacuum-tube circuits to make the transition. A 1-to-1 correspondence exists between the circuit elements of Fig. 2 and the blocks of Fig. 1. The reference element is the zener or breakdown diode, $C_R_1$. When subjected to a reverse voltage greater than its breakdown potential, $V_z$, a diode of this kind maintains a constant terminal voltage which is relatively independent of the current which passes through it. Thus its action is much like that of the familiar VR tube with the important exception that its breakdown and operating voltages are one and the same as opposed to the VR tube which requires an ionizing voltage considerably greater than its operating voltage. As in the case of the VR tube, its operating current range is rather restricted. The limiting factor in determining the maximum current through a zener diode is its maximum allowable dissipation, typically 200 to 500 mw. for the pigtail variety. For maximum stability it is important not to operate these diodes near their power limit since they are temperature sensitive and the heat produced by their own power dissipation will affect the breakdown potential.

**Transistor Regulator**

The comparator circuit is the base-to-emitter junction of transistor $Q_2$, the control amplifier. The controlled series element is $Q_1$, normally a power transistor. $R_2$ and $R_3$ are used as a divider across the output voltage so that the regulator can be adjusted for an output greater than the zener voltage of $C_R_1$.

In the following theory of operation two particular approximations have been used. First, that the base-to-emitter drop of $Q_2$, normally on the order of 0.2 volt, is negligible and, secondly, that the base current of $Q_2$ flowing through $R_2$ does not produce a significant voltage drop. The latter will be true for all intents and purposes provided that the bleeder current through $R_2$ and $R_3$ is several orders of magnitude greater than the base current of $Q_2$.

In operation, the voltage at the base of $Q_2$ is the zener voltage of $C_R_1$. Taking into account the divider action of $R_2$ and $R_3$, the output voltage will then be found from

$$E_o = V_z - \frac{R_2}{R_3} \left( \frac{R_2}{R_3} + \frac{R_2}{R_3} \right) = V_z + \left( \frac{R_2}{R_3} \cdot V_z \right).$$

Thus, by varying the ratio of $R_2$ to $R_3$, the output voltage can be adjusted between a lower limit of $V_z$ and an upper limit determined by the unregulated input voltage and the voltage ratings of the circuit components.

If the output voltage of Fig. 2 were to increase because, for instance, of a decrease in load current, the base current of $Q_2$ would necessarily increase, resulting in an amplified increase in the collector current of $Q_2$. This increased current

![Fig. 2][2]

**Fig. 2**—Regulator circuit using transistors. Circuit designations are for text reference purposes.
flow through $R_1$ causes a drop in the base voltage of $Q_1$ and a corresponding increase in the effective resistance of the collector-to-emitter circuit of the series element $Q_1$. The end result would be a reduction in the output voltage to its preset value. An analogous series of events will occur to raise the output voltage to its original value should something, say a decrease in line voltage, cause it to be lowered.

**Transistor Protection**

The most serious shortcoming of a regulator of this sort using a power transistor as the series element is the possible destruction of $Q_1$ by an accidental overload or short circuit of the output. If the output terminals are shorted in the circuit of Fig. 2, practically the only impedance to the flow of current through $Q_1$ will be the internal impedance of the unregulated supply, usually a matter of ohms, probably resulting in the almost immediate destruction of $Q_1$. It should also be noted that an output short would instantly apply the full output voltage of the unregulated supply from collector to emitter of $Q_1$. Thus, if the voltage rating of $Q_1$ is less than the output voltage of the unregulated supply, the chances of the survival of $Q_1$ are just about nil. Because of the inherent time lag of fuse elements and circuit breakers they can offer protection only from overloads of the regulator which are still within the ratings of $Q_1$.

Many sophisticated circuits have been devised to protect the series transistor, but most of these add seriously to the complexity and or cost of the basic regulator. A simple yet extremely reliable means of protecting $Q_1$ from being destroyed by current overloads or output shorts is to increase the output impedance of the unregulated supply by connecting a power resistor between the unregulated output and the collector of $Q_1$. The decrease in circuit efficiency and regulation can be considered negligible when compared to the resulting circuit protection. This device has been used with gratifying results in regulators rated as high as several amperes. This technique will not protect $Q_1$ from voltage overloads. The simplest expedient here is to select a transistor with a voltage rating sufficient to withstand the full voltage of the unregulated supply.

There are two criteria used in selecting the value of the protective resistance. First, it should be large enough to limit the current through $Q_1$ to a safe value in the case of a short across the output of the regulator. Secondly, it should be small enough so that under the conditions of maximum rated regulator output voltage and current, and minimum line voltage, the valleys of the voltage waveform at the collector of $Q_1$ are at least 2 volts higher than the output of the regulator. The latter is necessary to maintain regulator action throughout the complete cycle of input voltage.

**Practical Regulated Supply**

The circuit of a versatile yet simple regulated power supply that can be duplicated for less than twenty dollars at mail-order prices is shown in Fig. 3. This circuit varies only in detail from the basic circuit of Fig. 2. The current-limiting resistor $R_8$ discussed above, has of course been added between $Q_1$ and the unregulated supply. $R_8$ has been added to supply current to $CR_1$, the zener diode. If this supply were to be used at a fixed output voltage of about twice the zener voltage or higher, better regulation would result by connecting the left-hand end of $R_6$ to the negative output terminal of the regulator rather than to the unregulated supply voltage. In this case, $R_6$ should be of such a value as to provide about 5 or 6 ma. to $CR_1$. $Q_1$ and $Q_2$ are connected in what has come to be known as a Darlington pair. As a first approximation, $Q_2$ can simply be considered as a current amplifier which also raises the base input impedance of $Q_1$ as seen by the collector circuit of $Q_2$. $C_3$ and $R_6$ have been added to eliminate a high-frequency oscillation which occurred due to phase shift within the feedback loop. $C_3$ helps to improve the transient response and $R_6$ has been made variable to provide a means for adjusting the output voltage. $C_3$ reduces the ripple voltage across the reference diode and hence the ripple in the regulator output. The addition of $R_7$ prevents $Q_3$ from being cut off at low output currents.

### Table I

| $E_0$ | $I_{01}$ | $E_{AC}$ | $E_3$ | $E_4$
<table>
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<th></th>
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<td>Volts</td>
<td>Ma.</td>
<td>Ms. R.M.S.</td>
<td>Ms.</td>
<td>Ms.</td>
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<tr>
<td>7.5</td>
<td>300</td>
<td>3.3</td>
<td>75</td>
<td>25</td>
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<td>10.0</td>
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<td>4.2</td>
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<td>30</td>
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<td>35</td>
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<td>8.0</td>
<td>110</td>
<td>90</td>
</tr>
</tbody>
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1. Maximum load current with 115 v. a.c. input.
2. Output ripple voltage at maximum load, 115 v. a.c. input.
3. Change in output voltage as output current is varied from no load to full load with constant 115 v. a.c. input.
4. Change in output voltage with a constant load corresponding to one half of Column 2 as the line voltage is varied from 105 to 125 volts.

### Construction

The only precautions to be observed in constructing this and similar regulators are that the heat-producing elements, such as $R_1$ and $Q_1$, are not in a position to raise heating of the low-power transistors, $Q_2$ and $Q_3$, or the zener diode $CR_1$, and that $Q_1$ is mounted to an adequate heat sink. Several of these units have been built completely within $2 \times 4 \times 4$-inch utility boxes with heat sinks of only $2\frac{1}{2} \times 1\frac{3}{4} - 1\frac{1}{4}$-inch aluminum with completely satisfactory results. The characteristics of one of these units are shown in Table I.

### Other Output Ratings

Changes in the output voltage and or current ratings of the circuit of Fig. 3 can readily be made. As previously mentioned, the lower limit...
Fig. 3.—Circuit of the transistor-regulated supply. Capacitances are in \( \mu \)F, and capacitors marked with polarity are electrolytic. Resistances are in ohms and resistors are 1/2 watt unless indicated otherwise. Except as listed below, circuit designations are for text reference purposes.

**Table 1.** \( Q_1 \) should be fastened to an adequate heat sink and \( Q_3 \) should be changed to a medium-power unit. The current rating can be further increased by paralleling \( Q_1 \) with another similar unit. If this is done, it is a good practice to include equalizing resistors in each of the \( Q_1 \) emitter circuits. The value of this resistor is selected to drop about 1 volt under full load.

**Transistors**

The choice of transistor types used in the circuit of Fig. 3 is not at all critical. Practically any low-power entertainment-variety transistor with sufficient voltage rating can be used at \( Q_2 \) and \( Q_3 \) unless an output current in excess of 200 or 300 mA, is desired, in which case a medium-power unit should be used at \( Q_2 \). \( Q_1 \), of course, is a high-power unit in any case. One word of caution regarding the substitution of other transistor types: \( R_4 \) and \( C_2 \) may require adjustment if the gain-frequency characteristics of the feedback loop are materially affected.

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**28th ARRL Sweepstakes—Nov. 11-13 and 18-20**

Next month *QST* will have the complete announcement of the Sweepstakes Contest. This early announcement is for the benefit of amateurs in remote ARRL sections who will not have received the next issue before Sweepstakes. Refer to November 1960 *QST* for contest details. The rules are the same as last year's contest.

If you are anywhere in the League's field-organizational territory (see page 6, this *QST*) you are urged to take part in this popular contest activity. Although not an ARRL section, Yukon-N. W. T. (YST) counts as a section multiplier in the contest. There are two separate contests, phone and cw. The total operating time allowed each contestant in either contest is 40 hours. There are section awards, and special Novice awards as well. The week-end periods start Saturday afternoon (2300 GMT) on the 11th and 18th of November.

Contest reporting forms will be sent free to anyone requesting them by mail or radiogram. *Get your requests in early.* Check the full details in next month's issue of *QST*. Good luck.
WHEREEE, what a pile-up. Who they calling?
"EP1ZZ de W4 -- K3 -- K1 -- WA -- W5
- K7 -- K-K -- K-"

"Most everybody signed. Where is he? Must be
him under that W1 who's calling. If that's the
EP he's about a 444 here. After that W1 gives up
we'll see. There now--"

"QTH Isfahan -- QSL OK. W4JJK de EP1-
ZZ."

"Maybe that 4 can hear him a little better on
the east coast."

"EP1ZZ de W4JJK -- ur RST 579X in Flor-
ida. Pse QSL -- 73 --"

"Pwv, the roof fell in. Guess he signed. Must
be 40 stations piled on. Wonder how the EP reads
anything. Now if that W8 will give up — ever
hear of a t.t., ya DX clobber — sign 17 times
— good boy — Ahhhhh, our EP —","-

"-- ur RST 569X. QTH — name — 10 watts
m.o.p.a. QSL OK — 73 — W5XXX de EP1ZZ
K."

"Wnder if that 5 hears him any better than
the 4? He's still only about S4 here."

"EP1ZZ de W5XXX -- RST 560X — QTH
— name — PSE QSL QSL."

"Pwv — hit him again. Bigger pile-up than
before. But 560X — wow. Must be an ionospheric
funnel from EP to W5. Or maybe some of those
yahoos just want to be sure to get that QSL —
Gee! Now who's he got?"

"— de EP1ZZ ur RST 590X in Isfahan. QSL
OK. W6YYY de EP1ZZ."

"W6YYY?? My gosh! Old Gus in the next
town. We're getting close to home. How ya read
him, Gus?"

"EP1ZZ de W6YY, Tux. RST 590X in Calif.
— PSE QSL QSL."

"590X! What kind of new listening gear ya
paid over there tonight? I've heard better signals
yelling at umpires. And ya can just barely hear
him here! Oh well — let's get aboard. Snap on the
old Pulverizer and here we go. — EP1ZZ — de
W6ISQ."

"Whoops, guess I signed too soon. Ten guys
still calling. Ahhh, must be him under that K9
— good solid 444!"

"— RST 559X in Isfahan. QSL OK — W6ISQ
de EP1ZZ."

"ME?? — my gosh. What'll I do now? Never
worked through a pile-up like that. What'll I
tell him? Anyone breathe and I'll never hear him
again. I'll never even hear him acknowledge —
so make it good."

"EP1ZZ de W6ISQ. Tux cl. — ur RST —
(careful now, mate! You want a QSL or not?
YY gave him 599X. Maybe the beam isn't
pointing just right — maybe one of the elements
dropped off — maybe had tubes in receiver — no
one ever gives S4! And who ever heard of T4? —

that note can't be that bad. B.f.o. could be a little
fuzzy — maybe atmospheric or something. Maybe
a funny heterodyne. Only a little ten-watt
m.o.p.a. — you used to have one of those things,
remember? Little breadboard hashup — must be
worth at least a 578 — besides you need that EP
card — never even heard one before — Maybe
without all that QRM — Ahhh, that's it —
QRM — he's not 100% readable! — — — — —
— UR RST 499X FB SIG HR. NR. SF — PSE QSL-
QSLQSLQSLQSL 73 — That'll make him feel
good. Now if he'll make me feel good with that QSL."

"— RST 579X Isfahan — QSL OK — W1AW
de EP1ZZ."

"EP1ZZ de W1AW. Tux — RST 455 in Conn
— QSL OK EP1ZZ de W1AW."

"What's the matter with those guys? Must
have the wrong rhombic cranked in — or trying
out one of those 'beginner' two-tube receivers.
Or maybe W1AW already has their EP QSL! My
gosh — that was the loudest EP I heard on
the band all day!"
A Complete Two-Band Station for the V.H.F. Beginner

Part IV—Crystal-Controlled Converters for 50 and 144 Mc.

BY EDWARD P. TILTON,* W1HDQ

Thus far, we have described a simple tuner that will enable the v.h.f. newcomer to get started without a communications receiver, two transmitter r.f. assemblies, a modulator and power supply, and a standing-wave bridge. This final article of the series presents easy-to-build converters that are capable of exceptional v.h.f. performance. They work nicely with the tuner of Part I, and when the builder can afford the step to a good communications receiver, these converters will give him 50- and 144-Mc. reception that will equal almost anything that money can buy.

Noise Figure and Signal-to-Noise Ratio

First, let’s talk about v.h.f. reception generally. The above expressions describing receiver performance are often confused. Noise figure is a mathematical statement of the degree to which a receiver is less than perfect in the amount of noise generated within it. This quality is independent of receiver bandwidth. Signal-to-noise ratio is a measure of the receiver’s ability to respond to weak signals. It is directly related to receiver selectivity, as well as to noise figure. Thus, for optimum v.h.f. reception we need both low noise figure and high selectivity. These converters will give noise figures as low as can be obtained with relatively simple circuits at reasonable cost, but to achieve the best possible signal-to-noise ratio with them requires the highest selectivity that is usable for the mode of operation involved. Our simple tuner is deficient in this respect, obviously. It will give you a good start at low cost, but a good communications receiver that tunes 14 to 18 Mc. will be necessary before you get the full benefit of the fine performance of these converters.

We use a converter to change the very high signal frequency to a lower frequency, where amplification can be done more effectively. This is also done in communications receivers, where a 14-Mc. signal, for example, is converted to 455 ke. or lower frequency, where most of the amplification takes place. Because few communications receivers cover the 50-Mc. band and none cover the 144-Mc. band, we need converters to extend the frequency range of the receivers used on lower amateur bands. Frequency conversion is accomplished by feeding in r.f. energy that will beat with the incoming signal in a mixer stage. The output of the mixer is either the sum or the difference of the signal and injection frequencies. Our 50-Mc. converter has a 30-Mc. crystal oscillator which beats with the signals in the range between 50 and 54 Mc., giving an intermediate frequency (i.f.) of 14 to 18 Mc. Amplification and detection can take place at this frequency, as in our simple tuner of Part I, or the i.f. output can be fed into
a communications receiver capable of tuning 14 to 18 Mc.

In most v.h.f. converters there are one or more r.f. amplifier stages that work at the signal frequency. These are the principal source of the receiving system's sensitivity, as they determine the noise figure of the entire system if they are working properly.

One more basic point before we get to the converter construction. At 50 Mc., noise coming in on the antenna is a limiting factor in receiving ability, even in the quietest locations. Such "antenna noise" is much lower at 144 Mc. This is one reason why we have two tubes in the r.f. amplifier of the 144-Mc. converter and only one in the 50-Mc. model. The latter has more sensitivity than you ever will be able to use, even with a single amplifier stage. The 144-Mc. converter with its two stages just about reaches the point where antenna noise becomes a limiting factor in weak-signal reception.

Both converters use a new type of miniature tube called the Nuvistor, capable of high-gain low-noise amplification in the v.h.f. range. The 6CW4 Nuvistor is also well suited for use in the other stages of the converter, and it is inexpensive and small in size, so we use it throughout both units.

The 50-Mc. Converter

In the first photograph the 50-Mc. converter is at the right. Three 6CW4s are used. The first, a neutralized r.f. amplifier, is in the upper center portion of the picture. At the bottom right is the mixer tube, and to its left is the crystal oscillator. The 36-Mc. crystal is in the left center, and above it is the antenna connector.

Turn now to the circuit diagram, Fig. 7. The tuned circuits $L_4$ and $L_1$, with the small coupling capacitor, $C_2$, are used to give some selectivity in the r.f. amplifier grid circuit. The tuning screws for the coils are visible at the top of the first photograph. Similar circuits are used between the amplifier plate and mixer grid ($L_6$, $L_8$ and $C_8$) and these are at the right side of the top view. The oscillator coil, $L_{0a}$, is in the lower center. The mixer plate coil is in the lower right corner.

Bottom view of the 50-Mc. converter, rotated vertically from the top view. The antenna connector and trap circuit are in the lower left corner.
C1—3-30-μf, mica trimmer.
C2, C3—No. 22 insulated hookup wires 2 inches long, twisted together for approximately 1 1/4 inches.
C4—Same, but 1-inch wires twisted for 1/2 inch.
J1—Coaxial connector, SO-239.
J2—Phono jack.
J3—8-pin plug (Amphenol 86-RC8B).
L1—5 turns No. 18, 1/2-inch diam., 8 t.p.i. (B & W No. 3002).
L2—10 turns No. 28 enameled, close-wound on 1/4-inch iron-slug phenolic form, tapped at 3 turns, 0.65 to 1.3 μh. (Miller form No. 20A06CRB1).
L3, L5, L6—8 turns No. 28 enameled, close-wound on 1/4-inch iron-slug phenolic form. Range 0.43 to 0.85 μh. L5 set for 0.64 μh, L6 for 0.68, L5 for 0.73 μh. (Miller coils No. 20A687B1). L2 and L3 are 1/4 inch apart c to c. L1 to L5 is 1/4 inch. L1 to L6 is 1/2 inch.
L7—No. 32 enam., close-wound 1/4 inch on 1/4-inch iron-slug phenolic form; 3.8 to 8.5 μh., set for 6.9 μh. (Miller coil No. 20A686B1).
L8—Universal-wound coil, 4.7 to 10 μh., set for 7.9 μh. (Miller coil No. 20A826B1).
L9—8 turns No. 32 enam., close-wound on 1/4 inch iron-slug phenolic form; 0.67 to 1.25 μh., set for 0.94 μh. (Miller coil No. 20A106B1).
Y1—36-Mc. crystal (International Crystal Mfg. Co. FA-5).

The neutralizing coil, L4, is mounted horizontally, with its adjusting stud coming out of the side of the box. The i.f. output connector is in the upper right corner of the top view.

The trap circuit, L1C1, is optional. Its purpose is to absorb Channel-2 video signals that might cause interference to 50-Mc. reception, as a result of the second harmonic of the oscillator (72 Mc.) beating with a Channel-2 TV signal. (72 = 14 = 58) Unless you are near a Channel-2 TV station you will not need the trap, and the connection from J1 can be made directly to the tap on L2.

The bottom view of the converter is inverted vertically from the top view. The antenna connector and the trap circuit are in the lower left corner. To the right are the coils L2 and L3, and the i.f. output connector. Near the middle is the r.f. amplifier socket, and in line with it at the top is the mixer socket. The crystal oscillator tube socket is at the upper left. The oscillator plate coil, L5, and the mixer grid coil, L6, are in the same plane to the right. Directly below L6 is the r.f. plate coil, L4. The i.f. output coil, L5, is in the upper right corner, connected through a shielded lead to the output connector in the lower right. The neutralizing coil, L4, is just above the latter, with its tuning screw projecting through the side of the box.

The coupling capacitors, C3, C5 and C6, are made by twisting insulated wires together to form small capacitances where needed. This is a convenient and inexpensive way of doing the job, and since the values are not particularly critical, the twisted wires serve just as well as a fixed or variable capacitor of conventional design.

Power is taken from the 150-volt and 6.3-volt sources in the power supply described last month. The 8-pin power plug, J3, is mounted in the side of the converter case. It should be positioned so that it will line up with the socket on the side of the tuner, or the similar socket on the modulator, if the tuner is not used.

### The 144-Mc. Converter

The 144-Mc. r.f. amplifier uses two 6CW4s instead of one, and an oscillator-multiplier system is needed for developing the injection voltage for the mixer. Hand-wound coils are used in the r.f. circuits, instead of slug-tuned coils. The first amplifier is a neutralized triode stage, as in the 50-Mc. converter, but is followed by a grounded-grid stage, in the manner of the familiar series-cascade v.h.f. amplifier. The crystal oscillator works on 43.353 Mc., and drives a crystal-diode frequency tripler to 139 Mc. This injection frequency beats with signals at 144 to 148 Mc. in the mixer, producing an i.f. of 14 to 18 Mc., as before.

Looking at the top view we see the r.f. amplifier and mixer tubes in line vertically at the right side of the converter. The crystal oscillator is at the lower left. The capacitor C4, which tunes the diode tripler circuit, is in the lower center of the picture. Just above is a grommet inserted in the hole over the trap capacitor, C6, of which more later. The antenna connector is in the...
middle of the top portion, and the i.f. output connector is in the upper left.

The bottom view was made by rotating the unit vertically, so the antenna connector appears at the bottom. The first amplifier grid circuit, $L_1C_1$, is in the lower right corner. Above it is the neutralizing coil, $L_2$, mounted on the side of the box. The two tinned-wire coils side by side just above and to the right of center are for the amplifier plate, $L_3$ and mixer grid, $L_4$. To their left is the trap circuit, $C_6L_6$, tuned to the second harmonic of the oscillator, 86.67 Mc. The coil with its axis at right angles to these is $L_5$. It is tuned to 130 Mc by $C_6$, which appears in the upper center of the picture. The oscillator plate coil, $L_6$, and the mixer plate coil, $L_5$, are in the upper left and right corners, respectively.

**The Diode Multiplier and Trap Circuits**

Frequency multiplication with crystal diodes may be new to many readers, but it is a simple and effective way of developing injection voltage in the v.h.f. range. Diodes do the job easily, and at less cost than a vacuum tube. The crystal works at low impedance, so it is connected between a loop ($L_1$) around the oscillator coil and a tap on the tuned circuit $L_6C_5$. The latter should be fairly high-$C$, so that the desired harmonic, in this instance the third, will be accentuated, and other harmonics of 43.3 Mc, suppressed.

There will be some energy at unwanted harmonic frequencies passed on to the mixer grid circuit. The trap, $L_5C_4$, is inserted in the lead to $L_4$ to suppress the second harmonic, 86.6 Mc. As with the Channel-2 problem in the 50-Mc converter, this trap circuit need be included only if local interference makes it necessary. In the Hartford area an f.m. station just above 100 Mc. rode through around 14.2 Mc. ($100.8 - 86.6 = 14.2$), but the trap removed the interfering signal completely when tuned to twice the crystal frequency. Removing the offending harmonic from the mixer circuit was the best way of handling the problem. A trap in the antenna circuit to absorb the interfering signal was tried but it resulted in a slight deterioration of the converter noise figure at 144 Mc.

**Construction**

The converters are built in aluminum Mini-
boxes, 3 by 4 by 5 inches in size. The Nuvisor sockets have small metal tabs that are bent down against the underside of the chassis to provide grounding. These are clamped under washers by 4-10 screw-washers and nuts on opposite sides of the sockets. The socket hole should be ⅝-inch diameter, with small notches filed out for the tabs. The ceramic trimmers in the 144-Mc converter, C₁, C₂, and C₃, also require notched holes.

Leads in r.f. circuits should be as short as possible. Power wiring can be placed for neatness, but keep insulated power leads close to the chassis. Use terminal strips for holding resistors in place, and lugs bolted to the chassis for grounding.

**Adjustments**

The crystal oscillator is checked first. The meter in the bridge unit described last month, or any other 1-ma. meter, may be used to measure oscillator plate voltage, or a voltmeter will serve if you have one for the 100-volt d.e. range. To use a 1-ma. meter, connect a 100,000-ohm resistor in the positive lead and ground the negative lead. It is not important for this purpose that the 1000-ohm resistor shown in Fig. 6, Part III, be included.

Working on the converters is easier if a 3-wire power cable with suitable plugs is used, rather than plugging the converters directly into the tuner or power unit. Tests may be made with all tubes in their sockets, as the dropping resistors in the plate leads prevent excessive current. Apply power to the converter. Touch the free lead of the 100,000-ohm resistor to the B-plus end of the oscillator plate coil. The meter indicates 100 volts d.c. for full scale. The voltage reading obtained will depend on whether the tube is oscillating or not. The oscillator current runs through a 10,000-ohm resistor, so the more current the tube draws the lower the voltage will be. When

Fig. 8—Schematic diagram and parts information for the 144-Mc converter. Resistors ½ watt unless specified. Fixed capacitors are ceramic unless specified. Decimal values in μF, others in μF.

C₁, C₂, C₃—1-7.5-μF, ceramic trimmer (Centralab 829-7).
C₄—4-30-μF, ceramic trimmer (Mallory ST-554-N).
C₅—20-μF, miniature variable (Hammarlund MAC-20).
C₆—0.001-μF, button-type bypass (Centralab ZA-102).
Do not use disk-ceramic or other wire-lead capacitors for these points.
C₇—No. 22 insulated hookup wires ⅛ inches long, twisted together for approximately 1 inch.
C₈—Crystal-diode rectifier. Most available types will work: DR-303, CR-710 and 1N34 tried.
J₁—Coaxial connector, SO-239.
J₂—Phone jack.
J₃—8-pin plug (Amphenol 86-RCPB).
L₁, L₂—6 turns No. 18, ⅛-inch diam, ½ inch long. Tap at 2½ turns.
L₃—5 turns No. 28 enameled, close-wound on ¼-inch iron-slug form. Range 0.24 to 0.41 μH, set for 0.33 μH. (Miller coil No. 20A337RB).
L₄—6½ turns No. 18, ⅛-inch diam, ½ inch long.
L₅—5 turns like L₁, ½ inch long, tapped at 2 turns. L₁ and L₄ are parallel, ⅛ inch apart, c. to c.
L₆—Universal-wound coil, 4.7 to 10 μH, set for 7.9 μH. (Miller coil No. 20A826RB).
L₇—9 turns No. 28 enameled, close-wound on ¼-inch iron-slug form. Range 0.58 to 1 μH, set for 0.82 μH. (Miller coil No. 20A827RB).
L₈—1½ turns insulated hookup wire around L₆.
L₉—8 turns No. 18, ¼-inch diam, ½ inch long.
the circuit oscillates, plate current drops, and the indicated voltage rises.

Use of Ohm’s Law will tell you what the plate current is, though this need not be found except as a matter of interest. With the core stud all the way up, the circuit probably will oscillate, and the meter indication will be around 0.7 (70 volts). Turn the stud into the coil, watching the meter. It will rise to around 0.9 (90 volts) and then drop suddenly as oscillation stops, to around 0.5 (50 volts). These represent actual plate currents of 8, 6, and 10 ma., respectively.

Readings may vary considerably from the above, due to differences in crystals and other parts. The important points are the gradual rise (increasing vigor of oscillation) and then the sudden dip as oscillation ceases. Set the slug for the highest reading (lowest oscillator plate current) at which the oscillator will start each time power is applied. The frequency can be checked with a calibrated wavemeter or grid-dip meter. It should be the frequency marked on the crystal, and no other.

The 50-Mc. converter is now ready to receive strong signals, as soon as it is connected to the receiver or tuner. The latter has a cable and plug for connection to the i.f. output jack, \( J_2 \). To use a communications receiver, make up a cable of any small coax, putting a phone-pin plug on one end. The other end connects to the receiver antenna terminals. This may require a coax fitting for some receivers, but most have screw terminals. Connect the inner conductor to the antenna terminal and the outer sheath to the ground terminal or the receiver chassis. Do this with the shortest possible leads, to keep down pickup of signals at 14 Mc.

Now a 50-Mc. signal is needed. This can be from a grid-dip oscillator, a nearby 50-Mc. station, the harmonic of your transmitter, or ideally, a good signal generator. For any except the last, connect some kind of antenna to \( J_1 \). A short piece of wire will do at first, and the length can be varied to suit the strength of the signal. Set the stud in \( L_4 \) at about the middle of its range. Next, peak the screws in \( L_2, L_3, L_6, L_4 \) and \( L_5 \) for maximum signal strength. Now disable the r.f. amplifier stage by disconnecting the 10,000-ohm resistor from \( L_6 \), or by removing the heater lead from Pin 12 of the socket. Adjust \( L_4 \) for minimum signal. Replace the heater or plate voltage and readjust all coils except \( L_4 \) for maximum signal again.

The converter should be close to optimum performance if everything has been done properly up to this point. If the Channel 2 trap is used, adjust it so that no interference is heard from the local TV station. If the station is very near by, it may still be heard as long as the cover is off the converter case. It should disappear when the case is assembled. Recheck the adjustment of \( L_5 \) and \( L_2 \) after final adjustment of the trap.

Further work to improve weak-signal reception should be done with a noise generator, though satisfactory results can be obtained on weak signals if the work is done with care. The aim should be better signal-to-noise ratio, rather than merely greater signal strength. This will not be noticeable with the simple tuner, but it can be achieved with a communications receiver as the i.f. system. Using the receiver S meter, or the audio sound of a weak signal, tune for maximum signal with respect to noise.

As a final check, put a 50-ohm resistor across \( J_1 \). Observe the noise level. Now remove the resistor and put on an antenna system with 50-ohm feed. If the noise rises appreciably, you are hearing the external noise that limits your v.h.f. reception. The only improvement you can make from here on is to put up a bigger or higher antenna, or move to a quieter location.

Adjustment of the 144-Mc. converter is similar, except that the multiplier tank circuit, \( L_6 C_9 \), should be adjusted for maximum signal. External noise may not be discernible in quiet locations on 144 Mc., and the antenna check outlined for 50 Mc. may be inconclusive. Adjustment of all r.f. circuits should be made carefully for greatest margin of signal over noise, using weak signals. The minimum-signal method of adjusting the neutralizing coil, \( L_2 \), should be followed initially, but readjustment for optimum signal-to-noise ratio (or lowest noise figure, using a noise generator) may produce a worthwhile improvement. Do not use the second-harmonic trap, \( L_6 C_4 \), unless it is necessary to eliminate f.m. interference, as this circuit introduces one more variable to complicate the adjustment procedure.

In most areas 2-meter activity is spread over more of the band than is the case with 50 Mc. The converter response can be made uniform across most or all of the band by tuning the i.f. output coil, \( L_6 \), for maximum response near the high end or middle of the band. This coil affects only the gain of the converter; detuning it does not reduce the signal-to-noise ratio. The r.f.

(Continued on page 164)
PARAMETRIC AMPLIFIER FOR 432 MC.

A simple modification of the 1296-Mc. parametric amplifier described in January, 1961, QST will make a parametric useful on 432 Mc. A small change in the dimensions of the idler cavity, and an increase in the length of the signal cavity with a corresponding change in the coupling loops of the signal tank are all that one needs for a 432 amplifier.

After one understands the construction of the 1296-Mc. parametric, he can adapt the following changes. First, the idler cavity is changed to 2.3 centimeters in length. Next, the signal tank must be changed to 9.4 inches in length by 2 inches wide and 11.2 inches in depth. The center conductor is 3/8-inch brass tubing. Heavy brass is recommended for construction of the signal tank.

The coupling loops were made with about 3/8 inch of the loop wire parallel to the center conductor of the signal cavity. Provisions were also made to adjust the coupling loops. The tuning screw at the center of the signal cavity has a 3/4-inch disk soldered to the end of it. There is also a 3/4-inch disk soldered to the 3/8-inch center conductor. The screw and disk arrangement provides necessary signal tank tuning. The method of bypassing the half-wave signal tank center conductor at each end is the same, but the bypass plates were made larger to provide some additional capacity. The point at which the diode couples to the half-wave signal tank has been changed to 3 centimeters instead of 0.8 centimeters, see Fig. 1.

This should result in more reliable communication with stations over 200 miles away.

—Gordon Sager, WSUST

715B TUBE DATA

The 715B tetrode is a popular surplus tube but little information on its base and ratings can be found. The base diagram for the tube is shown in Fig. 2. The tube requires a standard Johnson socket (No. 124-234-1). Plate dissipation is rated at 50 watts and the filament requirements are 26 volts at about 2 amps. Typical operating voltages are plate 1500 and screen 300. The plate current should be held to 125 ma.

—Robert L. Peck, W9MOW

HOLE SIZE FOR TAPPING

The article in June 1961 QST, by Deane concerning “Screws, Nuts and Things” failed to mention that one can find the correct drill size for a hole to be tapped by subtracting the turns per inch of the screw as a fraction from the screw size. For example, if a machine screw has 32 threads per inch, then you would use a drill 1/32 of an inch smaller than the o.d. of the screw. This rule seems to hold true on all American screws because the threads are as wide as they are deep and it makes no difference if the threads are coarse or fine.

—Rev. Lyall Sherrod, K0DEU

VERSATILE MARKER

A small tube of quick drying ink can be used to good advantage around the ham shack. The tube has a felt wick which feeds out the ink and is shaped so that a broad or narrow line can be drawn. The ink, which is available in a variety of colors, adheres to just about any surface, and so can be used for writing on chassis, color coding components, wires, etc. More elaborate combinations of ink and pen points are available at the larger office and art supply stores, so that if one has a steady hand the ink tube can be used for panel marking.

—Alex F. Burr, K5NKK
CABLE RETAINER

The photograph shows an inexpensive wiring harness retainer suitable for holding down cables to wood or metal surfaces. The device was originally used to hold wiring harnesses in General Motors cars. It is only necessary to drill a hole which will accept one of the protruding tips of the strap and plug this tip into the hole. The strap is then wrapped around the cable and snapped into place by the remaining tip. There are several holes in the strap so that various sizes of cable can be accommodated. For wood mounting, cut off one of the tips and secure the strap to the wood with a wood screw and flat washer. The retainer can be obtained from almost any General Motors dealership for about 15 cents each. The GM part number is 3750535.

— Donald R. Kloie, K8JQV

WORKLIGHT

A small useful work light for lighting up cramped quarters can be made from an old filament transformer, a plastic tube and a flashlight lamp. The sketch in Fig. 3 shows the hookup. Although the 117-volt cord may seem a nuisance at first, it solves the problem of flashlight batteries which seem to go dead just when they are most needed. The plastic tube and the isolation transformer insure against shorts when you are on a “live” set.

— Wilfred Tritz, K9DLD

AIR WOUND COIL MOUNTS

The sketch in Fig. 4 shows how to mount commercial air wound coils, such as the Miniductor and Air-Dux types. The mount uses rubber faucet washers on aluminum brackets.

— Ronald E. Winther, W1GHT

EMERGENCY ALLEN WRENCH

When I was trying to remove the main tuning knob from my receiver I discovered that it had an Allen set screw and that I didn’t have an Allen head wrench. I tried a square-point wire nail for a tool and it worked fine! When I replaced the dial, I used a pair of long-nose pliers to tighten the screw via the nail wrench.

— Bill Jacobs, K5WTA

EMERGENCY COAX CONNECTOR

Face to face with an immediate need for a connector to mate with an SO-239 connector, I found that an Amphenol 75-PC1M microphone connector had the same thread and could be easily modified to do the job. The only thing I had to do was solder a piece of heavy wire or thin tubing to the center conductor of the microphone plug so that it would make contact with the center conductor of the SO-239. The r.f. characteristics of this connector are probably not the best in the world, but the connection is a positive one and a good scheme to remember when nothing else is readily available.
Official Results —
1961 ARRL International DX Competition

The lush years of the sunspot cycle are over, but DXers for sure haven’t thrown in the towel. Old Sol and his sunspots didn’t provide the cooperation we were beginning to get used to on the higher bands, but competition was still keen. The 10-meter letdown particularly crippled the low-power boys’ chances, for there was once a time when a few watts to a bent clotheshanger would pull ‘em in on that band. The less hardy of our fraternity might have tossed in the sponge, but most DXers keep right on pitching nevertheless. Ten meters on the West Coast still proved to be a godsend in many cases though, as the “Countries Worked” chart indicates. Better get those 50- and 160-meter antennas up though — pronto!

C.W. Highlights

Watching the 28-Mc. conditions W3DAO noticed: “Several 28 Mc. was wide open, but the DX stations were few and far between. I wish the DX stations would keep a closer check on these so-called ‘dead’ bands, so that they can get more multipliers and the W/VEs can get more too.” Two fledgling go-getters chorused: “Your editorial (Feb. 1960, QST) was right. This contest can be fun with low power,” from K2OFD, and from K7JCA: “My peanut whistle really surprised me.” From the DX side of the fence KR6LY said: “This contest gets bigger and better every year despite the declining conditions.” And the down-under contest giant VK2GW expressed that “conditions were patchy and not quite as good as last year, especially 28 Mc. Plenty of activity noted from stateside when the bands were open, and hope that will last through the thin times ahead.” And PA6LOU said it for everyone with: “Watch for me next year, conditions or no conditions, I will be in there again; I can’t help myself.” Amen!

The big splash this year on both phone and c.w. was the Kure DXpedition, KH6ECD (full story in August QST). This hot tip was announced both in QST and by W1AW bulletin. Although the KH6 call had a lot of the gang wondering what the excitement was all about, it did count for DX in the contest. A real “nice going” applause to the KH6 boys who really livened things up with a new country on in the contest.

Random comments on the c.w. contest ran along these lines. “As 1 grow older I wonder why I do this. However, as 0000Z rolls around I still get the same ‘spooky’ feeling, and once more the competitive urge comes flying through. As always a wonderful contest.” — W6IBD. “Jr op arrived 7th March. Hope to try again next year — DX Contest, I mean!” — VR1B. “It was enjoyable being at the other end of the path. Quite different from my K7ADD days.” — 1X1NJ. “My most interesting experiences were determining the identities of the stations I worked. Some of them signed their call within ten minutes, very good.” — W1VG. “At one of those rare moments when everyone on the frequency stood by at the same instant, I had the unusual experience of hearing my own signal bounced back from somewhere ‘W9HNN W9HNN K’ — I’m positive it was my own signal ReST 530.” — W9HNN. And here’s a maxim by W3EPR that seems to hold a good deal of truth: “In general, your signal strength is proportional to how long you have to wait in line, i.e. the longer you wait, the weaker is your signal.” Logs bear out that South and Central American participation was up again considerably on phone and c.w., thanks perhaps to our Spanish-language...
contest announcements sent to our neighbors to the South in droves.


On the DX side of the ledger, all the entrants are to be congratulated for a job well done. Thanks to all the DX stations for making the contest a success. These single operators posted the highest scores: KV4AQ 144,080, CE1AD 375,125, K8AMTV 367,029, VK2G9 309,264, KW6DG 288,072, PY4GA 247,680, VK5AB 242,221, HK7ZT 217,179, YN3AB 204,177, CE9AG 204,600, VK3AJ 200,880, VP7NT 185,745, K9PAQY 161,650, JA1VX 160,590, PY8ADA 157,263, YV5AVS 151,146, ZLING 143,605, YN1AA 130,101, U9LDF 125,734, ZL2PM 120,600, HK3AII 120,105, F8VJ 108,650, VR2DK 107,530, ZKIAR 105,612, E4LA 101,724, G2QT 100,320. And thanks to these multi-ops for really passing out the contests: KH6ECD 336,861, KG9BB 188,265, KH6JM 128,498, ZS9PTA 103,824.

OX3NK really worked hard at the contest, deriving transmitter power from this FOOT GENERATOR, pedaling out 584 c.w. contacts with 50 watts ... which really takes some doing! Not only that but the receiver used 6-volt batteries charged by a Windcharger, a wind-driven generator. "Ole" modestly gasped after the contest, trying to catch his breath. "It was a hard job taking part in the contest, but under the special conditions very interesting." Want to try "cranking out" your power for 45 hours?
Though mourning the poor February weekend c.w. conditions, DJ3KR led Germany on both c.w. and phone with 99,640 and 33,750 points respectively. "Jorge's" chief peeve is the guy who repeats his number three or four times after sending him a 599200.

Phone Highlights

Let's face it. In the phone section you either work sideband or you can't score high... that's why the ARRL DX Contest has never restricted itself to any one brand of voice work, because one never knows what will be best tomorrow. So all flavors of phone work have been encouraged... sideband, a.m., n.f.m., or whatever you choose. This seems to be the best procedure for then you can use whatever method gives you the most contacts. And right now it's definitely sideband. This year's top phone scorer K2GXI points it out with: "There is no doubt that the big news in this year's contest was the tremendous swing to s.s.b.: 75%; of my 20-meter contacts being on s.s.b. -- this figure floored me after determining it, almost unbelievable." Concurring comments speak for themselves: "Ninety-live per cent of contacts made on s.s.b." -- W3CTF. "But all one QSO on s.s.b." -- W3LEZ. "Without s.s.b. I couldn't have made the score I did." -- W3GKS. "For the first time in the DX test, there were more s.s.b. 7-Mc. phones than a.m. phone, a good sign." -- W2FYT. Perhaps the listening comments in the contest announcements in December and January QST encouraged the use of contact s.s.b., but more likely it's just becoming the preferred method of phone work.

Other choice comments about the phone contest included: "When I have to take 50DX100 as a number twice, I am really digging deep." -- W3ECK. It really paid off though, as Bob won EPA honors. Said K06DL: "A big hand for the best phone operator of them all, K5LAX. His system was most efficient and reduced QRM beautifully." "Enjoyed intense competition in my first ARRL venture. What a bellum of DX!!" -- K4CRX. "What a way to work new countries."

-- K0QCL. "Conditions were FB on 21 Mc. March 5. During one hour of operation I worked 99 W VEs, probably a USSR record." -- UR2AR. "This is the first time I have entered an international contest. My reaction to the new experience: When is the next one coming?" -- LU5DIF. Well put, Jorge... many share your opinion!

Faring out well in the score department were these single-operator W stations: K2GXI 246-1, W9EWC 196,535, W1ONK 189,761, W3ECK 164,088, W3DHM 162,537, W3CTJ 140-792, W4QCW 133,950, K6EVR 127,148, W9NZM 125,979, W9DUZ 120,632, W3FQF 119,574, W4OM 101,160, W3ZOK 101,001, W1ONK 100,772. Top Canadian scorer was VE3BAM, 47,762. Highest scoring multiple-operator stations were: W1ETB 281,389, W3BES 200,090, W8NWO 192,885, W8NOG 160,000.

Highest scoring single-operator DX stations produced these fine scores: K4PAV 283,037, KBSBGC 202,605, O6IRZ 117,855, HICAKA 90,104, 831BIA 91,728, PLAX 79,352, UR2AR 75,424, F7FB 73,188, P3AA 69,600, IK1KZ 62,640, K4PAW 60,624, L4UDAB 60,564, XE2DS 57,564, KZ5DF 56,826, KW5DC 55,095, TG1HC 54,250. KH6ECD caused the beehive bands to buzz with a multi-op score of 225,018.

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Club Scores

<table>
<thead>
<tr>
<th>Club</th>
<th>Score</th>
<th>C. H. Winner</th>
<th>Phone Winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frankford Radio Club</td>
<td>1,432,400</td>
<td>W3ECK</td>
<td>W3ECK</td>
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<tr>
<td>Palomar Valley Radio Club</td>
<td>1,324,618</td>
<td>W4YHD</td>
<td>W4YHD</td>
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<tr>
<td>Southern California DX Club</td>
<td>1,267,221</td>
<td>K4CRX</td>
<td>K4CRX</td>
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<tr>
<td>Northern California DX Club</td>
<td>1,205,388</td>
<td>W6DXA</td>
<td>W6DXA</td>
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<td>Lake Success Radio Club (N. Y.)</td>
<td>1,164,997</td>
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<td>Connecticut Wireless Assn.</td>
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<td>W6CH</td>
<td>W6CH</td>
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<tr>
<td>Northern Frontier DX Assn.</td>
<td>1,104,327</td>
<td>W6GTL</td>
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<td>Milwaukee Radio Amateurs' Club</td>
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<td>southeastern DX Club (Ga.)</td>
<td>1,062,924</td>
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<td>1,046,190</td>
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<td>Rochester DX Assn.</td>
<td>1,043,730</td>
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<td>Order of Holled State of New Mexico</td>
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<td>San Diego DX Club:</td>
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<td>W4WQ</td>
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</tbody>
</table>

* W3M1F, op.; / K2LWR, opr.
Forty phone is K2GXI's favorite hangout, but during contests Bob searches for contacts on all bands as his score soars higher... 443 exchanges for 246,078 this year for top U.S.A. phone score, thanks to a 40-meter 2-element rotary, stacked above a 4-element tribander, and a "V" for 75—all homebrew. Bob also credits s.s.b. for bringing up his score.

The Clubs

The race for the top spot was ever so close. The Frankford Radio Club beat out their Potomac Valley rivals by the thickness of this sheet of paper. Sixty-eight scores contributed to the Philadelphia-area boys winning effort, and another esoclobo gaved to the victors. Third was the Southern California DX Club, getting sweet revenge over the Northern California DX Club who beat them out the two previous years. Moving up from 20th last year to fifth this year was the Lake Success Radio Club, forging ahead of other highflying clubs, Connecticut Wireless Assn., Niagara Frontier DX Assn., and the Milwaukee Radio Amateurs' Club.

Certificates

Certificates are issued to each ARRL section leader on phone and c.w. and to each single-operator leading a country. A multiple-operator certificate is awarded to the highest scorer in ARRL section or country from which three such entries are received. Here's how many certificates are going out to happy recipients as a result of this year's fracas:

c.w. phone
Single-operator, W/AWE ........... 64 61
Multi-operator, W/AWE ........... 3 0
Single-operator, DX ......... 81 56
Multi-operator, DX .......... 4 0
Club ................................ 20 10

Congratulations to all these certificate winners.

Disqualifications

The following are deemed ineligible for score listing or awards. In each case disqualification under contest rule 14 was in view of non-observance of FCC rules as reported by at least two accredited Official Observers, or by a single FCC citation. Such violations as out-of-band operation, phone splatter outside band edges, unauthorized A2 emission, etc. were the criteria for these disqualifications: C.w. — W4KXY, W4MC, W6AB, K6JT; Phone — K2DGT, WA20JD, W9GAI.

The following is an unarranged list of Call, Frequency (M.C.), Calls worked, and Country Totals.

<table>
<thead>
<tr>
<th>Call</th>
<th>List 5 M.C.</th>
<th>List 7 M.C.</th>
<th>List 10 M.C.</th>
<th>List 20 M.C.</th>
<th>List 50 M.C.</th>
<th>List 100 M.C.</th>
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<td>W5DQ</td>
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<td>W2GBV</td>
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<td>W5WT</td>
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<td>W3BOG</td>
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</tr>
</tbody>
</table>

* Multi-operator

Top phone DXer this year is KP4AVQ with 293,037 points via 1716 QSOs and 57 multiplier. Tom, ex-W5GVP - KG1DJ - DL4DJ, finds Puerto Rico "the best location I have seen for DX, as well as the climate being as beautiful as the señoritas." Tom also organized and participated in the May 1961 VP5CD DXpedition.

October 1961
# PHONE SCORES

## ATLANTIC DIVISION

<table>
<thead>
<tr>
<th>Eastern Pennsylvania</th>
<th>W2FXN</th>
<th>7,100-58-105</th>
<th>C -</th>
<th>W2JAR</th>
<th>16,754-48-98</th>
<th>B -</th>
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<tr>
<td>W2QKJ</td>
<td>8073-39-69</td>
<td>B -</td>
<td>W2MDM</td>
<td>1388-41-26</td>
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<td>C-52</td>
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<td>W2VDB</td>
<td>568-14-14</td>
<td>A-7</td>
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</tbody>
</table>

## Western Pennsylvania

| W3KX1               | 248,078-83-143 | C-88 |
| W2QVI1              | 38,100-40-1614 | C-10 |
| W2OYJ1              | 18,323-91-86 | C-10 |
| W3NJT               | 7146-83-66 | C-58 |
| W2SU1               | 8100-40-43 | A-8 |
| W2SYU1              | 915-15-21 | A-3 |
| W2VAN1              | 270-9-10 | B-15 |
| W2VDP1              | 1963-7-9 | C-2 |

## Central Pennsylvania

| W3PEP               | 3702-27-36 | C-9 |

## Illinois

| WONZM               | 102,657-147-267-73 |
| W2PVV1              | 15,166-58-89 | R-32 |
| W2WYE1              | 21,711-83 | C-51 |
| W2QKJ               | 4698-29-54 | C-21 |
| W2VDD1              | 8412-18-18 | B-4 |
| W2VNC1              | 585-15-15 | A-12 |
| W2KSN1              | 105-7-9 | H-2 |
| W2QHQ1              | 70,200-110-213 | C-63 |

## Indiana

| W4QY1               | 41,94-91-151 | C-35 |
| W2ZQ                | 12,240-81-126 | B-44 |
| W3FC               | 11,712-94-90 | C-15 |
| W3QDD               | 6,557-42-5 | B-15 |
| W3WJ                | 6,758-11-55 | B-6 |
| W3MCO               | 2,578-65-84 | C-5 |
| K5CHW               | 2,258-25-30 | A-19 |
| W4NWX               | 3,890-22-30 | A-18 |
| W4uvo               | 75-5 | B- |
Announcing 1961 Simulated Emergency Test

October 7-8, 1961

You may not realize it, but about the time you read this your local ARRL Emergency Coordinator (if he's on the ball) will be planning his part in the annual Simulated Emergency Test exercise. This traditionally signals the opening of the super-active season of amateur operation in public service circles: emergency preparedness and traffic handling. Actually, there is no longer a summertime hiatus in either of these activities, but inevitably they slow down as vacations and poor atmospheric conditions arise. By October, vacations are over, conditions are improving (we hope), and amateurs are staying at home eager to do some operating.

The SET, in addition to "paying off the lid" of the active season, serves two primary purposes: first, to test our emergency potential and capability, and second, to give a public demonstration of our abilities. The former is for our own information, the latter for public information. Naturally, they follow the same order—that is, if your AREC group is poorly organized, you will not want to make a big public show of it, but if you have something of which to be proud you will want to emphasize the publicity angle.

Your local Emergency Coordinator (if any) will have received a bulletin from headquarters giving full details on what is expected of him. But he can do nothing without support from local amateurs. This is where you come in. Here's how you can participate:

(1) If you aren't already signed up in the AREC, see your local EC and get this taken care of. If you don't know who he is, inquire around of other amateurs in town, the local club, or your SCM (p. 6, QST). If it turns out there is no EC, it's time to get some of the local boys together and do something about this.

(2) Although we like to have all AREC groups conduct their SET on the Oct. 7-8 weekend, it is perfectly permissible for ECs to have their tests within a month either before or after the nominal weekend. Your EC may be planning some time other than the above dates, so better check with him.

(3) During the test, follow your EC's instructions. Don't foul up the procedure by being independent. If you don't like what goes on, this can be brought up during the critique after the test.

(4) The EC has a report to make after the test. You can help provide him with something worth reporting by showing up, going along with the spirit of the thing and showing your interest in a continuing AREC organization in your community or county.

(5) Even though you may find yourself, for any one of a number of reasons, unable to take part in your local test, you may still be useful on one or more of the National Calling and Emergency Frequencies by relaying or handling some of the traffic that may be flying around for Red Cross, civil defense and others. Give a listen, anyway.

Some big doings are planned this year by some of the Section Emergency Coordinators. We have word of extensive plans, for example, in Florida and Indiana, and watch out for statewide exercises also in Maine, Michigan, Kansas, Oklahoma and Texas, where AREC organization is at high pitch.

Mark your calendars and be with us on Oct. 7-8! — W1NJM.

——

Strays

Re the Stray on page 10 of June QST (about gear still in use which was built from articles in QST many years ago), W0PB sends in this photo of a wavemeter that was described in May, 1928, QST by former ARRL president Dr. E. C. Woodruff. It uses a Carborundum crystal detector that still works.

——

Hammy wedding. K21UC married W2YYW's daughter. K2KXB was best man. Ex-W2JDI was the groom's father. Wedding guests included W2ABI.

——

North Carolina hams interested in a source of free QSLs should contact Mr. Charles Parker, North Carolina Department of Conservation and Development, Raleigh, N. C.
A.F.C. with Silicon Capacitors for RTTY Reception

BY NICHOLAS G. MUSKOVAC, K1RYY

This article will describe a relatively simple a.f.c. circuit designed to be used for RTTY frequency-shift keying operation. It does not use vacuum tubes, transistors, or amplifiers of any kind.

Any RTTY operator who sits with one hand on the timing dial of his receiver will appreciate the addition of automatic frequency control. This little circuit will take care of any drift in your receiver as well as the other fellow’s transmitter drift.

**Principle of Operation**

Fig. 1 shows a schematic diagram of the a.f.c., complete with all values. Two tuned circuits, which use 88-mh. toroids, set the locking frequency. One is tuned 125 c.p.s. above and the other 125 c.p.s. below the frequency to be controlled. I chose the space frequency, 2975 c.p.s., since the Qs of the tank circuits will be higher than on the mark frequency of 2125 c.p.s. However, the circuit should operate just as well on either frequency. CR1 and CR2 are silicon diodes and are used in a discriminator circuit. By using a d.p.d.t. switch, the diodes can be switched back and forth so that the control will operate whether the b.f.o. is above or below the intermediate frequency.

The tuned filters and discriminator section can be mounted on a small board and built into or near the terminal unit. The rest of the circuit, which consists of four small components, can easily be mounted in the receiver. A shielded cable should be used between the discriminator output and the receiver in order to eliminate 60-cycle pickup. The input signal is coupled directly from the filter in the terminal unit.

C3 and C4 are silicon capacitors commercially available. C1 and C2 are 88-mh. toroids. The values given are calculated for 88-mh. coils. Use good-quality 0.03-µf. paper capacitors and paralleled with low values to tune circuits to desired frequencies. C1, L1, and C2, L2 should be tuned to equal numbers of cycles above and below 2975 c.p.s., respectively.

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**Fig. 1**—Circuit diagram of the audio a.f.c. circuit. Capacitances are in µf., resistances are in ohms, resistors are 1/2 watt. Capacitor with polarities indicated is electrolytic; except as indicated below, others may be paper or ceramic as convenient. Terminals A-A' and B-B' should be connected by a shielded lead. Circuit in lower drawing should be installed close to b.f.o. coil in receiver. The discriminator can be external to the receiver.

BT1—Two penlight cells in series.

C1, C2—Values given are calculated for 88-mh. coils. Use good-quality 0.03-µf. paper capacitors and paralleled with low values to tune circuits to desired frequencies. C1, L1, and C2, L2 should be tuned to equal numbers of cycles above and below 2975 c.p.s., respectively.

C4, C5—Capacitor diodes; see text (Pacific Semiconductor Varicap type PC113-22).

CR1, CR2—Silicon diode 1N2069 (Texas Instruments) or 1N1692 (G.E.).

L1, L2—88-mh. toroid (see text).

S1—S.p.s.t. toggle.

S2—D.p.d.t. toggle (for reversing control voltage).
known as “Vari-caps.” They are actually silicon diodes, and have the familiar forward and reverse characteristics. To eliminate conduction in the forward direction from the voltage present in the tank circuit, two capacitors are used back to back. The diodes are biased in the reverse direction by the d.c. control voltage. The capacitance decreases with increasing control voltage and increases as the control voltage decreases. It varies essentially as $1/\sqrt{v}$, when $v$ is the control voltage.

Whenever the frequency of the input signal to the a.f.c. unit tries to change, the discriminator bridge goes out of balance and a corrective voltage is applied to the voltage-sensitive capacitors. This causes the b.f.o. to shift frequency automatically until the correct beat note is obtained.

Performance

The frequency regulation obtained with this unit has been more than satisfactory on all bands. The amount of frequency drift that it can correct is limited only by the passband of the receiver. I use the Heathkit Comanche, which has a 3-kc. passband. The other fellow’s transmitter can drift 1500 c.p.s. before I lose copy on my teletypewriter!

The a.f.c. is especially useful on the higher bands. While a member of a ten-meter net in Cleveland, Ohio, the author, recently K8DXY, had no trouble getting solid copy while relaxing or making a pot of coffee.

The a.f.c. unit just described can be built in less than two hours and costs about $10.00. The whole thing is powered by two penlight batteries that have to furnish only microamperes of current and should give shelf life. The Vari-caps used are rated at 22 $\mu$F at 4 volts, and have a capacitance change of 3 to 4 $\mu$F per volt. Any other type with the necessary capacitance range can be used. The required sensitivity in $\mu$F per volt may differ somewhat with different b.f.o. circuits — e.g., whether the b.f.o. tank is low-C or high-C — and the intermediate frequency. However, it is recommended that the circuit as given be tried first. If more sensitivity is needed, parallel Vari-caps can be used. Another possibility is to use 1.5 instead of 3 volts bias. This will move the operating point to a region where the capacitance change per volt is greater, but the capacitance itself is also greater — of the order of 40 $\mu$F.

In either case, the effect of the shunt capacitance introduced by the voltage-sensitive capacitors must be taken into account since it has considerable bearing on whether or not the b.f.o. can be returned to the proper frequency after adding the capacitors.

• New Apparatus

Mobile Window-Bracket Antenna

A new mobile antenna that requires no holes for mounting, yet can be assembled or taken apart without tools in less than one minute has been introduced by Technical Industries, Inc., Woodbridge, New Jersey. It has a natural application for emergency, C.D. or temporary operation, since it can be set up in such a short time, but is easily disassembled and stored in a small area.

The accompanying photograph shows how the antenna is attached to the aluminum bracket arm which extends up and over the roof of the car. Below the arm is another aluminum fixture that clamps to any of the car’s window without hampering normal door movement. The two pieces of the clamp are held together with two thumb screws. The clamp is adjustable to fit over different thicknesses of glass, and there is no danger of cracking or scratching the glass, since the clamp is lined with soft rubber. The over-all height from the bottom of the clamp to the horizontal arm is about 22 inches. The arm reaches over the roof about 30 inches.

Attached to the end of the horizontal arm is a n.h.f. “through” fitting. The coax feed line (which is furnished with the antenna) connects to one end of the fitting and the antenna connects to the other. A quarter-wave two-meter antenna is shown in the photograph, but models for 6 meters and 1½ meters are also available. The antenna can also be mounted on vehicles without roofs, such as convertibles, fire engines and boats, and can even be set up in a motel or hotel window.

The antenna and bracket assembly weighs about 4 pounds.

— E. L. C.
A Filament Choke for Grounded-Grid Amplifiers

Impedance measurements on various suggested designs of filament chokes for grounded-grid amplifiers showed rather poor performance on one or more bands in the 3.5-30 Mc. range. This situation prompted a bit of lab work, leading to the design shown in this article.

By Kenneth C. Lamson, W2ZIF

With grounded-grid linear amplifiers becoming more and more popular, there is increasing need for a good filament choke. A typical circuit configuration for a grounded-grid amplifier using a filament choke is shown in Fig. 1. The choke should offer sufficient impedance to elevate the cathode above ground potential for r.f. and, at the same time, be made of heavy enough wire so that there is negligible loss of filament voltage in the choke. This means that in a choke for tubes such as the 4-250, P6680, P6659, and 4-400—which draw approximately 14 amperes of filament current—No. 14 or heavier wire should be used. Correspondingly smaller wire can be used for tubes that take less filament current. Two chokes can be paralleled in applications which require larger current-carrying capacities.

As shown in Fig. 1, a choke of this type is inserted in series with the filaments of the grounded-grid stage. The input impedance of a grounded-grid amplifier is usually in the range of 100 to 400 ohms, depending on the type of circuitry and tube being used. If the data for the tube in grounded-grid operation is available, the input impedance can be calculated from

\[ Z_{in} = \frac{(\text{peak r.f. driving voltage})^2}{2 \times \text{driving power}} \]

This impedance, which is that of the tube or tubes alone, is purely resistive when the plate circuit is properly tuned. However, it is shunted by the impedance of the filament choke, and since the choke impedance will be principally reactive, it is desirable that the choke reactance be as high as possible compared with the tube impedance. Considering the practical aspects of choke construction for a wide frequency range, such as 80 to 10 meters, experiment shows that a choke inductance of about 45 µH. is about as much as can be obtained. This is high enough for satisfactory operation on bands as low in frequency as 3.5 Mc.

The problem is to get the required inductance with the minimum wire length. Obviously a core material with high permeability is desirable, as this yields the most inductance for a given coil. Ferrite cores lend themselves nicely to this application, as they have high permeability and are available in various diameters. The choke can have a bifilar winding; that is, two wires wound side by side on the ferrite core. The enamel coating used on the wire provides sufficient insulation to prevent shorting between turns.

A well-designed wide-range choke will usually have its greatest effect on the input impedance at the lower amateur frequencies, simply because its reactance decreases with frequency. If the driving power is marginal, it may be necessary to use some type of matching network to match the output impedance of the driver to the input impedance of the amplifier. Any one of several methods can be used, the pi-network probably being the most flexible.

1 Use of a core of the type shown in the photograph was suggested by Henry A. Voorhees, W4CPJ.

Bifilar filament choke using ferrite core. When mounted in place, the choke is supported off the amplifier chassis by the ceramic insulators on the ends.
Construction

Construction of the choke shown in the photograph is straightforward and fairly easy. Two side-by-side 58-inch lengths of No. 14 wire are wound on the \(\frac{1}{2}\)-inch-diameter ferrite core. The core material, available in \(\frac{3}{8}\)-inch lengths, is Lafayette Radio type MS-333, Catalog No. 600. An over-all length of only 6\(\frac{1}{2}\) inches is needed. The core may be used intact, but the excess can be cut off by first securing the complete circumference of the core with a hacksaw or file, and then sharply but gently striking the core at that point. The ferrite material should break clean. For those who are not quite so daring, the much more tedious method of sawing the core with a hacksaw is recommended. The core should be covered with a single layer of Scotch electrical tape, and then the 36 turns of wire should be wound on tightly. All that remains to be done then is to fasten the wires to the three-lug bakelite terminal strips mounted at the ends of the ferrite rod. These terminal strips are held in place by \(\frac{3}{8}\)-inch cable clamps (Allied Radio 41-853, Cinch-Jones CC-161-6, or Herman Smith 855). The whole choke assembly is supported by two cylindrical ceramic standoff insulators (Millen 31007) which in turn mount to the amplifier chassis.

The impedance components of the choke at various ham-band frequencies are given in Table I. This choke will have adequate impedance to raise the filament of a directly-heated tube above r.f. ground potential on all bands from 80 through 10 meters. It is the best of several designs tried experimentally. Larger inductance (more turns) will result in higher reactance at the lower frequencies, but is accompanied by a deterioration in performance at the high end. The high-frequency range can be extended by decreasing the number of turns, but at the expense of too-low reactance at 3.5 Mc. The choke is self-resonant between the 7- and 14-Mc. bands.

### Table I.

<table>
<thead>
<tr>
<th>Frequency in Mc.</th>
<th>Shunt Resistance, Ohms</th>
<th>Shunt Reactance, Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50</td>
<td>28 K</td>
<td>1300 (inductive)</td>
</tr>
<tr>
<td>3.50</td>
<td>70 K</td>
<td>2200 (inductive)</td>
</tr>
<tr>
<td>14.0</td>
<td>100 K</td>
<td>8000 (capacitive)</td>
</tr>
<tr>
<td>21.0</td>
<td>100 K</td>
<td>3200 (capacitive)</td>
</tr>
<tr>
<td>28.0</td>
<td>75 K</td>
<td>2700 (capacitive)</td>
</tr>
<tr>
<td>Q at 3.50 Mc. = 32.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown by Table I, the equivalent parallel resistance of the choke is high throughout the frequency range. This means that the actual r.f. power loss in the choke will be negligibly small, since even the smallest value of shunt resistance is of the order of 50 to 100 times the input resistance of the amplifier tube or tubes. Thus in the worst case the choke dissipates only about 1 or 2 per cent of the driving power.

### New Apparatus

**Bartley Wire Stripper**

The Bartley wire stripper is a new tool which should find many applications around the ham shack. Resembling a pair of pliers, it can be used to strip wire in restricted or crowded areas where conventional strippers are useless. The wire to be stripped is positioned lengthwise in the jaws of the tool. With the jaws clamped shut by pressure on the tool handles, pulling back on the finger ring between the handles in turn pulls back a cutting blade, stripping the insulation from the wire. A spring returns the cutting blade and ring to their original positions.

The standard model will strip wire sizes 16 through 26. The tool frame is made of aluminum alloy and measures about 9 inches long. It is manufactured by the Bartley Manufacturing Co., Inc., P.O. Box 707, Rome, New York.

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E. L. C.
THE BACKFIRE ANTENNA

Electromagnetic Radiation Lab.
Electronics Research Directorate
HQ, Air Force Cambridge Research
Laboratories
Bedford, Mass.

Technical Editor, QST.

The "Technical Topic" in February, 1961 (QST), discussing novel possibilities using the "Backfire Antenna" principle for amateur work, prompted us to supply some further experimental data on this topic.

We agree with W1HDQ that there is no easy method for increasing the gain of Yagis and that the backfire method is no exception. However, it is a method that works, and we were able to increase the gain of a 1-wavelength Yagi, at 220 Mc. by 4.5 db., by placing it in front of a screen 2 wavelengths square. It must be emphasized again that you do not simply place the Yagi ahead of the screen without some modifications. This will be discussed later, but first it will be necessary to introduce a different aspect in Yagi design.

In analyzing a Yagi there are many variables that must be considered: element and boom diameters, spacing and length of elements, etc. To make an orderly investigation, it is necessary to have the least number of variables possible. This is what Dr. Ehrenspeck set out to do in his article, "A New Method for Obtaining Maximum Gain from Yagi Antennas," PGAP, Vol. 7, IRE Transactions, October 1959. He does this by making the element spacing constant and by fixing the length and diameter of the elements. The length and diameter of the elements are related to the wavelength of the Yagi and to the phase velocity desired. Thus, when Dr. Ehrenspeck conceived the idea of the backfire antenna, he used data from the above report. The work discussed in this letter makes use of both the "Backfire Antenna" report, Proc. IRE, Vol. 48, pp. 109-110, January, 1960, and the above article.

In the design of the 220-Mc. Yagi, a constant spacing of 4.2 wavelengths was used between elements throughout, to fix this variable. Experience with another Yagi fixed the element diameter at % inch and the boom diameter at % inch. This leaves the length of the elements as the only variable. The major difference between an ordinary Yagi and the one discussed here is the addition of linear reflectors. Linear reflectors referred to here are two reflector elements, added above and below the normal position of the reflector element, as seen in the photograph. The purpose of these is to trap the wave and cause it to be reflected back to the ground screen. The more times a wave can be reflected between the ground screen and the linear reflectors before it is launched, the greater the gain will be.

Starting with the linear reflectors and the driven element mounted in position on the boom, adjustment of the reflectors for best forward gain was made. Then directors were added, and their lengths were adjusted for an optimum pattern. The Yagi was then mounted in front of the screen, thus effectively doubling its length and changing its phase velocity. This made readjustment of the directors, driven elements and linear reflector lengths necessary. The driven element was fed through a 900 to 3000-ohm variable balun, mounted in the back of the screen. The balun was connected to the driven element through a pair of RG-59/U cables, using the shielding as ground and the center conductors connected to the balun halves. Below are dimensions of a Yagi antenna designed for 220 Mc.; the elements are % inch and the boom % inch in diameter.

When this Yagi was used with the screen, it was necessary to adjust the length of the elements to correct the phase velocity (refer to Ehrenspeck's PGAP article listed above). The dimensions for the backfire version of the Yagi are shown below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven</td>
<td>47.5 inches</td>
</tr>
<tr>
<td>Directors</td>
<td>41.5 inches</td>
</tr>
<tr>
<td>Spacing</td>
<td>20 inches</td>
</tr>
<tr>
<td>Reflector</td>
<td>45.5 inches</td>
</tr>
<tr>
<td>Linear reflectors</td>
<td>45 inches</td>
</tr>
</tbody>
</table>

Patterns taken with the antenna alone and with the reflecting screen, show that with the screen gain increased by 4.5 db. Also, the beam width decreased from 48 degrees to 24 degrees when the screen was used. Although the first side lobes increased 6 db., the back lobe (150 degrees from peak) went from 6 db. to 19 db. below the main beam.

Some work has been done with a 2-wavelength array at 220 Mc., and as time permits, other frequencies will be tried. The photographs show the 2-wavelength Yagi with a screen 2 wavelengths square.

—William G. Macriod, W1YLF
Leon S. Door, W1P1T

NOTES ON CRYSTAL MIXERS

14 Barclay St.
Brooklyn 7
New York, N. Y.

Technical Editor, QST.

In scanning the catalogs of semiconductor manufacturers, the amateur u.h.f., worker may gain the impression that low-noise mixer crystals have made vacuum tubes obsolete at 432 Mc. and paved the way for noise figures of 6 db. at 3000 Mc. or more. On the other hand, the crystal mixer has reportedly failed to live up to its promise of improved performance when tested under typical amateur operating

(Continued on page 174)

QST for
A Junk Key

BY KATASHI NOSE, KH6IJ

Lihue, Kauai, Hawaii

This bug was first built when I could not afford a real bug. All parts can be bought at Sears and Roebuck for 80¢ plus $1.00 worth of binding posts from a radio store. Even then, you end up with some spare parts.

Main Shaft and Spring

For about 35¢ you get eight jig saw blades of high quality steel, Sears Roebuck Catalog No. 9-2087. If these are unavailable, specifications are as follows: 0.08 inch wide, 0.010 inch thick, four inches long, 18 teeth per inch. You need only one blade, but you have to buy a package of eight, which means you have seven spares in case you are the type to break bug springs.

The plumbing department furnishes the rest of the material. For 25¢ get a piece of soft-drawn 1/4-inch copper tubing 8 inches long used in toilet overflow systems. While there, get three rubber bumpers for mounting feet and a piece of soft copper ground strapping used to ground electrical systems to water pipes.

Cut off 5 inches of the tubing, insert the jig saw blade into one end pin and all, and crimp tightly with a pair of pliers. Make the trunnion by pounding a finish nail or apple-crate nail through the tubing, but be sure to start the top side with a drill to prevent flattening of the tube. The soft drawn copper will grip the nail tightly without necessity of soldering. Cut off the head of the finish nail at an angle with side cutters. Scotch tape a wooden spoon tightly to the copper shaft to serve as a paddle.

Bearing and Stop Arm

The bearing consists of two pieces of ground strapping. Clamp these pieces in a vise when drilling the two holes to get good alignment. At the same time make a slight dent with a center punch or nail to serve as pivots.

This bug differs from the ordinary bug in that there is no solid vibrating rod nor an offset arm for dashes. Instead, a long stop arm of No. 14 copper wire or solder is bent parallel to the spring blade to dampen excess vibration. This damper arm must top the weight directly, not the jig saw blade.

The binding posts are mounted on three-ply board which is mounted on rubber feet. Alternatively, suction cups used on toy bow and arrow sets can be used for grip action.

Adjustment Hints

Use about three inches of ordinary rosin core solder wrapped around the blade as a weight. Be sure it is wrapped tightly as any play will ruin the action. Heavier weights are not suitable for this spring stiffness.

The return mechanism is merely a rubber elastic band wrapped around the shaft as shown in the drawing below.

Adjust all binding post stops and contacts for minimum wrist action, i.e. close spacing. In general, the object is not to see how long a string of dots can be sent but how solid the dots are. After about ten dots, the dot contact should close and stay closed until another train is started.

Try to develop a "light touch". If you find yourself chasing the bug across the table, you are working too hard. If necessary, scotch tape the whole key to the table.

Thanks to K1MMB for a newcomer’s evaluation and to W1RCQ for an old timer's opinion. For less than $2.00 you can’t go wrong.

October 1961
E-Z-UP Antenna for 75 and 40
Simple Construction for Inverted-Vee Dipoles

BY JOHN C. ALLRED,* W5LST

Full-size dipoles for the 75- and 40-meter bands occupy more space than is conveniently available on the 75 by 113-foot lot at W5LST. The increasing popularity of the "drooping," or inverted-vee, dipole antenna among amateurs led us to investigate it for our somewhat crowded conditions. Based on the electrical design of Glanzer,1 this system has performed meritoriously at W5LST. Requiring only one support, it was surprisingly easy to erect, gives a satisfactory s.w.r. over the phone bands and, importantly, the cost was less than thirty dollars complete. A plan-view sketch is shown in Fig. 1.

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Fig. 2—The mounting for the antenna mast. The 9-foot pipe is guyed temporarily while the concrete is poured.

such as those used on chain-link fence, secure the mast to the upright standard. During erection, these clamps are loosened and all three lie at the base of the standard, so that the mast need only be lifted about 6 inches to be put in place. When the mast is in place, the clamps are raised and tightened.

Rigging

Except for the antenna conductors, all rigging is of nylon line of 500-pound test. A halyard is reeved through a pulley of suitable size which is wired securely to the top of the mast. The two ends of the halyard are made fast to a harness snap which, in turn, supports the center of the

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*Associate Professor of Physics, University of Houston, Houston, Texas.

antennas. Provision of this halyard has proved to be a great convenience in permitting inspection of the antenna connections and the adjustment of tension in the wires without the necessity for lowering the mast.

Nylon line has a tendency to ravel at its ends but this problem is easily solved. Most fastenings were made with two half-hitches, followed by sewing the end of the line to itself with thread, as shown in Fig. 3A, and doping with one of the quick-drying model-airplane cements.

Some weeks after the initial installation, it became apparent that some additional stabilization of the mast against occasional strong northerly winds would be desirable. Accordingly a nylon line was run from the harness snap at the top of the mast to a convenient anchor in the back yard, which happened to be the top of the children’s swing set. Experience seems to show that the antenna wires, together with the additional nylon line, stabilize the mast against aerodynamically-excited vibration, without any appreciable strain on the antennas.

**The Antennas**

As shown in Fig. 3, the two antennas are connected in parallel at the top of the mast. The lower ends are connected to convenient tie points so that the two legs of a given antenna are more or less in a straight line. To our great surprise, very little effect is produced by moving the ends of the antennas either horizontally or vertically. There is apparently negligible electrical interaction between them as indicated by the s.w.r. bridge.

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**Strays**

You can get a series of awards from the Old Old Timer’s Club by working various numbers of their members. A Class D award is for working 25 OOTC members anywhere, while a Class AA award is for working 100 OOTC members in 50 states. Send a list of QSOs, certified by notary public, or two other hams, or a club official, to Earl C. Williams, W2EC, 507 Wayside Rd., Neptune, N. J. Include $1.00 fee.

Perhaps some of you have noted the items concerning K6BX and his campaign to ship old Callbooks overseas. Actually, what he does is collect the names of worthy recipients, and if you tell him you have one or more fairly recent Callbooks, he’ll give a suitable number of names to which you can ship the Callbooks. Now we have T/Sgt. Pete Smith, K9VRV/4, 1940 Richmond Ave., Petersburg, Va., who’d like to do the same thing but with ARRL Handbooks.

KN9ZUC perked up his code speed while away at college by maintaining regular skeds with his dad, W9YMZ.

K5RJC has fooled a lot of people into thinking he has a phenomenal memory, because when he works them the second time he is able to call them by name immediately. He uses a call index, as shown in the drawing above, the over-all size of this index being about 5 by 8 inches.
Half-wave filters for the 3.5- and 7-Mc. bands. The switch lets the user select either filter as required, and also has a "straight-through" position for cases where the filters are not needed. The two coils and three capacitors at the right are the components of the 80-meter filter; similar components at the left are for 40 meters. Note positions of coils to reduce coupling between them.

A Novice Three-Band Antenna System

Coaxial Feed with Harmonic Protection

BY LEWIS G. MCCOY, W1IICP

A sample antenna system for Novice three-band operation, 80, 40 and 15 meters, can be made up by paralleling two dipoles. The two dipoles are 80- and 40-meter half-wave-length wires both fed at the center with coaxial feed line. The antenna is shown in Fig. 1. Practically all Novice transmitters have pi-network output tank circuits and are designed to work into 50-ohm loads. This antenna system will present essentially such a load to the transmitter. If there is a mismatch, it can easily be handled within the adjustment range of the amplifier controls.

The only serious drawback to this type of system is that unless certain precautions are taken, there is always the danger of harmonics being radiated, which can result in a warning from the FCC. However, this is easily taken care of by the use of a filter inserted in the feed line. The filter requires no adjustment; it is switched in or out as required for whichever band is used.

The Antenna

The antenna is made up from a 100-foot length of open-wire TV-type transmission line. Either the close-spaced 300-ohm type or the widely-spaced (about 1 1/2 inches) 450-ohm line can be used. The 80-meter portion is actually longer than 100 feet (120 feet over-all), but the extra length can be obtained from the wire you remove for the 40-meter antenna. When you buy the open-wire line be sure to measure the length — in the roll we bought we found that instead of 100 feet there were actually 101 feet. Cut the line in the center and scrape the enamel insulation from all four ends. Don't be deceived by the appearance of the wire: it does have an enamel covering, so be sure to remove the enamel before making any connections. When the wire ends are cleaned they can be fed through the ends of the center insulator. Fig. 2 shows the details for making the feed-line connections to the center of the antennas.

Next, remove enough wire from each side of the open-wire line so that you end up with a dipole 33 1/2 feet long each side of the center insulator (67 feet over-all), as shown in Fig. 1. You'll find that if you use a pair of side cutters you can easily break the wire-spreader insulators of the open-wire line. However, only remove those insulators beyond the 33 1/2-foot point. The remaining insulators are needed to keep the 40-
and 80-meter dipoles from shorting to each other. Using the wire you have removed, you can add enough at each end of the 100-foot length to make up the 80-meter dipole. This should be 60 feet long each side of the center insulator, or 120 feet over-all when completed. However, allow about six inches length at each end (121 feet over-all) on the 80-meter antenna, the extra six inches for wrapping around the end insulators. Be sure to scrape the enamel covering from the wires at the ends when you add the extra lengths. Solder all connections. Put on the end insulators and the antenna is completed.

When you install the antenna, make every effort to get it as high as possible above the ground. If possible, install pulleys to raise and lower the antenna. Nylon 1/4-inch-diameter line makes excellent halyard material.

**The Half-Wave Filter**

The filter unit shown in the photograph and Fig. 3 consists of two filters, one for 80 and another for 40. The cutoff frequency for the 80-meter filter is approximately 5 Mc. It will attenuate any signals higher than 5 Mc, but permit your fundamental signal to reach the antenna without being attenuated. This, of course, means that 80-meter harmonics won’t be able to reach the antenna and cause you trouble with the FCC. The 40-meter filter cutoff frequency is about 9 Mc, so it will take care of any spurious signals above this range. There is no point in adding a 15-meter filter to the unit because if harmonics from this band are going to be a problem, a low-pass filter should be inserted in the line. A low-pass filter usually has a cutoff frequency slightly above 30 Mc, and any harmonics above this range will be attenuated. In other words, the harmonics that could cause TVI should be handled with a low-pass filter.

**Making the Filter**

The filter is built into a 3 x 4 x 6-inch aluminum chassis. The four coils required for the two filters are made from a single length of Mini-duo coil stock, No. 3015. When cutting the coils from the original stock, allow a couple of extra turns on each coil. These extra turns can then be unwound to provide sufficient lead length for attaching to the terminals of S1. Two phono jacks are used for connectors on the filter. If desired, the more expensive coax chassis fittings, type 80-230, can be used.

The leads from the jacks to the terminals on S1 are made with coaxial line, type RG-58/U, the same as used for the antenna feed line. Remove the black vinyl covering from the coax, exposing the outer braid. When making the connections from the jacks to the switch, keep the exposed inner conductor lead as short as possible. This is done in order to reduce any harmonic pickup around the filter sections. In other words, all the signal should go through the filter, with minimum leakage around it. Ground the outer braid of the coax at the jack end and also at the switch end. The switch end can be taken care of by installing a soldering lug as close as possible to the switch contact and grounding the shield.
C1, C2—750-μuf. mica.
C3—1500-μuf. mica.
C4, C5—500-μuf. mica.
C6—1000-μuf. mica.
J1, J2—Phono jacks or coax chassis fittings.
L1, L2—2 μh; 8½ turns No. 20, 1-inch diam., 16 turns per inch.
L3, L4—1.2 μh, 6 turns No. 20, 1-inch diam., 16 turns per inch. (All four coils can be made from a single length of B & W Miniductor, type 3015).
S1—Rotary, 2 sections, 5 positions, 1 pole per section (Nallory Hamswitch type 1511).

at the solder lug. The coils and capacitors for the 80-meter filter are mounted on one side of the switch and the 40-meter unit on the other side. The coil sections should be installed as shown in the photographs in order to reduce any stray pickup between the two filters. In addition, the switch sections are single-pole, five positions each. Only three of the positions are used — filter out, 80 meters, and 40 meters. In order to reduce any chance of pickup between the switch contacts, alternate contacts are used for the connections. In other words, the first contact is the straight-through position, then an unused contact, and then 80 meters. In addition, the unused contacts are grounded to the chassis. A bottom plate should be installed on the chassis in order to make it "r.f. tight."

**Using the System**

Use a short length of coax to connect the filter to the transmitter. The filter can be installed at any convenient place at the operating position. Then connect the feed line to the filter and the system is ready for operation.

Incidentally, the circuit works the same in both directions, so it doesn't make any difference which side of the filter is used for input or output.

Switch your transmitter to whichever band you want to use and also switch the filter to the same band. For 15 meters, the filter is set in the straight-through position. It is very important that you switch the filter when you change bands. If, for example, you tune up your rig on 80 with the filter switched to 40, you'll more than likely burn out the capacitors in the filter. You must remember to have the filter and transmitter on the same band!

Several measurements were made on the two dipoles to see what they "looked" like on the different amateur bands. On 80 and 40 meters, the antennas were resonant in the Novice bands, using the lengths shown in Fig. 1. The standing-wave ratio was less than 1.5 to 1 at resonance on both bands and remained fairly flat across the Novice segments of the bands. On both 80 and 40, the s.w.r. rose to about 5 to 1 at the band edges (3500-4000 and 7000-7300). The s.w.r. was about 3 to 1 at the lowest point when the system was used on 15. However, this is well within the tuning and adjustment range of nearly all Novice transmitters. When you pass your General you'll find that the same antenna can be used on 10 meters, as our tests showed the s.w.r. to be no worse than 4 to 1 at the band edges, dropping to less than 2 to 1 at the best frequency. On 20 meters, the system wasn't satisfactory, as it showed a high s.w.r. (over 5 to 1) across the band.

All of the above-mentioned tests were made with the antenna 30 feet above the ground and in the clear. Thanks go to Carl Dane, W1FXK, for furnishing the refreshments, swimming pool, and his vacation time while making these tests.

**Silent Keys**

It is with deep regret that we record the passing of these amateurs:

W1VVG, George F. Houtin, Salisbury, Mass.
W2PQ, John W. Conn, Middletown, N. J.
W2JICW, James T. Mahy, Brooklyn, N. Y.
W2NP, William G. Mayer, Asbury Park, N. J.
W2NOC, Harold S. Schecht, Catskill, N. Y.
W2VSE, Anthony G. Noll, Niagara Falls, N. Y.
K3GJH, Woodrow W. Schier, Fort Howard, Md.
W3NOQ, James C. Landerkin, Towson, Md.
W4AP, Robert G. Carrie, Montgomery, Ala.
W4LNX, Minor C. Wagner, Norfolk, Va.
W4TMO, General E. Pilgrim, Forest City, N. C.
W4VYS, James S. Williamson, Jr., Sanford, Fla.
W5DXI, Victor George, Haworth, Okla.
W5JHN, James E. Clayton, Conway, Ark.
W6VDR, Roger D. Loop, Livermore, Calif.
W6UD, Reginald T. Dunlap, Los Angeles, Calif.
K7BYW, Arthur E. Hudson, Renton, Wash.
W8PNT, Arthur G. Hubert, Oak Park, Mich.
KBVDA, Oscar Store, Cleveland Heights, Ohio
W9MWT, Clarence J. Coote, Joliet, Ill.
W9VRO, William W. Vincent, Jr., Kenosha, Wis.
W4EIAK, Gordon M. Arthur, Halifax, N. S., Canada
VE1JE, J. E. Garnham, Charlottetown, P. E. I., Canada
VE1RL, Gordon C. MacDougall, Antigonish, N. S., Canada
VE2KJ, P. A. LeBel, Montreal, Que., Canada

56 QST for
An “Ultra-Linear” Modulator

The “ultra-linear” circuit, widely used in high-quality audio power amplifiers, has its uses in plate modulation, too. The circuit reduces distortion and improves regulation while retaining the high power output and sensitivity of Class AB1 audio-tetrodes and pentodes.

Tapped-Screen Circuit for Pentodes or Tetrodes

BY ROBERT M. VOSS,* W2HTN

The ultra-linear mode of operation has been successfully used in the output stages of high-fidelity audio amplifiers for the past decade or so. This type connection, shown in Fig. 1, has been described as a means of applying power feedback around a stage of power amplification. It is recognizable as a method of operation which is somewhere between triode and pentode. The screens are connected to a tap on the output (or modulation) transformer and — unlike pentode operation — thereby deliver some power to the load, but not as much as they would if the tube were triode connected, with the screen tied directly to plate. The connection shown in Fig. 1A is most frequently used. The separate windings shown at B are necessary if the tube requires substantially different plate and screen voltages. Transmitting tubes, such as the 6146, have been used successfully this way.

Ultra-linear operation, also known as “tapped-screen” — perhaps this term would be preferred by amateur operators — has been shown to exhibit substantial advantages over both triode and pentode operation, particularly when used with tubes designed for it. It combines the high power output of pentode operation with the

* 697 West End Ave., New York 23, N. Y.
Fig. 1 — Tapped-screen power-amplifier circuit. (A) As used when the same d.c. voltage can be applied to both screen and plate, (B) As used when different plate and screen voltages must be used.

low distortion and low output impedance of triodes. In addition, compared with pentode operation it is unenlightened of the load into which it works, and is somewhat more efficient overall, since the screen is contributing power to the load and not just producing heat. Because of this, substantially higher screen voltages and maximum-signal inputs than shown in maximum rating charts for pentodes can be used.¹

These characteristics make tapped-screen operation ideal for modulator service, and tubes are available which will deliver anywhere from 5 to 100 watts in tapped-screen push-pull. The problem, however, is finding a suitable modulation transformer, since none to the best of our knowledge has been designed for tapped screens.

Having come into possession of an old Scott Laboratories audio amplifier, with its mounted tube sockets, husky power transformer and handsome chrome chassis, and possessing an extra pair of Genalex KT88s as well, we decided to tackle the problem.

Multimatch transformers seemed the best solution, and, after investigation, it turned out that the Stancor A-3893 was perfectly suited to matching both the 4000-ohm plate-to-plate load and the 40 per cent screen-tapping requirements of the KT88s.² In addition, the power transformer already in the amplifier, when used with silicon rectifiers in a conventional full-wave capacitor-input circuit, delivered precisely the plate voltage required by the tubes. Of course, any other arrangement that is capable of supplying 250 volts, and has an ICAS rating of 200-250 ma., may be used.

The final circuit is shown in Fig. 2. Aside from the output stage, the circuitry is entirely conventional, with great pains taken to avoid hum and r.f. in the audio circuit. The resistor shown shielded is connected directly to the microphone connector, with its body inside the connector, and is bypassed as closely as possible to the other side of its body. The additional shunting cu-

¹The screen input under quiescent or no-signal conditions must still stay within ratings. — Editor.

²The 40-percent figure — i.e., screens tapped across 40 per cent of the primary turns — is in the optimum region for most tubes, and except for some rather special requirements that are of interest in high-fidelity amplifiers but not in amateur communication, is not highly critical. Values between about 25 and 50 per cent will result in developing maximum power output with relatively low distortion. — Editor.

Fig. 2 — Modulator and speech-amplifier circuit. Capacitance are in µf.; resistances are in ohms, resistors are ½ watt, except where indicated otherwise. Capacitors with polarities marked are electrolytic; others may be paper, ceramic or mica as convenient.

CR₁—CR₅, inclusive—Silicon rectifiers, 600 volts inverse peak, 750 ma. (Sarkes Tarzian F-6).
I₁—Dial light, 6.3 volts.
J₁—Microphone connector, shielded.
J₂—Octal socket (A male connector is preferable to avoid exposed voltages on mating plug).
L₁—Filter choke, 1 henry, 250 ma. (Stancor C-2326 or equivalent).
R₁—0.25-megohm composition control, audio taper.
R₂—50,000-ohm, 2-watt composition control, linear taper.
T₁—Multimatch modulation transformer, 60 watts. Numbers on circuit refer to Stancor A-3893 transformer. Output winding shown connected for 4000-ohm load.
T₂—Power transformer; 750-760 volts c.r., 200-250 ma.; 6.3 volts, 5 amp. (such as Stancor F-8170); 3-volt rectifier winding not used.
T₃—Filament, 6.3 volts, 0.6 amp.
Capacitors serve both to bypass any remaining r.f. and, with the coupling capacitors, to shape the frequency response for good communications quality.

The volume, balance, and bias controls are all screwdriver-adjustment potentiometers, since it is assumed that they will be set only once. The balance control should be set for maximum output or, preferably, for equal voltages at the output tube plates with a signal of 800-1500 cycles fed to the input. The bias should be adjusted for 100-mm total cathode current at zero output. The volume control should be adjusted for only the largest occasional plate-current flicker on loud voice peaks. (The modulator has been used quite successfully with a clipper preceding it. This increases talk power considerably.)

All power and output connections, as well as the output-tube cathodes, are connected to an octal socket at one end of the modulator. This is connected to the transmitter via a single 6-conductor cable so that the modulator need not be left on the operating table nor connected by a tangle of wires. Make sure that the leads going to the modulated r.f. stage can handle the sum of both the d.c. voltage to the final and the peak audio, which is equal to twice the d.c. At the operating position, the cathode connection may be used with a d.c. milliammeter to monitor the modulator cathode current or may be grounded by either the antenna relay or the standby-transmit switch. The transmitter's meter can be used by replacing the meter switch with one having one more position.

Curves of output vs. load resistance are shown in Fig. 3. The dotted portions of the curves should not be used, since distortion will rise in these regions. The modulator will deliver 10 watts into any load from 500 to 10,000 ohms, and 50 watts into loads from 500 to 750, 1300 to 2000, and 2500 to 6000 ohms. Almost all 50-120-watt transmitters will be matched somewhere in this range.

The under-chassis view of the modulator shows a shielded cable running under the chassis from the octal socket to the 12AX7, and another shielded cable running in parallel with the output cable. After the pictures were taken, we found that we could eliminate neither the r.f. in the modulator nor the audio feedback with this arrangement, so we mounted a microphone connector right beside the 12AX7, bypassed it as described earlier, and ran a separate microphone cable.

The modulator is at present being used by W2JYQ, to whom thanks are due both for assisting in the tests and for permitting the author to modify his transmitter for plate modulation.

Fig. 3—Power output vs. load resistance for the amplifier shown in the photographs, measured at 1000 c.p.s., using multimatch modulation transformer with primary connected as shown in Fig. 2. Secondary connections as follows: A, load to terminals 7 and 10; B, load to 7 and 10; C, load to 8 and 11; D, load to 7 and 11, 9-12 joined.

October 1961 59
Performance Tests on the Big Wheel
2-Meter Array

Stacking Information and Results with Omnidirectional Antennas

In September QST W1HJD and W1FVY described a novel omnidirectional array for 144-Mc. mobile or fixed-station work. These fellows are now engaged in ice research in the Far North, and there was not sufficient time for them to complete tests on stacked versions of the antenna before their scheduled departure, so the writer gladly took up where they left off. As is usual when one tries to get to meaningful numbers in connection with amateur antennas (and by amateur methods) this turned out to be no mean task.

On-the-air results are all that really count in evaluating the worth of antenna ideas for amateurs. Precise measurement of pattern and gain are all but impossible, but if an antenna "has what it takes," protracted use of it under many differing conditions will show its superiority clearly. The "many" in the above sentence bears emphasis. Routine comparisons of various antennas can show widely different results. In fact, if they don't there is probably something wrong with the tester's methods. Reflections from ground, trees, buildings, hills, cars and the like add to or subtract from the direct signal to such an extent that "gain" figures taken by working stations and comparing signal reports show large variations from one station to the next. These are part of everyday v.h.f. communication, so the thing to do is to work many stations at various distances and directions with a given comparison setup. Then, if you want to know for sure, you set up again in a different location and work another bunch. This is time-consuming, but interesting if one keeps a detailed log of the results.

The writer spent many hours at this sort of thing with the Mellen-Milner Big Wheel. Tests at the W1HDQ home location proved inconclusive, because of a side-hill test area, and trees, guy wires and towers in the way of anything that could be worked on readily. So, after the matching problems were worked out to our satisfaction, we took the collection of antennas and masts out to some of our favorite wide-open hilltops. The single-bay clover-leaf was mounted on a 15-foot mast. Two-bay and four-bay stacked arrays were tested on a 24-foot support. All were checked against the turnstile\(^1\) regularly used for mobile work. This put the turnstile in a seemingly unfavorable light, as it was used in its permanent position some 20 inches above and to the rear of the W1HDQ station wagon. The turnstile had established itself as an effective mobile antenna, however, so it was useful as a standard reference for checking results with the larger and higher arrays.

**Results**

All told, around 100 different stations were worked or logged, and their signal strengths tabulated in terms of decibels above the readings obtained with the mobile turnstile. Care was taken to see that these stations were in various directions, at all possible distances, and well distributed throughout the active portion of the band. As expected, indications from these tests varied widely, but we feel that enough of them were made so that they are valid indications of what can be expected from various versions of the Big Wheel. It should be stressed that the margin credited to the single-bay Big Wheel over the turnstile is largely the result of the former having been mounted at considerably greater height. These tests were not intended to show the relative merits of the turnstile and Big Wheel; the turnstile was used merely to provide a reference against which all other setups could be compared. The tabulation below includes only received signal strengths at W1HDQ/1. Many reports were taken from stations worked, but individual 8-meter readings varied so widely that no numerically-useful data could be obtained from them.

\(^{1}\) Campbell, "Turnstile for Two," QST, April, 1959, p. 29.
Average gain, 1-bay clover-leaf over turnstile... 3.7 db.
Average gain, 2-bay over 1-bay... 6.2 db.
Average gain, 1-bay over 1-bay... 8.1 db.

The "gain" obtained with the 2-bay Big Wheel appears out of line, but more readings were taken with various versions of this array than any other, and we can assure the reader that the 2-bay version really does perform. Time and again, signals which could be heard only as faint whistles with a beat oscillator with a single-bay antenna jumped up to solid voice readability on the 2-bay version. These were not included in the tabulation, as the strength of the nonreadable signals could not be established readily — but they do show that a stacked Big Wheel does what everyone wants an antenna to do: it brings in signals that cannot be heard with simpler antennas. It should be emphasized, however, that these are not antenna-range measurements, and should not be interpreted as such.

The stacked versions proved to be nothing short of spectacular on signals coming from extreme distances. On one occasion a signal from a New York area station was totally inaudible on the single-bay and the turnstile, yet it was a readable S8 on the 2-bay array. This was over an indirect hill path of some 75 miles, and the test was made around 1 p.m. on a hot summer day, when tropospheric bending was at a minimum.

Tests made at night often showed the 2-meter band loaded with weak signals, fading into and out of the noise, when either the 2-bay or 4-bay stacks were switched to the receiver. Tuning the band with the turnstile and single-bay antennas under the same conditions would show only the strong signals of locals and near-locals. Many contacts were made at distances up to 100 miles or so from locations where long experience in the past has shown that some form of beam is a must for raising stations at anything like this distance.

We worked hard at trying to make the stacking of two pairs of antennas pay off as much again as did the stacking of two single bays, but this would not quite "come off." The indicated gain from the latter is more than would be expected on the basis of stacking theory, but it was there, over and over again, in unmistakable fashion. This is probably due to the nature of v.h.f. propagation, wherein lowering and narrowing of the vertical pattern pays off in surprising fashion on some paths. You get this when you begin stacking. More stacking pays off, but not so spectacularly as the first step.

But a gain of 8 db. with an omnidirectional antenna is not to be sneezed at. You’d have to put up a pretty fair Yagi to equal this — and remember the 1-bay Big Wheel gives the gain in all directions. This is not an unalloyed blessing, however. The stack of Big Wheels is fine for net activity and local rag-chewing, but its omnidirectional pattern and high gain can multiply QRJ problems manifold.

The 2-meter band becomes a mass of heterodynes when the 4-bay stack is used in a good location in an area of high v.h.f. activity, especially when some tropospheric bending is present. Another feature on the deh side: interference from commercial signals in the v.h.f. range multiples with an omnidirectional array of such beautifully broad frequency characteristics. We were forced to abandon work with the Big Wheels in one favorite location where there are two n.m. stations, a u.h.f. TV station, and various police and forestry-service relays. These non-amateur stations give little, if any, trouble in this fine mountain spot when a Yagi antenna is used.

The Big Wheel should prove a blessing in many types of 2-meter work, however. If you can take the jibes of pedestrians and passing motorists, a single Big Wheel should give you the best 2-meter mobile signal in your area. If you live in a spot where you can put up only one antenna, and rotators are out, a stacked Big Wheel will make the 2-meter band a lot more interesting for you than it ever was before. W1FYV and W1JD showed how to make the individual bays, and the stacking method for two bays last month. The four-bay version is shown herewith.

Reports following the appearance of the Big Wheel in QST last month indicate some confusion about the construction of the antenna. Referring to Fig. 3, page 44, of the September article, each element (A) runs from the grounded plate (B) to the triangular plate (C).

These two plates are mounted one above the other, at a spacing determined principally by available insulators. Ceramic standoffs 1 to 1 1/2 inches long are suitable. The Johnson Stealth cone, part 135-501, 1 inch long, with 8-32 threads, is good. The designers also used a bakelite block 1 inch long, with molded-in brass inserts, though we do not have a part name or number for this.

The tuning stub (D) is shown bent around a 3/4-inch radius, but this is not critical. Note that the stub length is 5 inches for a single bay. For a stacked 2-bay system the stubs should be 6 inches long. In a 4-bay array the top and bottom stubs are 6 inches and the inner pair 7 inches. For a single bay mounted above a metal car top for mobile work, a 6-inch stub may be needed.

— E. P. T.

**Strays**

Wa8XP (Ralph F. Denton, Box 730, Somerset, Kentucky) would like to hear from former ham members of the U.S. Navy Airborne Coordinating Group, active during WW II, for a possible reunion or ham net.

Receive an award called "The Cradle of the Confederacy," given by the Montgomery (Alabama) Amateur Radio Club, by working 25 stations within metropolitan Montgomery. Send alphabetical list plus QSLs to Betty M. Collier, P.O. Box 6125, Montgomery 6, Ala. All contacts must have been made on or after July 1, 1961.

October 1961 61
A small portable record player is used to drive this "CQ" wheel. Light falling through the perforations in the cardboard "record" actuates a photocell which controls a keying relay.

In any contest a certain amount of CQ calling is essential, though often tedious and time-consuming. The "CQ wheel" described here relieves the boredom and leaves the hands and mind free for logging duties. An attractive feature of the simple calling device described here is that it can be used to actuate an electronic key.

**Robot Calling Wheel for C.W. Contest Work**

BY ROBERT R. SKUTT.* WSCJN

A review of the facilities and operating procedure of the last SSB contest revealed several areas where the efficiency of WSCJN might be improved. In particular, it was noted that when short skip prevails, the rate at which contacts can be made is limited almost entirely by the length of the CQ and the time required to log the necessary data. Keeping the "dupe" sheet and making a running check on the rate at which stations are being worked. The latter is important for those who hope to end up in the "money" because it quickly reveals whether the band in use is paying off, or whether it would be advisable to shift to another band (or hit the sack).

"CQ wheels" have been suggested from time to time in the past, but most of the designs have been rather complicated and none too reliable in performance when subjected to use over prolonged periods. The one shown in the photograph is quite simple to build. Since the components are subject to negligible wear, they should last indefinitely. A phonograph motor rotates a coded perforated disk. Light passing through the perforations actuates a photocell which provides a keyed output.

**Circuit**

The photocell is a Clairex type CL3-A. This cell will control a sensitive-Type 5000-ohm relay directly using the simple circuit shown in Fig. 1A. Two cells may be used to actuate an electronic key of the self-completing type, as shown in Fig. 1B.

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*507 Ryland Court, Dayton, Ohio.

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Fig. 1—Photocell circuits. The circuit of A is for conventional hand-keying systems. The circuit of B is adaptable to electronic keys. $V_1$ is a Clairex type CL3-A photocell. $K_1$ is a 5000-ohm sensitive-type relay, such as Sigma 4F-5000-S/SL.
Disk Design

The photocell used has a diameter of \( \frac{1}{4} \) inch, and a hole of this diameter was chosen for the unit character length (the length of one dot, or only an initial impulse for dashes, it is unnecessary to punch more than one hole for either dots or dashes.

To minimize the chances of making an error in punching (which are surprisingly good, by the way), the preparation of a chart similar to Fig. 3 is recommended as a guide to follow in making the perforations. The holes may be punched with the sharpened end of a piece of \( \frac{1}{4} \)-inch metal tubing, or with a commercial paper punch. If a mistake is made, or if it is desired to alter the “program” on the disk, unwanted holes may be masked out with black Scotch tape. Be sure that the spindle hole is at the exact center.

Turntable Speed

According to accepted standards, an average word takes 50 units. Therefore one revolution would represent about 2.75 words. Ten revolutions per minute would then represent a speed of about 27.5 w.p.m.

The original speed of the turntable was 78 r.p.m., calling for a reduction of about 8 to 1 in getting down to 10 r.p.m. This can be accomplished by inserting an 8-to-1 reducing wheel in the drive system, as shown in Fig. 4. Reduction is in direct proportion to the two reducing-wheel diameters. In this case, the desired reduction was obtained by using a 2-inch pulley having a \( \frac{1}{4} \)-inch spindle.

The turntable (an 8-inch one in this case) was removed to expose the driving mechanism. Fig. 4A shows the original arrangement. The drive wheel \( D \) is on a bracket \( C \) which is free to slide. The spring \( E \) keeps the drive wheel in contact with both the turntable rim \( A \) and the motor drive shaft \( B \).

Fig. 4B shows the modifications. A Walsco repair kit included a wheel and spindle of the required diameters. This was mounted on a slotted bracket \( F \) similar to the original. The anchor pin \( K \) is mounted in such a position that spring \( G \) will cause wheel \( H \) to bear against the motor shaft, and spindle \( I \) to bear against the original drive wheel. Spring \( J \) is placed so that it holds the original drive wheel \( D \) away from contact with the motor shaft.

The Photocell

Mounting of the photocell will depend upon the styling of the turntable, and materials at hand. It should be mounted in each case so as to center the cell directly in line with the holes and with a minimum of clearance between the disk.

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Fig. 2—A shows the disk layout and punching for direct keying, while B shows the same for use with electronic keys. Calculations showed that an 11-inch diameter would provide circumferential space for 138 units. Allowing 1 unit for a dot, 5 units for a dash, 1 unit for space between dots and dashes, 3 units for space between letters, and 5 units between words, it works out that there is room for a “one-by-one” call (CQ SS DE W8CJX), which consumes 136 units. Longer call signs will require a slightly larger disk. At first, it was thought that the short type of call might be disconnecting to some operators, but to date the results have been quite satisfactory.

A disk 12 inches in diameter was cut from fairly heavy cardboard stock, and an 11-inch circle was drawn on it. The circle was then marked off into \( \frac{1}{4} \)-inch segments. For direct keying (Fig. 4A), the holes should be punched as shown in Fig. 2A, punching three consecutive holes for each slash. For actuating an electronic key, the holes should be punched in two tracks—one for dots and the other for dashes—as shown in Fig. 2B. Since a self-completing key requires

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Oct 1961

63
New Apparatus

Globar Dummy Load

The Carborundum Company of Perth Amboy, New Jersey, has announced a new dummy load with a rated dissipation of 150 watts, although a power of about 250 watts can be dissipated without difficulty for brief periods. The load is fitted with a standard SO-239 coaxial connector and can be conveniently mounted with clip fasteners, such as those used to mount large cartridge fuses. The 50-ohm model shown in the photograph has a d.c. resistance slightly over 49 ohms. The impedance at different amateur frequencies, as measured at ARRL, is shown in the table below:

<table>
<thead>
<tr>
<th>Frequency (Mc.)</th>
<th>Input Resistance (ohms)</th>
<th>Equivalent Shunt Capacitance (μF)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8</td>
<td>49.0</td>
<td>11.4</td>
</tr>
<tr>
<td>4</td>
<td>49.0</td>
<td>11.3</td>
</tr>
<tr>
<td>7</td>
<td>49.0</td>
<td>11.6</td>
</tr>
<tr>
<td>14</td>
<td>49.0</td>
<td>12.8</td>
</tr>
<tr>
<td>21</td>
<td>49.0</td>
<td>13.8</td>
</tr>
<tr>
<td>29</td>
<td>49.5</td>
<td>14.7</td>
</tr>
<tr>
<td>50</td>
<td>52.5</td>
<td>15.0</td>
</tr>
</tbody>
</table>

*Shunt capacitance required to be added to resonate the circuit at the given frequency.

The load measures 13¾ inches long by about 1 inch in diameter. Future models are scheduled to include a 72- and 300-ohm model, too. The dummy loads will probably be available through national mail-order radio-parts houses.

E. L. C.

Strays

K5DJU sends along a clipping from Reader's Digest, taken in turn from Today's Living, which says that hospitalized mental patients use "I" often than any other word, and that as they recover these people use "I" less often and "we" more often. There are several conclusions that could be drawn from this — any one of which could get us (me) in a peek of trouble!

K7GSG heard his call being bootlegged on 40 phone (a Novice was suspected), and so he fired up the rig and answered him. Must have been kinda disconcerting to all concerned to hear, "K7GSG calling K7GSG."

QST for
First World-Wide RTTY Sweepstakes
October 21-23

RTTY, INC. announces the First World-Wide RTTY Sweepstakes to be held from 0200 GMT October 21, to 0200 GMT, October 23, 1961. This is a competition between all stations throughout the world to determine ability in exchanging messages via two-way radio teleprinter.

Stations will exchange messages consisting of message number, check (RST), time in GMT, and state or foreign country.

Carefully check the log form, scoring sample, and complete rules which follow. Logs and score sheet must be received by RTTY, Inc., 372 West Warren Way, Arcadia, California, by December 1, 1961, to qualify. Complete results will appear in QST.

Rules

1) This is a competition between all stations throughout the world to determine their ability to exchange messages via two-way radio teleprinter.


3) Bands: This test will be conducted in the 3.5, 7.0, 14.0, 21.0, and 28.0 Mc. amateur bands.

4) Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if a different band is used. To encourage multi-band DX operation, the same country may be claimed more than once if contacted on different bands. The same station worked on more than one band may only be claimed once.

5) Country status: For the purpose of this contest, KH6, KL7, and VO will be considered separate countries, in addition to the ARR L Countries List.

6) Stations will exchange messages consisting of message number, check (RST), time in GMT, and state or foreign country.

7) Points: (a) All two-way RTTY contacts by North American countries (including KH6) will earn a maximum of two (2) points, one sent plus one received. (b) All two-way RTTY contacts by countries other than in (a) above will receive a maximum of ten (10) points, five sent plus five received. (c) All stations receive 200 points per country worked, not including their own.

8) Scoring for all stations: (a) Two-way plus one-way exchange points times total stations worked. (b) Total country points per band times number of continents worked. (c) Add item (a) and (b) above, for your FINAL SCORE.

9) Follow the sample score sheet and log form shown. Log the state only once, the first time contacted. Log the country the first time contacted on each band. To qualify, logs and score sheet should be received by RTTY, Inc., 372 West Warren Way, Arcadia, California, by December 1, 1961.

LOG, FIRST WORLD-WIDE RTTY SWEEPSTAKES

<table>
<thead>
<tr>
<th>NR Sent</th>
<th>RST Sent</th>
<th>Time Sent</th>
<th>Band</th>
<th>Station</th>
<th>NR Reqd</th>
<th>RST Reqd</th>
<th>Time Reqd</th>
<th>State or Country</th>
<th>Exchange Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>599</td>
<td>0205</td>
<td>14</td>
<td>W6CG</td>
<td>2</td>
<td>589</td>
<td>0204</td>
<td>CALIF.</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>599</td>
<td>0230</td>
<td>14</td>
<td>VK3KF</td>
<td>5</td>
<td>579</td>
<td>0231</td>
<td>AUSTRALIA</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>559</td>
<td>0247</td>
<td>14</td>
<td>W6NRM</td>
<td>7</td>
<td>7</td>
<td></td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>599</td>
<td>0300</td>
<td>14</td>
<td>W2JAV</td>
<td>7</td>
<td>599</td>
<td>0250</td>
<td>NEW JERSEY</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>579</td>
<td>0314</td>
<td>7</td>
<td>VK3KF</td>
<td>22</td>
<td>569</td>
<td>0514</td>
<td>AUSTRALIA</td>
<td>2</td>
</tr>
</tbody>
</table>

CLAIMED SCORE: (a) Exchange points......9 X 2 States = 18

(b) Country points......400 X 2 Continents = 800

Add (a) and (b)...............= 818

FINAL SCORE

This log is correct and true to the best of my knowledge.

Signature

Quisi Quiz

Harold Lunier, W4IFH of Fairfax, Ala., revises a Martin Gardner puzzler from the Scientific American to read as follows:

Radio operator A told operator B to look for him on a certain frequency some time later. When the time came op B remembered the six numbers of the frequency but he interchanged the kilocycles and the megacycles. Op B couldn't find op A on this frequency (obviously) but he tuned 5 kc. lower and read him loud and clear on the second harmonic. What was op A's frequency?
Amateur Radio Report

BY J. DON FOSTER,* W5TLL

Good public relations should always be an objective for amateur radio clubs. Here is a success story on how one group pitched in to sell ham radio to the public.

The Lawton-Fort Sill community of southwestern Oklahoma boasts a population of about 70,000 persons, of which some 50 are licensed hams. About the only contacts the general public seems to have had with these amateurs in the past involved TVI complaints. Many such complaints, both real and imagined, have been phoned into our newsroom at Channel 7 Television.

We had been seeking a tactful way of bringing to the public’s attention the causes and cures for TVI. When Governors Howard Edmondson of Oklahoma and Price Daniel of neighboring Texas proclaimed Amateur Radio Week June 18th through 21st of this year, it gave us an excuse to explain TVI and created an opportunity to report beyond the surface of amateur radio. On Sunday, June 18th, we presented a program entitled “Amateur Radio Report,” projecting an image of the radio amateur not only as a hobbyist but as a person interested also in civic welfare.

We learned of the Governors’ proclamations only a week and a half before the program went on the air. In the 10 days that followed, K5DLP and K5MBK shouldered the responsibility of liaison between the Lawton-Fort Sill Amateur Radio Club and the newsroom as we went about filming various aspects of amateur radio. These film clips ranged from code-practice sessions for the beginner at the radio clubhouse to the MARS installation at Fort Sill.

K5VOZ/ set up in the TV studio for on-the-air demonstrations. L. to r.: Frank Phillips, K5MBK, who demonstrated message handling; News Director Don Foster, W5TLL, who narrated the program; and cameraman Jerry Hawkins, K5KBO. Not shown is J. L. Copeland, K5DLH, who participated in the message-handling demonstration from his home QTH.

We had a stroke of luck one day when we learned that the State Civil Defense Director was scheduled to address a Lawton civic club. Following the luncheon, State CD Director Tom Brett and local co-ordinator Warren Wolverton were whisked away to the newsroom where statements praising amateur radio for its close work with civil defense in the state and community were filmed for the program. Their remarks bolstered the image of the amateur as a citizen interested in the welfare of his community and not just one interested in experimenting with gadgets which cause TVI.

As the program neared completion, we set up an actual ham station in the studio to give a live demonstration of traffic nets and storm warning nets, further pointing out how the amateur serves the public. A Field Day antenna was strung up on the microwave relay tower behind the TV station. When we placed the club station, K5VOZ-5, on the air in the TV studio the day before the program was scheduled, we found just enough TVI to get into the sensitive control room equipment. Thus we not only caused TVI but broadcast it to all sets in the city! A few adjustments, a good ground and a low-pass filter cured the interference.

The program, which was aired between 2230 and 2300 hours, went off without a hitch. From the start of the program in which amateur radio was defined, to the finish which included a general discussion of amateur radio, local club members went through their paces before live cameras as smoothly as the announcers who face “the tube” every day. Filmed reports on code-practice sessions, an amateur engaging in a ragchew and a ham at his workbench, portrayed the ham as a hobbyist. Studio demonstrations of an actual message being relayed from one station to another, contacts between the studio base sta-

Five of the eight amateurs with mobile units who participated in the storm warning net demonstration by checking in with K5VOZ/S from various parts of the city. L. to r.: K5QIU, K5TLE, K5REH, K5IZY, W5HFN. Also participating but not pictured were W5RDK, W5QAE, W5JBQ. Their mobile signals were heard over television as they checked in during the weather alert demonstration.
tion and eight mobile units observing the weather throughout the city, a film of the MARIS station at Fort Sill and the statements by the CD officials portrayed the ham as a public servant.

In the general discussion which concluded the program, panelists chosen by the club discussed the TVI problems and told the audience where to turn for help. Everything from Field Day to how to become a radio amateur was covered in the remaining moments of the program.

As this story leaves my desk, it's been a week since the program went on the air but the letters and calls are still trickling in, not with TVI complaints but with compliments. It even appears we may have recruited several new hams through the program in addition to presenting the true picture of amateur radio to southwest Oklahoma and north Texas.

In conclusion, I'd like to add a comment to those amateurs interested in furthering public understanding of their hobby in their own community. Aggressive TV and radio stations in cities such as your own are always interested in good feature material. If properly approached, these stations will more than likely jump at the opportunity to do a show on amateur radio. And, if in doing a similar program your club gives a news department the kind of cooperation the club here gave our department, the program cannot help but be a success.

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**New Apparatus**

**P & H Transceiver Antenna Transfer Unit**

With a station system composed of a transceiver, power amplifier, and antenna, the problem of switching between, through, and around the various components can sometimes be a headache. The model AR-1 antenna transfer unit, manufactured by P & H Electronics, Lafayette, Indiana, solves the problem and adds a few switching combinations to boot! Basically, the unit is designed to transfer the antenna automatically to the transceiver while receiving, and to switch the exciter to the amplifier and the exciter to the antenna while transmitting. A toggle switch on the transfer unit permits manual switching, so that the exciter can operate straight through to the antenna. The unit is not restricted to transceiver applications, but can be tied in to almost any exciter-amplifier combination or used as a conventional antenna changeover relay.

The AR-1 measures 4 inches wide, 3 3/4 inches high, and 5 inches deep. Four SO-239 coax connectors and two phono jacks are arranged along the rear of the box. When using the unit with a transceiver-amplifier combination, the four connections required are made to the amplifier input, amplifier output, exciter output and antenna. Controlled relay coil power (6.3 volts a.c. at 675 ma.) must also be supplied and is fed to the AR-1 by way of the two phono jacks. The internal relay is shock-mounted and, as can be seen in the photograph, the box itself is insulated for noise. It is practically impossible to hear any switching noise from the unit.

Maximum ratings for the transfer unit are 1500 r.f. watts. Included with the unit is an instruction manual which lists six different interconnection diagrams covering just about any station combination.

--- E. L. C.
The National NC-190 receiver, designed with special features for both the amateur and the short-wave listener, is a 10-tube general-coverage double-conversion (above 4 Mc.) communications receiver. It has a unique "dial selector" which allows the operator to select bandspread calibration for either the amateur bands or the international short-wave broadcast bands.

In some respects the receiver resembles the higher-priced ham-bands-only receiver, the NC-270\(^1\); cabinet size and coloring are about the same, and both receivers have flip-foot bases and ferrite-core filters which provide variable selectivity.

The NC-190 is a two-dial receiver, one for main tuning and the other for bandspread. It covers 0.54 to 30 Mc. in five ranges — 0.54 to 1.6 Mc., 1.6 to 4.0 Mc., 4.0 to 10 Mc., 10 to 20 Mc., and 20 to 30 Mc. The dial selector feature permits mechanical change of the scales appearing in the bandspread-dial window. The dial calibrations are on two separate segments of the dial and the desired scale is selected by pulling out a panel dial selector knob and rotating it one half turn, at which point the dial selector knob will snap back toward the panel and the desired scale will appear. Bandspread tuning is through a combination planetary and pinch-rim drive giving a reduction of 60 to 1. About 26 turns of the bandspread knob are required to cover the 80-meter band, 10 turns for 40 meters, 10 turns for 20 meters, about 20 turns for 15 meters, and about 12 turns for 10 meters. The other selectable dial provides calibrated tuning for the 49-, 31-, 25-, 19-, 16-, and 13-meter short-wave broadcast bands. The tuning ranges of these bands are 5.9 to 6.3 Mc., 5.6 to 10 Mc., 11.7 to 12 Mc., 14.6 to 15.5 Mc., 16.4 to 18 Mc., and 21.5 to 22.2 Mc. In every case the slide-rule main tuning dial must be set properly for the bandspread dial to read correctly. This has been simplified by coding the bandset marks and the bandspread calibrations in identical colors.

A block diagram of the receiver is shown in Fig. 1. It starts out with a single 6BZ6 r.f. stage, \( V_1 \), and 6BE6 first converter, \( V_2 \). The input stage of the receiver can be peaked up with a panel antenna trimmer. Output from the first converter, \( V_2 \), is at 2215 kc. on the three high-frequency bands, and at 230 kc. on the two low-frequency bands. On the three highest bands the 2215-ke. signal is converted to 230 kc. in the second converter, \( V_3 \), which operates as a straight-through 230-ke. amplifier on the lower bands.

Selectivity in the NC-190 is provided by a ferrite filter\(^1\) which follows the second converter.

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\(^1\) "Recent Equipment, QST," January, 1931, p. 47.

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Fig. 1 — Block diagram of the NC-190 receiver.
Three selectivity positions give the following degrees of selectivity: 600 cycles, 3.0 kc., and 5.0 kc., at 6 db. down.

The 230-ke. signal from the ferrite filter is fed to two stages of i.f. amplification in V5 and V6, both 6BA6s. The r.f. gain control circuit varies the cathode bias on the first i.f. amplifier and the 6HZ6 r.f. amplifier. Some output from the second i.f. amplifier, V6, is rectified and provides a.c. voltage to control the gain of the r.f. amplifier and the second i.f. amplifier. On the broadcast band only, a.c. is also applied to the first converter, V2. The a.c. system has its own on-off switch, and can be used for either a.m. or c.w. s.s.b. reception. A panel S meter gives a relative strength reading for incoming signals. It operates only when the a.c. switch is on and the r.f. gain is set at maximum. So that the receiver can operate at maximum gain with weak signals, some positive voltage is applied to the a.c. line to bring it down close to zero voltage with no signals. Since extremely strong signals could cause the a.c. line to go positive, the a.c. clamp diode, V5C, is used across the a.c. bus for protection.

Output from the second i.f. amplifier, V5, can be fed to either an a.m. diode detector or a triode product detector. The detector selection is controlled by the panel r.f.o. switch, which also turns on the b.f.o., V5B, in the c.w. s.s.b. position. The b.f.o. frequency is adjustable. The signal from the a.m. detector can be routed through a series-cage automatic noise limiter, which operates only with the b.f.o. off.

The triode section, V6D, of the 6185 is used as an audio preamplifier, to drive a 6CW5 audio power amplifier. The audio gain control is in the grid circuit of V6D. Terminals at the rear of the chassis are provided for connecting a 3.2-ohm speaker (a matching table speaker, National NTS-3, is available). A front-panel headphone jack is also provided; inserting the phone plug breaks the speaker circuit and connects the headphones.

A conventional transformer-operated power supply using a full-wave rectifier powers the NC-190. Regulated voltage is used on all the oscillators to insure frequency stability.

Panel controls on the NC-190 include the previously-mentioned main and bandspread tuning knobs, the selectivity switch, bandswitch, r.f. and a.f. gain, antenna trimmer, r.f.o. tone, bandspread dial selector, and five slide switches for receive-standby, automatic noise limiter, (A.N.L.) a.g.c., r.f.o., and calibrator. The receive-standby switch can be tied in with the station control circuits since terminals at the rear of the receiver are shorted when the switch is placed in the standby position. Alternatively, the switch can be left in the standby position and a remote switch used to control the receiver through leads terminating at the calibrator socket at the rear of the receiver.

Rear-apron connections and controls include a phono-jack antenna connector, terminal strip for antenna and ground (the phono jack is used with coaxial feed lines and the terminals with individual antenna-ground lead wires), speaker terminal strip, 5-meter zero-adjust potentiometer, line cord, relay terminal strip and calibrator socket. A calibrator which will produce accurate 1-Mc. marker signals through the entire tuning range of the receiver is available as an accessory for the NC-190.

E. L. C.

The NC-190 receiver removed from its cabinet. The large black-rimmed disk in the center of the chassis is part of the main-tuning drive mechanism. Terminals arranged along the rear apron of the chassis are from right to left: Relay (for control of an external relay circuit by means of the panel standby-receive switch), S-meter adjust, antenna jack (above) and antenna-ground terminal post (below), low-impedance speaker terminals, calibrator socket (for an accessory crystal calibrator) and line cord.

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**NC-190 Receiver**

<table>
<thead>
<tr>
<th>Height</th>
<th>83/4 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>15 3/4 inches.</td>
</tr>
<tr>
<td>Depth</td>
<td>9 inches.</td>
</tr>
<tr>
<td>Weight</td>
<td>28 pounds.</td>
</tr>
<tr>
<td>Power requirements</td>
<td>75 watts, 105-125 volts, 50-60 cycles.</td>
</tr>
<tr>
<td>Price class</td>
<td>$200.</td>
</tr>
</tbody>
</table>
At first glance it is hard to believe that the small gray plastic box shown in the above photograph could fulfill all the necessary requirements of an automatic electronic keyer. Nevertheless, the Autronic keyer does have it all, and it's packed in one container — keyer, power supply, side-tone oscillator and speaker. Completely transistorized, it has an instant speed range of 8 to 65 words per minute.

The Autronic contains no relay and therefore there is no annoying relay noise; trouble-free operation is insured because there are no moving parts. In the Autronic, a transistor keys the transmitter directly. Although the keyer is designed primarily for use with transmitters using grid-block keying, it can be used with cathode keyed transmitters as long as the voltage across the keyed terminals during open circuit does not exceed 80 volts. Special high-powered keying transistors are available from the manufacturer for high-power applications.

The basic 10-transistor 10-diode Autronic circuit is represented in the block diagram in Fig. 1. Generally speaking, it is similar to the circuit described by Eld 1 which uses two multivibrators to form the dots, spaces and dashes. This method insures self-completing characters that cannot be jammed, regardless of faulty timing by the operator. When the key lever is moved to the dot side, transistor switch Q1 is turned on through CR1, which, due to the existing polarities, conducts only on the dot side and fires the free-running dot multivibrator, Q1Q2. A loop from the dot side to the bistable dash multivibrator, Q3Q6, keeps it off during the dot cycle. Once a dot has been started, it will go to completion even though the lever is released, and the space following the dot will be included. This self-completing action is accomplished through switch Q4, which feeds back some signal from Q1Q2 to keep Q2 on until completion of the dot and space. Output from the dot multivibrator is fed to the keyer transistor Q7, which keys the transmitter.

When the key is closed on the dash side, the bistable dash multivibrator, Q6Q5, is shifted to a "ready" condition since it does not receive a "stay off" signal as it did on the dot side. Also switch Q3 is turned on and starts another dot cycle. The leading edge of the first dot from Q1Q2 triggers the waiting bistable dash multivibrator which remains on (and keys Q7) until the leading edge of the second dot arrives and turns it off.

If you have been able to follow the sequence so far you will know that the dash is still one dot short of being full length. This space is filled in by the second dot from Q1Q2 — the same dot that turned off Q3Q6.

If semiautomatic operation is desired (automatic dots and manual dashes), a switch is provided to bypass the dash control circuits and key Q7 directly.

Also contained in the Autronic circuit is an audio oscillator and audio amplifier for sidetone generation. When the keyer transistor is turned on, the side-tone oscillator is also turned on and produces a tone which is amplified and then reproduced by the speaker. A headphone jack automatically turns off the speaker when a phone plug is inserted. The audio section of the keyer

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The sub-orbital astronaut shots earlier this year had plenty of amateurs on the job and handling communications, although not on ham frequencies. We have a rather detailed report from W2IXU, who says that among the amateurs taking part were K6DUE, W2AOB, W2DZR, W2IP, W2JKO, WA2FRM, W2UYH, W2FZQ, W2GRA. The fellows used amateur sideband gear on non-amateur frequencies assigned to them for this operation in order to provide live coverage of the recovery of astronaut and capsule. W2IXU was stationed aboard the Navy carrier, while others of the ham group were on the Bahamas, on the destroyers, and back in New York. These fellows expect to be on the job again at a later date when the next shot is made.


The latest changes in the FCC Rules and Regulations are automatically mailed to those who have purchased a copy of Volume VI of the FCC Rules. This volume covers the amateur, citizens, and disaster services. Send your check or money order for $1.25 to the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

You can make a wad, if you know how. WAD, that is. Work five stations in Deming, New Mexico, and send log info to K5IKL, P.O. Box 903, Deming, New Mexico.

K4VLE (Stephen Johnson, 1320 Southwest Fourth St., Fort Lauderdale, Fla.) would like to hear from other amateurs who are Industrial Arts Teachers.
LAOS OFF BAN LIST

The Government of Laos has notified the United States that it no longer objects to communications between its amateurs and those in other countries. Accordingly, U.S. amateurs are now permitted to work N08 stations in Laos, the ban having been lifted on August 24. The countries still on the U.S. list and those on the Canadian list are shown on the tear-out card elsewhere in this issue.

ARRL FILES RTTY PETITION

In accordance with the decision of the Board at its meeting in May, the League has filed a petition for rulemaking with the FCC, requesting a change in regulations to eliminate the present requirement that RTTY stations identify by c.w. as well as by teleprinter. As of this writing, the petition has been acknowledged by FCC and, we hope, will shortly become the subject of proposed rulemaking. The text of the League’s petition follows:

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

In the Matter of
Amendment of Section 12.82(a)(2)
of the Commission’s Rules, Amatuer Radio Service, to Eliminate
Multiple Identification of Station Employing Radioteleprinter Emission.

PETITION FOR INSTITUTION OF RULE MAKING PROCEEDING

Pursuant to Section 4(d) of the Administrative 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 Section 12.82(a)(2) of the Commission’s Rules and Regulations to eliminate the present requirement for additional station identification by radiotelegraphy when radioteleprinter emission is being employed.

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

(2) The required identification shall be transmitted on the frequency or frequencies being employed at the time and, in accordance with the type of emission authorized thereon, shall be by either telegraphy using the International Morse Code, or teleprinter, or telephony. In addition to the foregoing, when a method of communication other than telephony, teleprinter, or telegraphy other than Morse Code is being used or attempted, the prescribed identification shall also be transmitted by that method. (New language in italics.)

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 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 present Section 12.82 imposes an unnecessary hardship on an amateur employing radioteleprinter emission in that Paragraph (a 2) thereof requires dual identification of the station — once by the teleprinter mode and a second time by telegraphy using the International Morse Code. In the earlier stages of amateur teleprinter use and development, the League had no objection to this requirement because of certain practical problems which would otherwise have existed. These were:
    (a) Difficulties encountered by the Commission in performing its monitoring functions in the amateur bands (such as lack of sufficient teleprinter equipment in monitoring stations) and amateur use of frequency shifts of widely different order.
    (b) Undue administrative burden on the Commission in handling complaints from amateurs who, not having teleprinter equipment and not hearing a separate telegraphy identification, would erroneously conclude that amateur teleprinter stations are commercial operations improperly in the amateur band.

3. The League now believes, however, that the above difficulties either no longer exist, or are not now sufficiently valid arguments for requiring the present inefficient procedure of dual identification.
    (a) It is the League’s understanding that at present the Commission’s monitoring stations have adequate teleprinter equipment and capability to accomplish necessary monitoring functions of such emissions.
    (b) The present rules permit any frequency shift less than 900 cycles for experimental purposes. In practice, however, the standard frequency shift of 200 cycles is employed almost exclusively by amateur teleprinter stations.

4. It is the intention of the League, if the requested amendment is adopted by the Commission, to expand its Official Observer program, the “heart” of traditional amateur self-policing, by the inclusion of additional numbers of volunteer observers recruited from among present RTTY users. Informal discussions with individual RTTY amateurs and local societies have already determined a willingness on the part of numerous such amateurs to volunteer for such a program. The purpose would be, of course, to provide a means of identifying interloping commercial teleprinter operations in the amateur bands after the distinguishing procedure of dual amateur identification is no longer required.

5. Suitable information to amateurs in the League’s publication, QST, will also help to avoid any potential incorrect identifications as between amateur and commercial use. Further, amateur teleprinter operations are almost exclusively conducted on, or adjacent to, specified frequencies within each amateur band where the mode is authorized. This is an additional means of broad appraisal of whether a radio teleprinter station is amateur or not.

6. Under the above proposed procedures, the League believes that no undue burden will be placed on the Commission as concerns complaints of “commercial” RTTY operations in amateur bands.

7. The present requirement works considerable hardship on amateurs employing teleprinter emission in that it requires periodic interruption of normal communication for the purpose of identification by means of an additional mode of emission. This is particularly a problem in single-frequency net operation, a common practice of teleprinter stations. Under the requirement of dual identification, the call-up of stations in such nets occupies more than double the normal amount of time. Thus an efficient means of communication is handicapped by an extremely inefficient procedural requirement. Further, during the supplemental (Continued on page 174)

72 QST for
RECRUPTICAL LICENSGING

Senator Barry Goldwater, ex-6BPI, of Arizona and Senator Andrew F. Schoeppel of Kansas have introduced a bill, S.2361, to amend the Communications Act of 1934 so as to permit the issuance under certain conditions of amateur licenses to aliens whose own countries will issue licenses to U.S. citizens. The bill has been referred to the Committee on Interstate and Foreign Commerce, comprised of the following senators:

- Warren G. Magnuson, Washington
- A. S. Monroney, Oklahoma
- Strom Thurmond, South Carolina
- Claire Engle, California
- E. L. Bartlett, Alaska
- Gale W. McGee, Wyoming
- Norris Cotton, New Hampshire
- Clifford P. Case, New Jersey
- John O. Pastore, Rhode Island
- George A. Smathers, Florida
- Frank J. Lausche, Ohio
- Ralph W. Yarborough, Texas
- Vance Hartke, Indiana
- Andrew F. Schoeppel, Kansas
- John Marshall Butler, Maryland
- Thurston B. Morton, Kentucky
- Hugh Scott, Pennsylvania

Amateurs interested in passage of this bill should write their Congressional representatives promptly to urge affirmative action. Letters from amateurs in the states listed above addressed to the named senators, will be especially effective. The text of the “reciprocal licensing bill” follows. For editorial comment on the bill, see page 9.

S.2361

In the Senate of the United States August 1, 1961

Mr. Goldwater (for himself and Mr. Schoeppel) introduced the following bill, which was read twice and referred to the Committee on Commerce

A BILL

To amend sections 303 and 310 of the Communications Act of 1934 to provide that the Federal Communications Commission may, if it finds that the national security would not be endangered, issue licenses for the operation of an amateur station to certain aliens for any temporary period, not in excess of three years.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That clause (1) of section 303 of the Communications Act of 1934 (47 U.S.C.303) is amended—

(1) by inserting “(1)” immediately after “except that”; and

(2) by adding before the semicolon at the end of such clause a comma and the following: “and (2) upon a finding by the Commission that substantially similar privileges are granted to citizens of the United States while in the foreign state of which an alien is a citizen or to which an alien owes permanent allegiance, the Commission may, if it finds that the national security would not be endangered, (A) issue a license for the operation of an amateur station to any such alien it finds qualified for any temporary period, not in excess of three years, and (B) revoke summary any such license, notwithstanding any other provision of this Act relating to revocation of station licenses”.

Section 2. Subsection (a) of section 310 of the Communications Act of 1934 is amended by striking out the last sentence and inserting in lieu thereof the following: “Notwithstanding paragraph (1) of this subsection, (A) a license for a radio station on an aircraft may be granted to and held by a person who is an alien or a representative of an alien if such person holds a United States pilot certificate or a foreign aircraft pilot certificate which is valid in the United States on the basis of reciprocal agreement entered into with foreign governments; and (B) upon a finding by the Commission that substantially similar privileges are granted to citizens of the United States while in the foreign state of which an alien is a citizen or to which an alien owes permanent allegiance, a license for an amateur radio station may be granted to and held by any such alien the Commission finds qualified, if the Commission finds that the national security would not be endangered thereby.”

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Strays

Anyone in the Chicago area interested in amateur television please contact K9GRH or W9AUM.

The 66-foot cutter Nam Sung won the 22nd biennial Transpacific Yacht Race in July. On board was W7HUM, who maintained contact with the States on 21-Mc. sidband when communication on the regular marine channels was impossible. One of his regular QSOs was K7AWI, who handled a considerable amount of important traffic.

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FOUNDATION AWARD

Alexander F. Burr, K3NKH, of Baltimore, Maryland, is the recipient of the John Gore Memorial Scholarship, offered this year for the first time by the Foundation for Amateur Radio, Inc., of Washington, D. C. The Foundation is a non-profit organization of trustees representing radio clubs in the Washington-Baltimore area.

The award, a $250 scholarship, was conferred on Burr by FCC Commissioner Robert T. Bartley (as Acting Chairman during the August recess) during a ceremony held in the FCC's meeting room in Washington recently. Burr, working toward his doctor's degree in physics at Johns Hopkins University, where he is also an instructor, was chosen "due both to his activity as an amateur, and because of his high standing in his chosen field," according to a Foundation announcement.

Present at the ceremony was Major William L. Scott, W4PVR, of the U. S. Army Signal Corps, president of the Foundation. Major Scott said that the object of the scholarship was to encourage young amateurs in college who had chosen electronics or similar work as their chosen profession.

Burr is the first amateur to receive the scholarship, named in honor of John Gore, W3PRL, a former president of the Foundation and who died last year. Speaking at the ceremonies, Commissioner Bartley said today's amateur is "part and parcel of the new frontier of technological development."

Commissioner Bartley said, "The amateur radio fraternity has performed a unique function over the last half century. Many of the foremost contributors to the early history of radio were men who were amateurs, in the best sense of the word — men like Hiram Percy Maxim, or like Marconi himself. Their pioneering work resulted from a deep personal urge to explore a new and exciting world."

"Today we are in an even newer world — one made possible by the efforts of these and many other men of science. The amateur's place in this world has grown even more important. His responsibilities, too, have enlarged and expanded."

"Amateur radio is, by its very nature, satisfying to the individual. It gives him the wonderful opportunity of communicating with other individuals in every corner of the globe, and the pleasure of creating and experimenting as he pleases with the equipment and techniques he enjoys."

"But his talents and interests have helped swiftly to expand a great industry. And he himself has served his country and his community in times of national emergency and of natural disasters. He is now much more than an individual absorbed in a fascinating hobby. He is part and parcel of the new frontier of technological development."

"You have only to monitor the amateur frequencies to realize that these men and women are serving in the farthest-out frontiers of scientific development — for you will hear them literally from pole to pole, on ice islands and in jungles, and in practically every country in the world."

Commissioner Robert T. Bartley, Acting Chairman of the Federal Communications Commission (light suit) stands with officers and trustees of the Foundation for Amateur Radio, Inc., after a ceremony in the FCC's meeting room in Washington, D. C., where Commissioner Bartley awarded the John Gore Memorial Scholarship to Alexander F. Burr, K3NKH, of Baltimore, Md. (holding paper). Others are: (front row) Tex Debardeleben, W4TE, and Ethel Debardeleben, K4LHB, trustees; and Scotty Scott, W4PVR, president of the Foundation and Roy House, W4LSC, vice president. Back row: Steve Manning, W4CAE, chairman of the scholarship committee; Ted Craver, W4IOQ, trustee; Van Van Deusen, W3ECF, past president; Bob Carpenter, W3OTC, secretary; Lou Craneberger, W3UCR, trustee.
CONDUCTED BY ROD NEWKIRK. * W9BRD

How?
How logical! With venerable appreciation we acknowledge receipt of further communication from the precocious Extra Klusk neplus of Count U.R. Kuntries. One of that lad’s pet inclinations is to carry ridiculous trends to their ultimate ludicrous conclusions. Thus does he offer his latest development to a breathless DX world....

The Sheepskin Kit

Chosen of the shanzzy zertifikits, OM? Veil, las unken liddle zense fildien with der korespondenz und — Himmlit — risken der rarer QSL in der postbox. Zo iss rekommenden zumif zafe und simple van is gemakun der sklaher wallen skaphael und zertifiketvokun getstaplen. Der Sheepskin Kit. Iis mit der rubbershampfem and zuperkolor zertifikits blanken outzn. Getinkten uppen WAX. WPZ, WAHI WOOL, undroskoi, und preatof gestaplen mit der rubbershampem der fanczy blanken and der zampfem seen der sklaher wallen. Instant zertifikits!

Ja, risken geen QSL, fildien mit geen leder-

 What:

“When the nights begin to lengthen, then the signals start to strengthen.” (From an old DX bulletin.) Sure — they strengthen till the next fadour, then start all over again, and break down... Good time to remind you that, in the hand-by-hand activity analyses to follow, frequencies appear in parentheses in number of kilocycles above the lower band-limit; the figures outside parentheses are GMT to the nearest whole hour. Thus "SIJAB (102) 13" in the 20-cw. paragraph meant that SIJAB was active on 144 kc. Let’s try it.

20 phone is a lively subject this time, W101JF KJ1IF, K2s TJU UYG, W2a LAG OVR, K3s KIH

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October 1961
VH3HT, Box 11, Taipei, Taiwan, Republic of China
CRAEZ, R. Eulzel, P.O. Box 145, Tempe, Arizona
CRAF1, F. Lomos, P.O. Box 212, Landa, Anazola
CZTFN, F. Alzamo, P.O. Box 582, Beira, Mozambique
CAINA, via RCSUS with LACAS, LORC, and ICRS. The two CTD, TXS, and TVS are said to represent the State of New York.

VERON QSL, notes: ZB6RSC is back in the U.K. and will release missing cards on receipt of QSL with his LORC and ICRS. The two CTD, TXS, and TVS are said to represent the State of New York.

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Summer field days are popular amateur activities in central Europe. At left we see OK1AMS and friend striving for score in a recent CAV outing. DM3YM, on the other hand, prefers a solo effort with his one-watt portable phone-c.w. outfit for field tests in East Germany. (Photos via K3CUI and W2KQG)

5N2BC, B. Fisk, Cable & Wireless, P.O., Box 173, Lagos, Nigeria
5N2DK, A. Mool, P.O. Box 293, Port Harcourt, Nigeria
5N2DMS (via 5N2AMS)
5N2EBL, E. Lloyd, c/o C. Zard & Co., P.O. Box 114, Freetown, Sierra Leone
5N2JAF, F. Fashola, c/o Cable & Wireless, P.O. Box 173, Lagos, Nigeria
5N2KX (via W2CTN)
5N2LKZ, O. Jackson, c/o IAL, Kano Airport, Nigeria
5N2RDC, G. Gun, P.O. Box 173, Lagos, Nigeria
5RBA, P.O. Box 19, Flumina, Madagaskar
5RBAF, C. Arvettne, P&T, Tamanarivo, Madagaskar
5RBBG (to PHBQG)
5W8BF, Box 1971, Dakar, Senegal
7G1A (via CAY)
9G1D (via W2HUE)

NOTE: No assurance of accuracy and officialness goes with the preceding. Good luck, any way—and if you encounter another previously unpublished DX QTH possibilities, pray pass the word along.

Whence:

Asia — H19KT commentary from K2LSX at the scene: "We’re operating 20 phone and e.w. on 14,150 and 14,015 kc., mostly between 1100 and 1300 G.M.T. Quite a few operators here besides myself, and other W5as occasionally drop in for QSOs. H19KT has a half-zollon BC-510 job, an R-588 receiver and a dipole. Well soon replace the latter with a beam. Watch for us in the contests!" K2GJS also writes from Korea where he hopes to help dish out H19 QSOs手机版ward. Always pleased to work W5s," writes operator Davi of V819B to W8KKX. "You boys really know how to operate in pile-ups. Our rig here might be called a plumbers’ delight, a mess of wires, dog ends and coffee stains. But we manage to get around the planet, all right. "Our club station, K2MA, has gained five members so far," writes(prefix) John. "We have a KWS-2, a 35-foot-high triband beam and a 75A-1 on 20 and 15 meters at 1000—1200 local time." J84BA was K2GIPS’s 500th Japanese station contacted. Bill still hunts two holldout J4 prefectures. K2UYG says AC1AX is working out arrangements for a return to the air.

Asian adieu conurona W2XQXG: VS1RP mentions an ASCP of E. Pakistan, X88AL is hard at work attempting to extricate Laos from the ITU-FCC Ban List. Africa — E14A returns home to the airwaves in July after his statewide tour. Bob’s XL, E14YL, caught the DX bug for 200 quick QSOs with 85 countries. They’ll have a sideband kilowatt peaking at any time now. "YU8A1 vacanceneon on the Riviera for a month but now plans to keep the L.O.C. regularly workable on 20 m. That from K1KSG. "Poor conditions plus illness in the family have kept OT280 temporarily on the DX shelf. W8KEX grows steadily acquainted with 001MT. Mauro has lived in Somalia for 30 of his 17 years and works as a radio technician. "We live in a subverted life. My wife is Italian; we have a little donkey but no family. It is, you say, OK. 001MT uses a 156-B10G-6V-807 rf., line-up, 6S7-6SL2-6HC1 LED fig. (receiver and dipole, 20 meters preferred). . . . K55WJ feels the Liberian radio mugs may thin out the EL ranks for a while. There’s an effort to be made. . . . K4LDS visited South Africa this year and found ZS1NG quite active on 9, 15 and 20, phone and e.w., in addition to discharging duties as president of S.A.R.L. W5, W2K6, and K2FZ, on the air. A-95cm and HBO do the job. . . . K2UYG hears that Teshul is added to the DXpalatory objectives of K15AMZ. . . . Nigerian commentary thanks to 5N2KKO. "Pros- 

Oceania — KX5BH’s K6HPR writes from Kwaiojina: "I arrived here a few weeks ago to carry on where departed W4PTG left off. I’ll hit 25-meter bands between 14,200 and 14,320 kc., 0400-0800 GMT regularly, 1200-1400 occasionally. Filled five log pages in two hours in one recent session with the East Coast. If all callers cooperate, KX5BH can check in many stations in a short time. . . . W1NJM forwarded notes on W4WJH’s recent visit to Hong Kong and the Philippines. Harry was especially impressed by club spirit out that way; meetings seem invariably well attended. W4HIJ was also struck by the pugent reputa-

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November 9th, 1961

October 1961

VY5AGS typifies the amateur radio boom now under way in Venezuela. Juan shows for WAS on 10-, 15- and 20-meter phone and cw, and occasionally signs VY5AGS/4. (Photo via W8KXL)

TL8AC, formerly FG0HT, has a pair of 807s and homebrew triode-con eer peraker repecting in Bangui, Pierre hopes to multiply the efficacy of this arrangement with some directive 21-b. skycrocks. (Photo via W8KXL)

In June's Certificate Hunters Club QSO Party, other highest order: W8PB, W2Q2 and W2AW... W2PFP envy the north Atlantic path for a personal visit with VLA 4U. SK777 and ZNF. "Listening to the W2K/YE QRN in Norway gives me an insight as to how sound is to achieve DX results from the U. S. A."... W2KXQ quotes an authoritative prediction that Great Lakes salmon-bait fishing results are expected to be better for the next few years. Summits -... W2ADJE, a Maryknoll missionary at Auschwitz, Poland, now is active on 10MHz, with an ARC-5, and TCS-13 on 40, 80, and 75 meters, K2DDK says, "At present his antenna is just a 5-Mc. dipole. I'm trying to get him to try a monster Vee beam because his QTH is at the margin end of a 3600-foot funnel-shaped valley aimed Stateward..." DXers may be interested in the Worked New Mexico Counties certification engineered by W9LPE, S8, etc. to Willy will get you the specs in a jiffy. ... W8ND and VP2BP/mn & Co. are said to be just about for see. Ten Years Ago in "How's DX?" - Your conductor deparage the roll-your-own school, a few misfits who appreoch DXCC status through homebrewing or stealing rare "QSLs"... Eighty and 160 meters estimate DXwise but good old 40 stays awake with W1M1D, K8X, WG1X, VG1X and others available in Twenty c.w.'s summer fare is sumptuous enough: AP2N, C8B AB, CREO, CVEC, F7QO, P6DK, P6AC, P6AK, K8DL, K6LX, LAXLW, A1B0B, JD3, BC GH, MTB1A, OP1BRQ, GQ5A 44RA, PX1A, Credo's 8V9F, 8V1X, VK7BB... Two plasma events CS8AA, EK3A AD DD, EQ9FM, HC86Q, K06AA, V89AA and 8V8BA... Ten phone's unusual late-summer DX crop is topped by K8JBA. The Monsoon suction of WP8QLy brought 699 32AXQ 9Q0s to DXers in more than 100 countries, and we hear that QASHL did quite well from Andorra as PX1A. When next... This year's VK/ZZ DX Contest is announced, to be held in conjunction with Australia's Commonwealth Jubilee,... leave is all up in the air about autums, while photos of CT3AA, SV6WX-FQ7Q, Rabani's VK5GB and VP7BP (VP3CQJ) supplement the life for October, 1961.

The Amateur Radio Magazine

October 1961
There are many famous names in Naval history — names of ships, names that live on and on. Sometimes the particular ship is lost in combat or retired because of age, but the heroic name is passed along to some new ship. So it is with the Navy’s famous radio call NAA. In the earliest days, many an aspiring amateur learned the code by listening to NAA, and it was indeed the very first station that many people heard. Located in Arlington, Va., it transmitted time signals, weather, and various other Naval traffic. As we have reported in QST, it was finally retired, with honors, from active service to the fleet. Later, for a short time, it was used in connection with the Navy’s reserve training program. Now, however, it has been recalled to active duty. What could be more fitting than the use of the call NAA by the Navy’s newest shore radio station — the most powerful radio station in the world, U. S. Naval Radio Station, Cutler, Me.

By Richard L. Baldwin, W11KJ

Very Low Frequency

Two million watts! The words alone are overwhelming, but at first sight the actual installation is almost beyond comprehension. Everything is king-size.

When operating at full power the antenna is fed by four separate 500-kw. final amplifiers, each with eight M1-6607 air-cooled tubes operating in push-pull parallel. The antenna consists of some 62 miles of one-inch copper cable supported by 26 towers in a double star pattern, with the towers ranging in height from 800 to 980 feet. The antenna insulators are 75 feet long. The coax cable is a foot in diameter! The antenna loading coils and variometers, located in an aluminum-lined house at the base of each down lead, tower some 50 feet above an awed spectator. Four huge diesel engines of some 3850 horsepower each drive the generators to develop the necessary power. This required power reaches a peak of some 12 million watts when deicing of the antenna is required during storm conditions.

This is a fabulous installation!

Familiar Techniques

Every aspect of NAA is so immense that a little time elapses before you suddenly realize that most of the techniques in use are right in QST and other League publications. Here are a few examples.

The v.l.f. antenna system makes one of the most impressive horizons you will ever see, stretching some three miles from north to south, and as you stand in the midst of that antenna farm and look up, it is quite overwhelming. But hold on a minute — this turns out to be

This thousand-foot tower, guyed at three levels, supports the center of each star-shaped pattern. The "helix" house at the bottom contains the loading coils which match the coax cable to the antenna itself.

QST for
nothing more or less than a highly efficient Marconi antenna. The general layout is shown in the photo on page 80. The horizontal wires serve as a capacitive top loading, while the vertical leads actually do the radiating. Efficiency is increased by the presence of some 2200 miles of No. 6 copper wire radials, buried beneath the towers and extending off into the sea on three sides.

When all four finals are on the air, the output impedance is about 4 ohms. This is matched two 100-ohm coaxial cables (each feeding one-half of the array) by means of an L network. Norm Mathew, KBSYL, senior project engineer for Continental Electronics, told us that when he was first tuning this monster up, his constant guide was a series of articles on impedance matching written by ARRL Technical Director George Grammer, W1DF.

The Navy calls one a helix and the other a varactor, but together those two large items are simply for the purpose of providing bottom loading of the antenna. The matching section to the bottom end of the loading coil is gargantuan in aspect, but it is right out of the Antenna Book. The last 500 feet of the coax cable to each array (and each run is about a mile) go through a seven-foot concrete-pipe tunnel which has been lined with copper. The coax cable has a slot in it, and the motor-driven contactor controlled by the operator on watch a mile away. We use the same thing in ham radio, only we have 1/4-inch coax (for high power) and 1-inch pipe for the folded skirts.

So it is with the entire v.l.f. transmitter. It's big and it's complicated; but it uses techniques that are familiar to each of us. But familiar as the techniques may be, it isn't every day that you can stand in front of a transmitter console and see one meter that reads 12,000 plate volts and another one that shows 200 plate amperes!

Power like this calls for many safety precautions. An intricate interlocking system prevents entry into any of the transmitter spaces while power is on — this protects the personnel. There are also a multitude of devices to protect the equipment in case of component failure, and at 12,000 volts a component failure can mean fireworks! (I wandered into the v.l.f. building one morning but neglected to mention to the chief electronic technician who is in charge of maintenance at the v.l.f. station and who was making some tests at the time that I intended to take flash pictures. I was out of sight of the chief when I made the first exposure, and the instant that flashbulb ignited, there was a thunder of feet as Chief Miller and a couple of his men dashed over to see what had happened. Chiefs don't often chew out commanders, but I think he had it in mind!)

**High-Frequency Transmitter**

NAA exists solely to transmit traffic to the fleet and although the two-megawatt v.l.f. trans-

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October 1961
tion such programs as ICT (Individual Craftsman Training), which pried loose surplus Navy electronics gear and got it into the hands of active naval reservists and amateurs, who used it for training purposes. He was a leading proponent of the Individual National Naval Reserve Radio Net, which is now functioning weekly on Navy frequencies and which provides operating experience for radio amateurs who are naval reservists. And Cdr. Zammit pushed the shipboard use of amateur radio, something which had been taboo in the Navy for many years. Now, however, authority can be obtained to operate an amateur station on board a Navy ship.

Putting NAA into operating trim has been a busy job, and so W5HKP/1 doesn't get on the air very often yet. However, a kw. rig is all set to go, and sometimes you'll find him on 20 sideband, working his son, K4MJZ.

The operations officer, who is in charge of keeping the traffic moving, is Warrant Chief Officer "Pete" Ellison, K1QMK. Pete is pretty active on sideband with a kw. and a multiband vertical, and you may run across him on any of the phone bands between 40 and 10 meters.

K2UTU, Ted Miller, RM3, stands watches at the v.f.f. transmitter, and in his spare time has been running code and theory classes for would-be hams on the staff. K1TBB, Bobby Barrymore, RA1, stands watches in the operations room, which is the nerve-center of this radio station. Neither of these two fellows is on the air at the moment, but with aid of the skipper they are getting some gear together, along with a surplus house trailer, and will have a ham shack set up on the base before very long. The amateur call K1NIA has already been assigned.

The senior project engineer for Continental Electronics Mfg. Co. of Dallas, Texas, designers and builders of the two-megawatt rig and prime contractors for the whole station, is Norm Matlack, K5SYL. He has lived with this installation right from the beginning and, as we have mentioned earlier, found some QST articles of help in the initial tune-up. His right-hand man on the job is Gene Gildow, K9JKL. Both of these fellows have spent too much time on the world below 50 kc, the past couple of years to have much time left over for the world above 50 Mc.

Two civilian hams on the base are Red Ross, W1BBSB, who has general supervision of all electrical maintenance at the station, and Russ Crossman, K1GWX, who also works on electrical maintenance. What with the lights for 26 towers, a power-generating plant big enough to supply a city of 50,000, and all the other electrical facilities, they have plenty to keep them busy.

(Continued on page 168)

Old-timers will recognize this monster as a variometer. It's used to tune the bottom end of the v.f.f. antenna, and is controlled by the operator on watch a mile away.

QST for
1961 AWTAR

Despite widespread adverse weather conditions and the crash landing of one plane, the fifteenth annual All Woman Transcontinental Air Race was pronounced a success by Air Chairman of the Board, Betty Gillies, W6QPI.

Ninety-seven TAR contestants flew the 1961 race route from Montgomery Field, San Diego, California, to the National Aviation Facilities Experimental Center airport near Atlantic City, New Jersey. Twelve airports along the flight route were designated as official refueling stops. Period of the race, known by the press as the “Powder Puff Derby,” was July 8 through July 12.

Amateur Liaison

For the tenth consecutive year amateur radio operators engaged in special net operation to assist TAR contestants, Carolyn Curran, W3HTC, of Norristown, Pa., served as General Chairman of amateur operations for the fourth year. Amateur chairmen at each stopover city were aided by scores of operators along the flight route, who relayed such information as take-off and arrival times, weather conditions, progress reports, and personal messages.

Of the amateur assistance, Betty Gillies, AWTAR Chairman of the Board of Directors for the eleventh year and a ham herself (W6QPI) summarized “Carolyn, through her ham network, always knew where every flier was — a tremendous help to us!” Betty invited TAR contestant #89, Nancy Bird Walton of New South Wales, Australia, who was impressed by the amateur network, to jot down her views of the ham tie-in with the race.

“Who’s where? How goes it? Ask the ham! Part of the interest and fun of flying the race is to know each evening who is out in front, where so and so is, who landed at an undesignated field — in short, who did what?”

“The ham operators play an important part and add to the excitement of the race by keeping us up-to-date. Often inconspicuous, tucked away in a corner of an airport building, in a hotel bedroom, or in a caravans, one had to dig them out, but when you found them it was always worthwhile.

“It was at Tuscon 1 first met this efficient team. Fifty-nine of us decided to stay the night there waiting for the westerly tailwind that never arrived. I found the hams behind the weather office — four or five of them who knew where everybody was, what time they had taken off, when they had landed, etc. On a long list was every jolly aircraft. What fun it was to have this information — and what a saving in long distance telephone calls for the fliers and the Air Race Board.

“Would you like to send a message?” asked a ham as I landed at El Paso. At Dallas a ham had a message from Montgomery, Alabama. One of the fliers had left her handbag behind. Would I bring it to her?

“Some of the operators had almost become part of the race, like Evelyn, K5TXQ, at sharepoint. Evelyn was at her rig for five days. She watched for the fliers like a cat watches a mouse, and the minute they were open Evelyn was going to have “her girls” in the air. There were 87 aircraft between Sharepoint, Jackson, and Montgomery airports. When one plane took off five hundred miles away, we knew immediately because Evelyn told us.

“At every opportunity the hams were on the spot, trying to be as helpful as possible. How much we fliers appreciate all that they did for us throughout the 1961 Powder Puff Derby.”
Report from W3GTC

From General Radio Chairman Carolyn Currens, W3GTC, comes the following brief summary of amateur activity that accompanied this year’s race.

"At last the 15th annual AWTAR is history. Everything that could possibly happen did. For the first time the time of the race had to be extended twice. As far as communications are concerned, we had an aurora, thunderstorms, long skip on 40 meters and one day the bands all went dead for several hours.

"There were some nice things, however. For four years I have tried to get the whole net on side-band. This year I finally did it. Also, the 20-meter schedule with the west coast at night worked very well. Many of the ships commented on how well the net worked and how sharp they were that we had an amateur net.

"This year we are sending a certificate to all amateurs who participated. These were designed at NAFEC, where we had our terminus, and I think they are worth having. I will be handling the race again next year."

In Montgomery, Ala., Betty Collier, K4ZNK, was radio chairman. (Photo by K4DOL)

Getting communications rolling at the race start in San Diego were Kathy Kreysler, K6AWP (left), and local chairman Barbara Davis, W6VSL.

The backs belong to Pat Hubert, W5SPV, Bernell Johnson, K5GBX, and Jean Olds, K5PLC (left to right), three of the WHOOT club members who maintained communications at the Dallas stop-over.

More on page 168

Standing by for contestants’ arrival and departure times at Donnelly airport in Montgomery were Jack Giddens, K4DMN, Ken DeBordelaben, W4FHH, and John Plott, K4PFM. (Photo by K4DOL)

Three of the El Paso team—Wade Williams, K5ILG, local chairman, Betty Behan, K5YOY, and Erv Williams, W5KOK (1 to r.). (Photo courtesy El Paso Times)
The publishers of QST assume no responsibility for statements made herein by correspondents.

THE RIGHT TRACK

1. I wish to express my thanks to the League and QST for all the help they have given me in my work with amateur radio.

At the age of eight years, I devised amateur radio was for me. I got a set of the "Gateway to Amateur Radio," and I became more the help of many friends, the ARRL, the DX books, and W1AW. I finally acquired the Novice license in July, 1959, at the age of twelve. I used the License Manual and the Handbook, and copied W1AW every night to get my code speed up. In July, 1960 at age thirteen, I received my General license.

During my Novice Class days, the League had been helping me with its books and QST to improve my operating and the operation of my station. Every QST article continued to be of value to me, whether it was a technical article which increased my knowledge of theory; a construction article which I could not use or could not afford, but which increased my knowledge of circuitry, or a construction project which I built.

Recently in the "Correspondence from Members" column, I've read several letters condemning QST for certain articles. No article will directly benefit every reader, but if we try to find something of value in each article, we all get the maximum value out of what we read. — S. Merrill Weiss, W32HQ, Painted Hills, N. J.

2. I wish to thank you for your letter of welcome to the amateur ranks and the booklet Operating an Amateur Radio Station.

Perhaps some might think I got the cart before the horse by taking membership in the ARRL before becoming an amateur, I have been an associate member about two years, and before that I bought QST from the newspapers, QST has been a great help to me and I always look forward to the next issue.

My first transmitter, which is under construction, will be from QST. — Robert L. Williams, W5NOX, Charleston, W. Va.

DECEMBER INDEX

1. It sets tiresome to see letter after letter in which people complain about what is published in QST. I think that they forget how diversified our hobby is. That is what makes it so wonderful — there is something for everybody, no matter what their interest is. To be a shame that some fellows have to get so cynical because a certain issue of QST might not be devoted completely to their little corner of the hobby.

I think that everyone concerned would be more than a little surprised with how much is read in QST if they pick up the November issue and scan the complete index in the back. In 12 months there are more interesting items to look back on than what one might find in the single issues, even if they read them "cover to cover." — Daniel F. Stanley, K4JL, $00, Kentucky.

THE SIMPLE THINGS . . .

1. I'd like to congratulate you for including in the August issue "My First Transmitter" by K4VQ. I'm sure a great many readers were as impressed as I. This brief narrative is indeed a symbol of ham radio's very essence. It is a literary masterpiece of simple integrity which even makes the accompanying photograph unnecessary in conveying an impact which should endure as long as there is ham radio.

The work deserves repeated reading, especially by those about to run off to buy a piece of commercial gear — just so as to "keep in touch," as it were. — Donald F. Meadows, W2ZM, Richmond, California.

SOUTHERN NEIGHBORS

1. I've come to notice how rare it is for a U. S. station working DX to even attempt speaking a few words of that DX station's language. Of course, they are in another language, but how the DX station's language is spoken. I've tried to converse with our southern neighbors, usually with little real success! Even so, it seems to bring us closer, by having him realize that we just might be trying to understand his world and the way he lives. Yet more important is the establishment of an attitude of mutual respect.

Since it is impossible to learn most languages of the world fluently, we could write the basic words and phrases used in a QSO in this DX station's native tongue on paper or 8 1/2 x 5 cards. Of course, if you get involved in a long raceyou might say you've just learning! For those languages not using our alphabet, the English equivalent should be sufficient. — James Talens, K3MNJ, Philadelphia, Pa.

1. I'm a sophomore in high school and only a Novice who probably shouldn't be speaking up in church yet but I wanted to agree wholeheartedly with K83HJ (Correspondence, August QST). If a radio amateur can speak a foreign language he should be permitted to operate outside the U. S. alone bands. As I mentioned, I'm only a Novice but I have worked over a dozen Spanish-speaking amateurs. They all overjoyed when I could come back in Spanish, even a poor one is. Why not have endorsed licenses for those who can handle foreign languages with reasonable fluency that would permit the hobbists to operate in sections of the 10/15/20 meter bands other than the U. S. alone bands, possible in special segments? To qualify for the endorsement the applicant would have to show proof of having passed at least 2 years of the language in school or would have a sworn statement from someone who had that the person was reasonably fluent in the particular language. . . . The FCC could think it up some devilish penalty for non-endorsed off land operation. Any suggestions, group? — Lowell Ponte, W7TDRS, Holland, Ohio.

1. I finally stand behind K83HJ, most of it at least. I am also a junior in high school and did study first-year Spanish. Although I didn't take it out to such extent, I do try to speak their language. I do not, however, believe in the proposal that we be given certain segments or power limitations. — Judson V. Whately, W4NZJ, Cedartown, Georgia.

WIDE SIGNALS

1. I read in your magazine about suspensions and revocations, etc., because of illegal tickets, Novices working 75-meter phone, etc. Do the hams with extra-wide a.m. phone rigs ever get their whip slapped?

Listening (I do a lot of that), I read the mail on some that are better than 20 kw. I'm glad! My equipment is up to par enough so I can check very accurately and they are not leech with our antennas tied together.

I've checked them on a scope and listened to their "hen scratching" 15 and 20 kw. is really wide. What happened to the old 6 kw. slots? — Jack Patterson, K7UI, Jamestown, N. Y.

WHICH COMES FIRST?

1. Regarding the letter from VK3AIZ, Victoria, Australia, it would seem that the "their" system makes more sense than "ours," since the units of time are in sensible progression. However, it also seems as though the only objection to using the "29 Jul 01" system would be that languages other than ours would have different abbreviations for the months. Any other objections? — David Z. Earle, WB2CZ, Indianapolis, Indiana.

DO SOMETHING ABOUT CB

1. Been reading all the QRM lately concerning amateur gripes about Citizens Band operations.

Some of the statements by fellow "Hams" are on the extreme side. I would remind all amateurs that the "Ether" is the property of all the citizens. The FCC acts as "agent" for the people by making rules and allocating frequencies, etc.

The amateur fraternity could follow the lead of the Petersberg Amateur Radio Club of Petersburg, Virginia and do something about Citizens Band.

The PARC made a drive for all interested CBs to attend (Continued on page 168)

October 1961
Perhaps the old argument about how much power is enough will never be settled. Surely the low-power transceiver boys will never be happy when their high-power neighbors come on and blank out their whole band. Oddly enough, the use of high power by stations at least 100 miles away is considered perfectly acceptable by the same stations, their complaint now taking the tack “That guy ought to fix his receiver so he can hear me.” I guess a case could be made for the type of operators who are only interested in low-power local type of operation, but I was reared on a sterner diet. It seems to me that a genuine ham-type fellow has a duty to the pioneers who went before him.

Are we to believe that the sweat and tears put into the v.h.f. by the Ross Hulls and Boyd Phelps of yesteryear were for naught? Should efforts to advance the art stand still while a couple of crusty hams discuss the merits of the latest type of push button? I think not. I believe that anyone worthy of the title of “Ham” should be willing to protect himself in the clinches. Ignorance is surely, in this case, no excuse. The number of dissertations, papers, articles and talks rendered on the noble art of receiving signals through interference is as long as ham radio itself. I do not think that every ham should be an expert on it but if he isn’t, he should be willing to admit that he is deficient in the technical aspects of his hobby. It doesn’t take a Ross Bateman to figure out why a Communicator drops dead when a high-power station comes on in the same half megacycle. And blaming the high-power station for your troubles is about as sensible as blaming an s.s.b. station for not having a carrier.

Now it is (unfortunately) true that there is no regulation which requires you to have a receiver, (and, believe me, if you are experiencing overload problems, you don’t have one), but there is a

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*P. O. Box 334, Medfield, Mass.*
Here and There on 6 and 2

Our thanks to Rosalind, W9LRG, for the following information concerning a six-meter DX station: "Doug, W8ADM/KC4AAB, has asked me to drop you a line and let you know what's happening on 30 Mc. down at Ellsworth Station, Antarctica. He has recently put a kw. station on 30.015 with an automatic keyer that puts out a combination of dots and dashes. This is a 24-hour-a-day operation." We don't know what kind of antenna, receiver, etc., that Doug is using but it sounds good and, I'm sure a lot of amateurs will be interested.

In Virginia, K4VWH, Don, worked KO10A for number 48 during the V.H.F. contest and is probably the first Virginia station to set that No. 48. Now, as Don says, after getting the 48 in nineteen months, he'll probably just have to "sit and wait" for the hard ones. On the week end of July 1, 2, and 3, W3BWV worked K4AML, K4MCK, K4AJF, and 240E on 30 Me. all on phone, that suggests that the v.h.f. gang pay more attention to propagation and they'll probably get a little more out of operations. Highlights from a letter received from Bob, W9NVM, report (as many others do) that this has been a good year for sporadic E. Bob also mentions the great amount of s.a.b. activity, centered mostly between 50.1 and 50.12. A few of the highlights from Bob's letter state that on May 29 he worked KATVY, who QSL'd immediately, thus making it 47/47 for W9NVM. On that same date he heard VE96Q, VE5XP, VE6UV and VE6MO. VE5XP and VE6UV were the one ones. (At least he did manage to snag one from each call area.) June 4, according to Bob, was one of those "wild openings" with all areas heard except 6 and 7 bands. Even heard VE6 and VE6. June 29 VE4QZ was heard. Between June 27 and July 16 more s.a.b. stations were worked by W9NVM than a.m. stations, and many times were very good copy in Madison, Wisconsin, when no a.m. stations were being heard at all. Some of the rumors heard by Bob during the recent openings are reports of K7AVU being worked in Florida and New England, P5 being heard in New England, and scattered reports of stations either hearing or working TI, KZ5, KV4, VP5, CO, and northern South America. We've heard some of these rumors too, but have had no such reports from the stations involved. Fact or Fiction? We just don't know! Second- or third- or fourth-hand reports just don't support the facts on most occasions; we'd like to report 'em all but can't do it without reports from the stations who "dood it".

An active sidebander on 30 mc. from the west coast is KGQXY, who is presently doing quite a bit of scatter work on six meters. Bob works W6FPA regularly, about 230 miles, and gets many, many "pings" from the boys out of Los Angeles. Another of Bob's frequent contacts is K7JTG.

October 1961
and 27. Dick was one of the many who worked VESBY and on that same night, July 4, also heard VE2C4V and VE3AW and worked VE3Y4W for a new VE district. Almost worked VE6VL (50.4) but band left before reports could be exchanged. According to Dick all the VEAs had one thing in common; rapid QSB and with the b.f.o. on a T9 carrier with no trace of aurora. Dick was also one of the fortunate ones to work K33UV/Y02 during the evening of July 13, with 547 reports both ways. W42BAI, Fred, mentions that during the auroral sessions of July 4 and 9 he was listening on Florida stations and during aurora on the 10th into the Gulf area. W3AIVM also mentioned the auroral session of July 17, but replies he received after calling CQ were on a.m. and not geared to copy. Dave, K0R3A3, worked W9QUV during the aurora of July 26 at 1500 CST. He also heard several signals from 9 land. On July 21 Dave observed anaural Es to Brandon, Manitoba (VE6Y4W) and then to Yellow Knife, N.W.T. (VISEBY). Later the same night he worked VE35DA. W2ABAI has set up shop for the summer in Niskayuna, New York (near Schenectady), and has gear set up for 50 Mc., 144 Mc., and 220 Mc. During the June contest, Stan worked four new states, Texas, Arizona, California and Idaho; and then on July 4 worked XE1OE and WICOE in South Dakota for state number 39. Stan is using an NC503 with converters for 50, 15, 10, 20, and 80 Mc., and 100 watts phone, 150 watts c.w. for transmitting. Antennas consist of 4 elements on six, 18 elements on two and 2 and 220 Mc. slots stacked 100 elements each, these all stacked atop a 30' tower. "I wish we had a double hop," Joe said. "We have it go good autority (W7RT) that Sunday, July 16, can now be called 'Texas Day'. Between 5 and 7 p.m., DST on that date, John had QSOs with 33 different W3s in Texas. At the same time he was hearing a few stations in Florida, Colorado, Nevada, Nebraska and Minnesota plus many California stations. John says he is possible to work 48 states during the last few months and says he has QSO on 50 Mc. under the band has been open 50% of the time for DX. The band has been open 50% of the time for DX. I wish we had a double hop."

W4YRM had his share of DX during July when he worked Pennsylvania, New Jersey, Texas, Colorado, Nebraska, Massachusetts, Connecticut, New York, Virginia; all of these between July 8 and 17. Julie runs 150 watts c.w. and 125 watts on phone on 50 Mc. K68IL got these quite a few bands opening during July but due to a heavy work load was unable to operate very much. He's hoping to get the six-meter beam back up in the air very shortly. I've noticed that a number of the gang have said practically the same thing. "Due to the heavy work load I've not been very active," or "Although six is still very good, I haven't done too much operating this month; wonder if it could be because they're trying to get caught up on the things they neglected to do during May and June while the band was really "hot". Helen gives the same reasons for not being on the air quite so much during July. KAUDP tells us that he now has eleven states confirmed on 50 Mc. with about 10 watt power from the antenna. He has them as New Hampshire, Oklahoma and Louisiana. Dick also mentions that there are two hams in Gainesville, Georgia, now himself and K4UVD. K4UVD is using a household Heath Sizer. Another Georgia observation, this time from W4FWH, who says there were not many openings during June, but some rather unusual openings. W8, W8RAN, and his XYL, K8YKW, both worked VPSBY on July 28; first time for K8YKW but a re-do for W8. W8RAN would like to hear from anyone in West Virginia, Kentucky or Tennessee west of the Mississippi. W8 is six and two meters. He is presently working on a stacked 6-meter four-john beams for 6. We do scan around the country (a'ain't six just won-ful - Helen), this time Dave, K7BBQ, from Texas, Washington, sent me that he heard W6NLZ on forward scatter on July 18 and 23. He's heart it's been a good year for him for hearing the Es and 6s, but expects the band to start dropping out soon. Another Dave heard from is W42APC who says that the band has been open 50% of the time (during July) to Texas, Mexico, and the east in general. He is using a six-element 6-meter beam 85-feet high and says "amazing what height will do". W44UU/W8UU is operating a beam 120' tall with 600 watts on 6-meter for 300 watts to a 4-element beam usually directed north. Often changed to NE and West. No specific times of operation but

220- and 420-Mc. STANDARDS

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<td>50 Mc.</td>
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The figure after each call refer to states, call areas and mileage of best DX.
usually in the afternoons and evenings. W9AOW reports extended ground-wave on July 5 when he heard five states, the farthest being Iowa. Another from Indiana. K8PFP, reports openings of July 10, 11, 12, 18, 20 and 28. On the 11th to 26 June, W7BMD in Florida the 11th to August 4, Texas and Louisiana; the 12th to Colorado; the 18th to Texas; the 20th ground wave into Ohio; and the 28th into California. Cherry says he's tinkerin' with a cubical quad for six which he has worked fairly well, just one difficult thing--mounting! He has to take his 4 element down from the top of the tower by hand to mount the other one. Oh well! Just one of the fun things of ham radio!

Report through Dot, K9GHC, that K9PIB heard K7AG calling a W7 on the night of July 18 at 0445 GMT. VE4CV, Caux, was on or near the frequency and made the K7L rough copy. VE4CV getting through to Kansas like a local. Dot gives us a detailed report of the July openings into Wisconsin, which wish we had space to print entire report. However, the band was open in her area for fourteen days during July and during that time she copied or worked 35 states plus XE1 and VE4. According to K9CDN, Forest Park, Illinois, six meters was open almost every day during the first two weeks in July. Most of the openings were to the west but a few were to the east extending from Florida to Maine. During the opening of July 8 he worked South America running 2 watts on six meters to a 3-element beam and received a 5-5 report. From Indiana K9FPF says that July was less active than June (we're all worn out!) for long skims but Florida and Illinois were in for a part of each day. As almost everyone agrees: 'the skip is far better than last year so far...'.—Jim. We've had this comment in just about every card, note, letter or report received and are inclined to go along with it, but—remember the activity! Compare the number of active six-meter stations reporting against the number in the same area a year ago. It's difficult to say for sure, but there are definitely many, many more active stations on six meters than there were a year ago. Jim has worked and confirmed 35 states to date.

Dxpedition

Word received directly from Charlie O'Brien, W2EKJS/ FPRAS, tells of his coming trip during the last week of September and the first two weeks of October to St. Pierre. Due to the generosity of the Johnson Company, Charlie will have the use of their newest rigs, the Ranger II, and will thus be able to operate on 30 Meters, on both cw and phone. He does not know as yet the exact frequency he'll be using but says it will undoubtedly be very close to the cw edge for phone. Charlie will be using an 11-element T-shaped beam which he plans to rotate 360° from his shore location. The beam will be headed down W1 and W2 way for the duration of his visit to St. Pierre. (Sorry, fellows!) We assure all that those who have the best of luck, Charlie, and we bet that most of the 10 meters and above will have their beams ginned up your way during that period of time.

This one we received ‘first-hand’ from W8NOH: “On July 3 at about 1500Z, heard K02EG coming in loud and clear at 9 and over for about 15 minutes on 50,300 on W5AVY, on c.w., 50,000; unable to raise either. Called CQ and P22R on c.w. came back from Arubal First Michigan QSO!”

Perseids Meteor Shower

Most of the schedulers amongst the 144-Mc DXers had some luck during the recent Perseids. Don, W1AIKZ, reports the results and adds: “I heard although he heard from the station he least expected to hear, W0ENC, Rapid City, South Dakota, came through with signals and short bursts and complete calls on the 11th, 12th, 16th and 14th during the 2200 EST periods. Complete calls were received from W5JW, on August 10 and not a single "ping" after that. Also through Don we learn that W5FZP made contact with W4WJZ and W5FZM and received complete calls on a scheduled call and about 10 minutes on 50,300. K0FZM’s first sked on August 10. Thanks, Don, for the information. W2ALR brought his total on 144 Mc. up to 24 states when he worked W5FZP during the Perseids. Larry sez he’d like to report something interesting but it’s been rather quiet in his part of New York. Other than the tests of W2F on August 17 (nothing new worked) when W4GR was the loudest station coming through, and lots of other 9 and 80 coming through, nothing to report from W2ALR. Rex.

2-METER STANDINGS

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

W5RCI, brings us up to date on his 144-Mc activity with his Perseids report. He worked George, W1MNN, in Vermont during their Perseids sked, for state number 37, on August 10. W5WZG received W5FZM’s sked then their first sked on August 10. Thanks, Don, for the information. W2ALR brought his total on 144 Mc. up to 24 states when he worked W5FZP during the Perseids. Larry sez he’d like to report something interesting but it’s been rather quiet in his part of New York. Other than the tests of W2F on August 17 (nothing new worked) when W4GR was the loudest station coming through, and lots of other 9 and 80 coming through, nothing to report from W2ALR. Rex.

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

For Cheriton, Virginia, K4EUS, Sam, we received his report of the successful contact with Mike, W5C6U, bringing his total up to 25 states worked. Mike sez this is his first m.s. contact after about four years of

October 1961
K6QXY, Bob, at the controls with his OM, K6YL, Frank, giving moral support.

working at it, and that more power, better receiver and bigger antenna put up higher, finally paid off. Jack, W8JPT, didn't find the Persians as good this year, although he had a QSO with W4EWC, South Dakota, within six minutes of their first seek. (It was a new state for him.) Jack did work W5KXO for state number 38 on 144 Mc., and heard a few signals from W7LEE but no contact. Nothing heard from schedules with K7IDQ in Utah, or K5TQP in New Mexico. Old regular, Leroy, W5AJG had two skeds during the showers; the one with W8IFS in Minnesota paid off and brought Leroy's two meter total up to 32 states worked. No luck on the sked with WIREZ in Connecticut. Three out of eleven skeds proved to be successful for Ernie, W5FYZ, the successful ones being W2ALR, New York; W4WNL, Kentucky; W8BBF, Iowa. Many long bursts were copied from K4EUS and W8AZT but just couldn't put them together for a legitimate contact. A 20-second burst was heard from W1JDF and a number of glims from W1AZK but that was it. Nothing at all heard by Ernie of W4MLX or K7CW although K7ICW reported hearing one complete call sequence from Ernie. We're very sorry to hear of the death of a well-known切for in Louisiana circles; Almarin Colvin, W5KTD, suffered a heart attack while aboard a survey ship off the Bahama Islands. If there are any 144-Mc. stations in Indiana, West Virginia, Delaware and North Carolina who would like to try m.s. skeds during the coming showers, Ernie, W5FYZ, in Louisiana, would be happy to hear from them.

Moon Bounce

KH1M1 at Farmington, Connecticut, has his 144-Mc. moon-bounce set-up completed and is in operation on a more or less regular schedule. Operation is on 144.252 mc or take 39 kc. The antenna has 170 elements in clockwise circular polarization. Naturally, reception should be attempted using counter-clockwise circular polarization. Actually, as long as Neil has done all the work on his end to provide a solution to the faraday rotation problem, his signals can be heard on either of the polar linear polarizations as well. (Assuming sufficient gain, etc.) Transmitter is running 1 kw. input, and receiver has adequate selectivity and a good paramp in front. Unfortunately, by the time you read this his advance schedule will have been completed. If you weren't on his advance mailing list and are interested, I would suggest writing him for further information. W6M1MU informs us that "The Two Meter and Down Club" have completed their 1200-Mc. moon-bounce receiving set-up and are in a position to start listening as of the 25th of August. Their set-up includes a paramp by Don and is using an eight-foot parabolic reflector on an equatorial mount. Details are hard to come by but will probably filter out of the beemdomics as soon as they have had some success.

Meanwhile, at the other end of California, we have W6BZJN and W6AXN who have completed 10- and 16-foot pole-mounted dishes and are ready to listen. W6BZJN has a W6M1MU paramp feeding a W1OOP converter. IF is 16 Mc. to 455 kc, with crystal-lattice filter giving 100-cycle selectivity. An audio filter of the bridge type allows variable selectivity down to 8 cycles. Receiver to string starts at 5 Mc. Ten-foot parabola is built using a system worked out by W6AXN. Mike has his 10 meter (made by the same process) ready to go and will be transmitting by the time you read this.

In Ohio W8L1O has completed the enlarging of his dish and now has a 20-foot in operation. Preliminary tests have been very gratifying and it is very likely that the first a.m., voice transmission will be accomplished in the next month. Jack has one of the UPX-1 transmitters and will soon have 300 watts of c.w. feeding his antenna. The UPX-1 uses 6 2SC30As in a ring amplifier and looks like the answer to a moon-bouncer's dream, as far as the transmitter is concerned.

One European effort on 1200 is nearing completion. Karl, DL6FAR, says that the only remaining big effort is to get his ten-foot dish mounted on its roof-top polar mount. Karl plans to enlist the aid of a helicopter in moving the dish to its final resting place. HB9RTG has been listening daily on schedule for W1BU. Transmission schedule at W1BU is too variable to supply a list. We operate on a twenty-minute schedule only as requested to do so. So far there are five active listening installations in the U. S. Only one active transmitter, however.

Strays

Boy Scouts in Canada will hold their fourth annual Jamboree-on-the-air October 21 and 22. Listen for VESJAM on 3750, 7210, 14,106, 21,185, and 28,400 kc. Scouts who make contact with VESJAM or other individual Scouts during this Jamboree will receive special "participation cards" if they report their work to "Jamboree-on-the-air," Boy Scouts International Bureau, 77 Metcalfe St., Ottawa, Canada.

The barge Arizona Sword sunk in the Atlantic off West Palm Beach, Fla., on Jan. 13, 1961, and seven seamen lost their lives. If any hams happened to hear the radio communications between the barge and its towing tug prior to the sinking, please communicate with Attorney John R. Parkhill, 308 Tampa St., Tampa 2, Fla.

The International Ham-Hop Club was designed to help amateurs on one side of the Atlantic visit with amateurs on the other side — cutting down the expense of foreign vacationing. The Club particularly wants members in North America. For further info, write to R. I. Gunther, W6TTH -4, Biology Department, Brown University, Providence 12, R. I.
Operation NCEF. In August QST we asked for comment on the National Calling and Emergency Frequencies. Thanks for all your responses and various ideas. One group is anxious to have the NCEF at 50.55 Mc. patronized widely "to better populate the upper part of 'six!'" Of course we're all for that. Another NCEF booster says to give an extra point for receiving messages via an NCEF to encourage more listening there. The dividends from general use of the national calling and emergency frequencies are ample without extras. That is, (a) ARRL message-points (for receiving a message, and relaying or delivery for a second point) come easier through use of an NCEF, and (b) finding states, for WAS or other purpose, is the reward for correct calling and consistent NCEF-plan listening sessions. WH2T summed it up when he said: "The NCEF plan is an ideal mechanism to help make contacts with any locality at any time."

Like any doctor's prescription, there is no benefit, except to those who follow through on the directions. For emergency, after we find a given net or sked can't help, a QRRR on an NCEF is appropriate. The Red Cross and many c.d. Hq. will have monitoring receivers on the spots for local and statewide coverage. For daily calling purposes, an NCEF, since it has more listeners tuning back and forth across it, or monitoring receivers siting there, will net better results. Short calls (3 x 3 suggested) with frequent breaks to listen and 15-minute spaced calls that hit new groups coming on the air, are calculated to get the answers. Let us also put the directional CQ, specific of direction, N-E-S-or-W, or of place, to work on the NCEF for a given band. We must do our personal share of keeping an ear bent to the NCEF in our favored bands at all times practicable too.

Here's to Your Test With the NCEF's (on the National Calling and Emergency Frequencies, that is).

C.w.: 3550 7100 14,050
21,050 28,100 50,550 kc.
Phone: 3875 7250 14,225 21,400
22,840 145,550 kc.

Note: Canadian frequencies are 3555, 7050, 14,060 kc. on c.w. and 3765, 14,160, 28,250 kc. on phone.

Prescription:
1. Use daily. Or each day you are in your shack and can be on.
2. Activate your regular or surplus monitoring receivers on an NCEF (above) to become part of a constant-alert amateur communications pattern.
3. If and whenever you hear pertinent calls, warm up your transmitter and make the contact. As soon as you are in QSO, shift to any frequency other than a C band E's too — all during October, all during November. FILE AND START A FORMAL MESSAGE, AMATEUR RADIOGRAM. See if you can move it by NCEF's... either by relay or direct. LOOK FOR A GIVEN CITY OR A NEW STATE. See how nearly you can hit your selected communications objective, and how long it takes.

NCEF TIME-TEST — OCT. 1 TO NOV. 30, 1961
In August QST we asked if you wanted an NCEF point-contest. We interpret your responses as for a test but without point formalities. We'll be glad to compile a report on results. This column then announces OPERATION NCEF... QSL cards or radiograms only required for reports. YOUR REPORT INVITED.

Eligibility and objectives: "'Tis a station operating test for each amateur who is on the air. Are we or are we not amateur communicators? Can we do a spot job of communicating, or only go off casually in all directions? How well can each of us make the NCEF's serve us?"
The test! Take one of the following problems to be solved exclusively by NCEF means. REPORT how you made out with (1) or (2) to ARRL. (1) Select three states at random. Note the starting time and date, ANY TIME YOU PLEASE Oct. 1 to Nov. 30. Contact any amateur you can reach over the air from your own individual station in three states (one of which may be your own). (2) Prepare, start and move-by-radio one amateur radiogram, complete as to check and correct as to order of parts. Send it by radio to a preselected state, NOT your own, by the NCEF method of finding stations to relay or handle it reliably.
Report — QSL to ARRL! On your own QSL, or by radiogram give ARRL the following information.
# Section Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your town have an SEC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

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## Canadian Division

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## Section: Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM’s executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your town have an SEC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.
Contest and CD Party stalwart K4BAI, shown here at the rig, really came through in the July c.w. CD Party to out-score other brasspounders with 213,200 points. John (OO, ORS, and OBS) likes DX, traffic, and ragchewing as well as contests. His ability in the latter is backed up by four section awards in Sweepstakes.

(a) Is your report for NCEF-ONE or NCEF-TWO?
(b) Names of the 3 states *
(c) Calls of the three * you worked.
(d) Band(s) used or give NCEF frequency.
(e) Total elapsed time (days, hrs., minutes).
(f) Operating time spent at the rig using NCEFS.

(*N.B. One state and one call on NCEF-TWO reports.)

Either problem, one or two, or each separately, should be good fun. This is a time test and one that must be done on the NCEFS'. It's a fair shake to select the best band for the distances involved, if you can work all bands, as every amateur should aim to. We owe it to ourselves to be just as versatile as possible. But this test is not unduly to weight versatility, as such. It's fair, as we see it, if presently we are on one band only, to set our selection of objective one or two in that band, and see and report how we make out... for personal credit and to help evaluate each NCEF in the list.

ARRL's start-of-season demonstration is a must for every amateur. The test is to show our capabilities for Public Service. The kind of test is strictly up to you and your Emergency Coordinator as is the exact day, hour, and simulated contingency. It can be a quiet exercise that examines deployment of mobiles, tests the activation of emergency power at fixed stations, re-registers and expands the Amateur Radio Emergency Corps membership throughout the nation, and improves planning and execution.

Your Section Emergency Coordinator's name appears on the facing page. You can find the name of your local EC from him, if you don't already know. Our Emergency Unit Placards and ARDEC decals, available to ARDEC members from their EC, should be freely used by groups actively in the S.E.T. ECs should get statements from city, state, or agency officials if possible, as part of the exercise. Our S.E.T. should be but the first of a number of local radio exercises during the year to achieve the very best plans and radio coverage for possible disaster uses. Each group should review its own results and recruit and better the communications capabilities, whatever they are. Radiograms will be prescribed in the test and for reporting; all amateurs are here reminded that while some Oct. 7-8 traffic will come by section nets and National Traffic System channels, there will be many messages floating around. Give the National Calling and Emergency Frequencies a full workout in and after the S.E.T.

— F. E. H.

RESULTS, JULY CD PARTIES

With the summer noise level at its highest, and 80-meter conditions at its poorest, both in the phone and c.w. CD July Parties, you either worked the high bands or you were just plain out of luck as far as raising the CD gang was concerned. Twenty meters, hotter than a pistol, proved to be the mainstay, while the real high scorers made excellent use of 10 and 15 meters. Who says these bands are dead? For example, comparative youngster and CD veteran K4BAI with 849 QSOs in 85 sections was torn in the c.w. party with 213,200... helped greatly by 81 contacts made on 21 Me. Another young ORS WS1BX was second with 205,690 points and tied three-ways with W1YE and K4BVD for high section total of 69. Old Timer W4YP was credited through 200K with 202,200. On phone K2KIU was torn with 28,800 in 154/36... Ken too made much use of 21.3 and 29.6 Me. to score out those rare sections. K5DMX scored high section total with a starting 42 sessions on phone. Of course, in October we look for better 80-meter conditions to up our contact totals, but keep that good ear peeled also to 10 and 15 again. It just might be the "rave" it was this time.

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

W4DOL

C.W.
K4BAI...213,200/449-65...K1KYP...111,185-392-60
W3KDX...183,300/417-66...K1KQ...113,300-371-06
W1YE...201,200/905-66...K0RXW...112,355-365-61
K4BVD...185,620/595-62...K2UP...112,230-380-68
W1RX...111,375-590-61...K2JF...110,230-391-05
K2KIU...198,300-505-66...K7JF...114,230-384-55
K5BSZ...187,375-510-65...K2JG...118,385-104-53
W3KES...160,000/324-63...W1D...116,955-324-62
W4LI...157,170-503-62...K7D...118,245-369-57
K1RAD...155,700/411-60...W4KFT...115,920-395-64
K4BQ...151,190-361-65...W1UF...115,305-391-65
K4BH...158,300-395-63...W3L...118,500-340-51
K4AMC...145,200-364-57...K6L...119,410-367-56
K2SH...143,200-452-66...W3Q...117,105-368-56
K1HIN...142,100-562-61...K5JMK...105,225-371-64
K1WNL...141,000-464-60...K1W...141,418-385-51
K4BY...133,259-429-65...W4C...130,100-329-60
W0H...134,350-467-65...W4C...130,100-329-60
W3KLS...134,500-383-61...W3K...128,090-154-60
W4AKI...126,300-115-62...K2K...126,090-144-60
W3Q2Y...130,240-402-64...K4B...27,000-126-26
W0Y...128,240-402-64...W4C...27,100-126-26
K2K...127,290-395-61...W4Q...25,740-137-56
K4BR...123,840-383-64...K2K...15,915-115-56
K2F...123,810-383-64...W4Y...24,140-125-56
K0PSU...120,240-411-58...K2J...14,000-76-56
W17M...118,770-363-57...K5DSX...12,240-76-56
W4W...117,100-362-60...K2Z...10,800-85-56
K4FM...108,030-103-58...K2J...7,500-85-56
K2LO...107,600-363-63...K4K...5,000-65-56
K2B...106,600-363-63...K2J...5,000-65-56
K4LO...106,600-101-57...K7F...5,000-65-56
K4LO...115,400-102-57...K7F...5,000-65-56

W1WPR, op.; T W4C, op.; T W3KLS, op.; T W0H, op.
The control center for the Los Alamos, N. M., Operation Alert exercise was established at the club station, W5PDO. These two pictures were taken inside the "shock." At right, a message clerk busily types messages while WSHFW (seated), W5SOT and W5HYQ engage in serious discussion. At left, K5RHR patches in another rig.

With the AREC

We are getting a great deal of material for this column, these days — more than we have room to print. The stink of it facing us at this writing is formidable, and even more awesome is the task of deciding what is usable and what is not and trying to forget about any angle but the undiluted merit of each. First priority is given to accounts of operation in an actual communications emergency. Now an emergency isn’t always a communications emergency, and often amateurs participate in such activities; so, we give these second priority. Third priority goes to alerts, when an emergency is expected and amateurs are deployed and even start operating but the expected emergency doesn’t develop. Fourth priority goes to non-emergency activities such as AREC participation in public events. And last priority goes to reports of routine tests, drills and simulated emergencies. Needless to say, occasionally one or two items in the last two categories receive the light of the printed page because they become obsolete with age and are scrapped.

Then we get items that don’t fall within any of the above categories, so we mark them “special” and look for an opportunity to use them, meanwhile holding them in our source material file. When they become yellowed with age, we have to throw them out to make room for more current material.

We doubt if you are much interested in our editorial problems, but we can’t help pleading for your understanding and cooperation, sometimes material submitted is so incomplete (we don’t require you to be a master with the pen, but we do need facts) that it just has to be blue-pencilled. If you sent us something that never got printed, there was a reason for it — a good (we think) reason. Maybe you won’t think it’s so good. But of one thing we can give you absolute assurance: the reason had nothing to do with who you are, what you are, or where you are. We take all material as it comes and judge it strictly on its own merit. Our judgment is not perfect, but it’s all we have to go on. You fellows have been swell about submitting material you think might be usable; there is no dearth of it for this column. Keep it coming. We promise to use as much of it as we can in the space allotted to us.

On the North Dakota snowstorm writeup (July QST, page 80), delete the notes W4SCH and W5GCI and add the calls W5CZL, W5CCH and K5GGI.

At approximately 2330 GMT on June 13, the city of Pharr, Tex., N. Y., and several nearby communities in Clinton County were hit by a storm with gale velocity winds, lightning and torrential rain, uprooting trees, downing power and telephone lines and leaving many areas without electricity or telephones. Immediately following the storm, acting EC K5BYL made contact with W5OHI mobile, who was already heading toward the major damage area, and within minutes AREC services had been offered to and accepted by fire, police and sheriff’s departments and news agencies. As more mobile units became active, they were utilized to the fullest extent. One unit supplied temporary communication to the Fire Dept. control center; others patrolled the city, reporting damage areas, blocking off traffic, planning emergency flights. Some controlled rural areas looking for possible fires, controlling official and re-routing tourist traffic. A country-wide AREC emergency net was called to assist the mobiles, with K5YXR and K5BYL alternating NCS duties. Mobiles participating were K2MKB, W4A9 RVA SIE EBB JHU JAY C8C and JKC. Fixed stations included K5UYM, W5A9 NYT RLV and G7Z. — K5BYL, Acting EC, Clinton Co., N. Y.

We can now supplement the saga of XE2PAY, reported in this column, Sept. QST, with a report direct from XE2LR, who owned and operated the equipment. The unit left from Monterrey on June 19 en route to Del Rio, Texas, via Eagle Pass (not Laredo, as previously reported). During the trip, contact was maintained with XE2s (CY CZ QA DB FP as far as Saltillo; get yourself a road map of Mexico, if you want to follow this). After that, as far as Sabins, contact was maintained with XE2s and XE9s. At Sabins, the unit had to cross the railroad bridge because the highway bridge was under water. From this point, communication was maintained on 7000 kc. with XE2s and XE9s, and IA. The entire trip was fraught with difficulties caused by torrential rains, heavy winds and landslides.

At 0110, June 19, XE2PAY crossed into Eagle Pass, Texas and was met in person by K5QPR, and an overnight stop was made. The following day the trip to Del Rio was continued, with XE2PAY listening to emergency operations on 7200 kc. but being unable to transmit. Arriving at 0830 in Del Rio, using blind transmissions of W5ABB as a guide, they proceeded to the International Bridge where they parked their car and crossed the bridge on foot (and had been closed to auto traffic) to locate the general in command of troops assisting in the emergency area of Villa Acuna. Unable to find him, they returned to the U. S. side, where it was revealed that XE2PAY had been given temporary permission to operate in the emergency-declared frequencies of 7275-7285 kc. An antenna was erected and operation commenced, with contact with Monterrey, Reynosa and Saltillo, assisted by W5ABB. Operation was suspended at 0330.

We assume that it was the Mexican city of Villa Acuna, just across the border from Del Rio, Texas, that was hardest hit by the flooding and that the Mexican amateur mobile unit was unable to reach it without crossing at Eagle Pass and approaching from the American side. We also assume that it was W5TRY, Texas c.d. communications officer, who managed permission from FCC for XE2PAY to operate from the U. S.
The crew of Mexican mobile XE2PAY (XE2LR, left, and XE2L, center) are greeted upon arrival at Del Rio, Texas, by W5ABB in front of his service shop.

On July 10, a cigarette carelessly tossed into dry brush by a passing motorists near Crescent City, Calif., caused a blaze that endangered the home of W5HY and surrounding national forest. W5HY got on the air and called for help and was answered by K7HBA/Z, who contacted his local forestry office, which in turn contacted the forestry office in Crescent City and two service trucks were sent to fight the blaze. W7TQF later helped get a message to the sheriff's office in Crescent City so that the character who started the trouble could be apprehended. — The Oregon Nettier, June 1961.

On July 28 a tornado caused considerable damage in Sidney, Troy and Greenville, Ohio, and the Miami Valley Emergency Net was activated to assist with communications. Streets in Troy were blocked by fallen trees, power and communications lines. Participating amateurs were K5COQ/mobile, K5VDE, W8s CTO JDQ PEX HPG FW ALZ HZV, — W9FPC, Assl. EC and W8THA, BC Miami Valley, Ohio.

At 1800 GMT, July 30, W8PNI alerted Huntington (W, Va.) EC W8FUM that a flash flood was reported in the Paintville, Ky., area. County AREC and RACES stations were immediately alerted and the county control station was put on the air under the call W8FUM/8. The six-meter stations were unsuccessful in raising the flood area, but W8FUM succeeded in doing so on 75-meter phone. W7QF SKY WE and K4ZHO in the flood area handled emergency traffic with him. At 2300 a request was received to send a c.d. rescue team to the scene of a drowning at Beech Fork. K5NMH/mobile went along to supply communication and when contact was lost with W8FUM/8, W8AFX provided a relay. The body was found at 0055 and K5NMH returned to Huntington. W8s AFX and NJL also assisted at the control center. W8PNI reported that radio was no longer needed in the flood area and operations were secured at 0330. The following additional amateurs were known to have been active: K8s DKK OVI BEL IYU EFB GMV W8PJJ, WALGB, — 1F8FUM, EC Cabell County, W, Va.

On Aug. 5 at 1400 GMT, W8FUM was alerted by civil defense that a search for three missing boys required communications assistance. W8FUM/8, Cabell County (W, Va.) e.d. control station was activated at 1450. Stations reporting into the net included K3MXT/8, K4MRT/mobile, K3NGL/8, K4EFT, K8s BEL OVI IXU/mobile TKR/mobile IYU/mobile, W8s AFX NJL. Mobiles reported to e.d. officials in charge of search units at 1455. The missing boys were found at 1535 and operations ceased at 1600, — W8FUM, EC Cabell County, W, Va.

The Kansas Storm Warning Net was activated at 1815, June 3, when a severe storm was forecast for the area of Liberal and Meade, Kansas. The net tracked the storm and Associated tornado funnel cells until it headed north and was last sight of, at which time communications to the north were notified of possible trouble. A total of 19 amateurs took part in the activity. — K5IZU, SEC Kansas.

The Newton (Kans.) Amateur Radio Club activated the local storm net on June 17 at 0600 in order to handle traffic associated with the cleaning up of Sand Creek to remove flooding of the city following heavy rains. Two mobile units and three fixed stations were used, including club station W5BZH. More than 12 local amateurs were active all day long, and the net was closed at 1700. — K5EMB, Asst. EC Zone 5.

Late in the afternoon of July 7, a freak weather condition produced a rapidly-moving tornado that struck Kenmore and Tonawanda, in the northern suburbs of Buffalo, N. Y. Assistance EC W3QJJ reported to Kenmore e.d. headquarters and alerted the six-meter AREC net. Within 15 minutes seven stations were on the air at strategic locations and three fixed stations were standing by for possible relay traffic. W3QJJ as base station transmitted from that location until it was determined that normal services had the situation under control. — W3BIXE, SEC Western N. Y.

Amateur radio kept a worried grandfather in Jersey City, N.J., in touch with the condition of his small granddaughter, who was critically burned in an accident in Miami. Upon hearing of the accident, K2JKR, who lives in the same building, contacted K4DJW in Miami, enabling the man to talk with his daughter, mother of the child. Other amateurs "reading the mail" assisted and some have sent good wishes and even donations to the mother of the child.

On June 15, amateurs in the Cupertino area of the Santa Clara Valley, Calif., were called upon to assist city officials in asking people to conserve water. EC W6BEC called for volunteers on the c.d. net. Later, other towns in the affected area were also aroused, and the Santa Clara County E.C. Net on 145.29 MC, was activated along with the c.d. headquarters station. Water pressure returned to normal around midnight and operations were suspended. — W5ZBZ, SEC Santa Clara Valley.

The tally of SEC reports for June is 26, representing 12,657 AREC members. This is the lowest number of reports for any single month this year, and a far cry from last June's record 52. However, the number of AREC members represented is almost a thousand higher. Sections heard from: Mich., NYC-LI, E. Mass., S. Texas, Ind., Wash., E. Fla., Ohio, N. Texas, Iowa, Utah, Nevada, Colo., S. Dak., Santa B., Ore., Ga., Md.-Del.-D., Tenn., Okla., E. Pa., Va., Kans., W. Va., W. Fla., Santa Clara Valley.

This brings us up to mid-year, so let's whoop up a comparison. So far, we have received 178 reports (185 last year) from 42 different sections, as opposed to 100 reported for this year. As far as standard reports are concerned: S. N. J., W. N. Y., West Pa., N. Dak., Ark., La., Miss., Ky., E. N. Y., Nebr., Conn., N. H., R., I., Alaska, Idaho, Mont., Hawaii, San Fran., N. C., S. C., N. M., W. I., C. Z., Ariz., Que., Alta., R. C., Main., Sask.

RACES News

We have a supplementary report on OPAL-1961 to end all supplementary OPAL reports. This one comes from Los Alamos, N. M., complete with nine beautiful glossy 8 x 10 prints of the boys in action. At this late date, it is regrettable that we cannot do them more justice, but we'll try to get two of the pictures in, and summarize the operation, to wit:

Official notification of the beginning of the exercise was received from local e.d. at 1510 GMT, April 26. AREC and RACES personnel were notified and those responsible for out-of-town operations packed and checked their gear. At 1300 on April 27, 7 mobiles and 12 operators were dispatched to relocation centers in Durango, Pagosa Springs, Monte Vista and Alamosa, Colo., with an additional operator at state e.d. headquarters in Santa Fe. Operation was begun at noon (1900 GMT) on Apr. 27 and continued until 1700 Apr. 29. Continuous communication was maintained among the relocation centers and traffic was handled for local Colorado e.d. officials as well as for the Los Alamos e.d. group.
The Los Alamos club station, WSPO, was activated on Apr. 27 and maintained contact with the mobile units until they reached their destinations, then served as NCS for the N. M. RACES net on 3963. Five other nets were met, including an AEC Emergency Net on 7 Mhz., ECDM Region 5 Net on 3965, and two mobile nets to local and state AEC headquarters. An actual evacuation of the city was conducted on Apr. 28, involving approximately 3000 people, 1700 vehicles and 20 AEC officials. The main portion of the drill was directed from emergency headquarters at Alamosa, Colo. WSPO closed down and four operators were dispatched to Alamosa to handle the additional traffic. Communications for AEC officials en route were handled by a mobile unit. A total of 22 Los Alamos amateurs participated in OPAL 61.

We are informed by K6TRT, Texas state AEC communications officer, that RACES plan, and we believe this completes the roster of all 50 states now in the RACES fold. Operationally, the state is divided into 20 RACES districts, each under a district radio officer. Each of the counties in Texas has a station operating in a District Net. As of June 1, the state has one 20 approved local plans, and they are aiming at a local plan in each county by June 1, 1962.

K6TRT is RACES radio officer as well as state communications officer—a big job for a big man in a big state.

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. Nominations are solicited. The signatures of five or more ARRL members, of past RACES experience, are required on each petition. No member shall sign more than one petition.

Each 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.

Nominating petitions are solicited. The signatures of five or more ARRL 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. Each of the-by-nominate, as candidate for Section Communications Manager, must meet the qualifications of this petition. Each Section Communications Manager for this Section for the next two-year term of office.

Present at a meeting of the King County (N. Y.) AEC 2-meter group were (l. to r.) K2SID, W2AGAB, K2OXK (Asst. EC), W2GSK, K2HAM and K2EOE (Asst. EC).

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. Bills 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.

—— P. E. Hardy, Communications Manager

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.

West Indies William Werner, KP4DJ Aug. 10, 1961
Kentucky Elmer G. Loveless, W4BEW Aug. 10, 1961
San Francisco Wilbur E. Bachman, W6BIP Aug. 14, 1961
West Virginia Donald B. Morris, W3PMN Sept. 18, 1961
Utah Thomas H. Miller, W7QWII Oct. 28, 1961

In the Maine Section of the New England Division, Mr. Albert C. Hodson, W1CBR, and Mr. L. George Clark, W1EPN, were nominated. Mr. Hodson received 152 votes and Mr. Clark received 104 votes. Mr. Hodson's term of office began Aug. 11, 1961.

In the Western Massachusetts Section of the New England Division, Mr. Percy N. C. Hodson, W1CBR, and Mr. David L. Welch, W1DXS, were nominated. Mr. Welch received 187 votes and Mr. Welch received 71 votes. Mr. Nodine's term of office began Aug. 11, 1961.

In the Southern New Jersey Section of the Atlantic Division, Mr. Herbert C. Brooks, K2HG, and Mr. Edward G. Raser, W2ZI, were nominated. Mr. Brooks received 214 votes and Mr. Raser received 133 votes. Mr. Brooks' term of office began Aug. 28, 1961.
We're sort of running out of subjects for this column heading — that is, subjects that haven't been treated before. Anyone want to "guest" write? We'll save it for next summer when we're going on vacation, just like they do on the big newspapers.

Guess we'll just have to hang on some of the things we've talked about before. One thing we have noticed a great deal lately is that about half the messages we handle are incorrectly "checked," or have no word count on them at all. How come, gams? What's so doggone difficult about counting the words as you copy them and making sure your count agrees with the check as is in the preamble? The least we could do is make sure the count is correct when the message leaves our station, even if it is wrong when we receive it. After all, the "check" is not an optional part of ARLL procedure, as is the filing time. You don't just drop it overboard, any more than you do the number, station, or any other part of the preamble.

Most of us copy our traffic by pencil, either because that's all we have, or because we haven't learned to copy with a typewriter. Personally, we use both or either, depending on whether or not the "mail" is set up at the time someone says "QTC, QRV?" Frankly, we think that pencil copy is one of the reasons for some of the garbling we have been howling about -- but okay, if you can't copy by mill, use a pencil. Now, if counting up to five while you're copying is too great a strain on your mental capacities, make yourself up some message blanks with specific spaces for copying five words per line. Once the message is copied, it's then easy to count the words quickly for a "check."

But this is a nuisance. Counting and copying is easy. We learned to do it in less than a week. Shucks, you don't even have to count; you can single out five words at a time with a single glance. If you find this difficult, practice a little. Have someone write down a different number of words at a different length on different pieces of paper, then have them flash

**A.R.R.L. ACTIVITIES CALENDAR**

*Dates shown are per GMT*

| Oct. 5 | CP Qualifying Run — W6OVP |
| Oct. 7–8 | Simulated Emergency Test |
| Oct. 11–15 | CD Party (c.w.) |
| Oct. 19 | CP Qualifying Run — W1AW |
| Oct. 21–22 | CD Party (phone) |
| Nov. 3 | CP Qualifying Run — W6OVP |
| Nov. 11–13, 18–20 | Sweepstakes Contest |
| Nov. 17 | CP Qualifying Run — W1AW |
| Dec. 7 | CP Qualifying Run — W6OVP |
| Dec. 16 | CP Qualifying Run — W1AW |

**OTHER ACTIVITIES**

The following list dates, name, sponsor, and page reference of QST issue in which more details appear.

- Sept. 30–Oct. 1: VK/ZA Phone DX Contest, WIA (p. 75, last month).
- Oct. 7–8: VK/ZA C.W. DX Contest.
- Dec. 9–10: Kansas Centennial QSO Party.
We're not saying that P.A.N.V. hasn't had its own editorial policies and opinions. That it has. Critics of ARRL traffic policies were allowed full sway, and this was a good thing. Progress cannot be made without the dissemination of opinion and free expression of same.

Vie, W7FIX, was and still is eminently qualified to edit such a paper. He was one of the earliest supporters of NTS. Now he is the first manager of the Pacific Area Net of NTS, served several terms as SCM of Washington, and is fortified with a wealth of experience in traffic handling — amateur, military and commercial. His wisdom and guidance, expressed through P.A.N.V., have been an inspiration to us all.

We know that traffic men will join us in wishing him an enjoyable and relaxing vacation, a restful respite from the grueling task of grinding out the pages of P.A.N.V. each month in his own time and sometimes at his own expense, and a return, in good time, to the active position of respect and leadership he will always have in our ranks, both personally and editorially.

———

We think the "Passing" (only temporarily, we hope) of the Pacific Area Net News from the traffic scene should be recorded in this column. We're sure that very few traffic men need be told about P.A.N.V. because it was distributed for many years in traffic circles throughout the country, as well as on the west coast. In his last editorial, Editor Vie Gah, W7FIX, said: "Until this editor retires for the fourth time, this will be the last issue of P.A.N.V. News." He's promised to make refunds of all donations on hand as soon as he returns from a long-awaited vacation.

We have never considered P.A.N.V. as a rival publication. Quite the contrary, we have often praised it and quoted from it in these pages. What's more, we say without much fear of contradiction that P.A.N.V. has probably done more for traffic handling in general and the National Traffic System in particular than any other amateur publication...outside, of course, QST itself. In fact, because P.A.N.V. has been able to do more to traffic matters than has even QST itself, it has therefore served as a very valuable supplement to this small-print column. We don't know what we'd do without it.

This communications van of the Free State Amateur Radio Club (K31VC) at Fort Meade, Md., can operate on 2, 6, 10 or 80 meter amateur bands and several MARS frequencies.

QST for

National Traffic System. Like just about everyone else, we're often prone to forget that those traffic men holding leadership jobs in NTS are doing what they're doing (which is plenty!) not for the material rewards they get, but for the sheer joy and pleasure of doing it. This outlook is well illustrated by the fact that hardly ever, in our eleven years of administering region and area nets and the TCC, has a leader at that level demanded to know why we didn't send him his special hand-lettered certificate which we promised when he took the job — although very often one has become impatient with our slowness in sending him blank certificates to be issued to his net members.

The other day, in going through our NTS files (we do this every so often, because we don't trust ourselves, we noticed that some NTS net managers at region, area and TCC level were appointed as long as six months ago and have still not received their special certificates. We ought to be red-faced in making such an admission (and we are, a little), but not one of the several appointees concerned has so much as uttered a peep about his missing certificate. It is pretty obvious, from this, that they consider the certificate merely a mere frill and of no importance compared to getting the job done. We're sure this same attitude prevails at section level, at which the SCM issues the certificates.

So, fellows, don't take your net manager for granted and don't give him too much a time. His job is no cinch. It will be easier if you give him the maximum of cooperation and make all criticism friendly and constructive, not mere grumbling.

July net reports.

One thing which all traffic managers in the Pacific Area have in common is that they are all at least as busy as their counterparts elsewhere. The Pacific Area seems to have the same amount of traffic as the other areas, only it is spread over a larger area, and with more traffic centers, so that it is harder to keep up with the total traffic load. The Pacific Area traffic managers have been particularly busy this month, and the traffic load is still high. The Pacific Area Net is still the busiest net in the country, and the Pacific Area traffic managers have been working hard to keep up with the traffic load.

The Pacific Area Net has been very active this month, with a record number of traffic messages handled. The net has been working hard to keep up with the traffic load, and the traffic managers have been working hard to keep the net running smoothly.

The Pacific Area Net is still the busiest net in the country, and the traffic managers have been working hard to keep up with the traffic load. The net has been working hard to keep the traffic flowing smoothly, and the traffic managers have been doing a fine job of keeping the net running.
SCN (S. C.); AISN, MSFN Eve, MSFN Noon, MGN (Milan); GBN (Out); GSN (Ga.); KYN & MKFP (Ky.); 4 TCC functions reported, not counted as net sessions.

Very good reporting, for a midsummer month. One missing section net report and a bit of a dearth of traffic kept us from breaking the total July traffic record made in 1959. The previous record number of sessions beaten by a rout this month, was also made in 1959. The previous record July "rate," beaten this month by CAN, was made in 1959, also by CAN. Breaking the records of overall traffic per session is a practical impossibility in these days of multiple reports of section nets, most of which have very low averages; the average of 15.2, which stands as the record for July, was made in 1951. Everything considered, NTS has posted another good month.

W3UK points out that July was the worst month, condition-wise, that CAN has ever experimented; we hope we don't set any good months, or CAN will leave us all behind. PAN is doing well on 40 meters, with RN7 presenting consistent 100% representation despite difficulties. W2ESZ says 2RN is having "growing pains" because of change in schedule (to normal NTS pattern), but expects it will iron out. W3UE challenges any section net to equal 3RN's record of 100% representation from all sections twice per month for six straight months. K4UBL, used the bets of 4RN back to W4SIL at the end of July. RN5 certificates have been issued to K3UBL and K4WD; heat and summer QRN have plagued the net. W5BDAE complains that lack of West Va. representation is still dragging 8RN down. W9ZYK has issued RN3 certificates to K2WIL, K5QGV and W4RQK. W6LCX wants to be relieved of TBN management the end of October. V6SBZZ is spending his vacation in V6J-land, where he hopes to smoke out some recruits for SCN. Long winter hours keep W5PEO out of TWN, but the net keeps right on running.

Transcontinental Corps. These TCC fellows, and especially the directors, can't even go on vacation without making a lot of arrangements about "Who's going to tend the store?" Now if each section had a record and allocate, this would be pretty much taken care of automatically. However, TCC is doing pretty well for itself. Here is the July summary:

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**DX CENTURY CLUB AWARDS**

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ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZIQ—SEC: DUH, RM: AXA, PAM: IWS. New appointments: QPZ as a V.I.E. QO in the Susquehanna Valley Area, SCM as an O.E. The 20-meter beam mentioned in the last report for K3CNN did not arrive in one piece. Launching was unsuccessful. K3LQK and K3KGD are reported the 2nd FRP 80-m station. K3KLG in New York City, K3KGD and K3KBD in New York with MWB and NCS. K3KBD is in dire need of information regarding an apartment-style antenna. K3KJI placed first in the VPLC, second in the ARRL rate Delaware section. K3KIM was potted at Camp Anika near Stroudsburg, K3HTZ got his first DX, and K1H still takes phone. K3KIM sends plenty of brass and does plenty of traffic-handling. HKK is 2-meter mobile to Illinois. EML and K3LMP were recipients of the "Order of the LCD" Award at a recent 3HN clan gathering. The 3HN has been setup by BWE, visiting from our neighboring section, has seen K3DRD switched from a one-element beam to a six-element beam for 6 meters resulting in extra DX. New Gear Dept.: K3KTS, a new 100-watt homebrew SWR, K3KMG, the Baltimore High School RC, on active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters. New officers of the Adams County ARC are K3IHI, K3KX, K3WJ, K3EVY. K3EVY, the Harris Fine, has a new job which is expected to keep him busy for a while. K3KPN, the Haddonford Junior High School RC, is active on 40, 10 and 2 meters.
AMATEUR PUBLIC RELATIONS,
CHICAGO STYLE

The International Trade Fair recently concluded in Chicago was an example of the ability of the ARRL, 23 local Amateur radio clubs and 128 "hams" in Chicago, plus an inestimable number of 20 meter sidebanders across the nation, to organize quickly and lend each other full cooperation.

W9TEM was on the air for 17 days at the Fair, twelve hours a day, morally rock bound. It was a real credit to the side banders that the frequency was kept clear nearly 100% of the time. Over half a million visitors attended the Fair and had an opportunity to see and hear ham radio in action. The station gave Chicago Amateur Radio a much needed public relations shot in the arm.

The Fair exhibit started with an idea by Mel, K9HVE, in an executive conference of Fair officials two weeks before the doors opened. Kap, W9QKE, president of the Chicago Area Radio Club Council, Inc., agreed to obtain the equipment and organize the radio clubs of Chicago comprising the council. Eve, K9EMS, was asked to organize the Ladies Amateur Radio Klub to handle the stations during the day time hours. Several manufacturers and distributors contributed sufficient equipment for the exhibit to have two 1KW stations. Over 2500 contacts were made and over 3000 pieces of visitors' traffic were handled during the Fair. Bud, W9QVA, designed two mike mixers for the stations which permitted the public to hear both sides of the QSO through a public address system. The mixers also had provisions for a second mike which allowed visitors to talk to given stations and yet permitted the operator to control the station.

Several of the more versed members of the CARCC TVI committee were always on hand to answer questions from the visiting public concerning problems with individual amateurs.

It is doubtful that Chicago amateurs have ever had the public understanding that exists today. ARRL sent the exhibit many reprints from magazines and ARRL publications which greatly contributed to the public knowledge and understanding of amateur radio.

Hallicrafters is very pleased to have been able to supply equipment to this worthwhile cause of amateur radio.

— HAROLD A. CHAVTAT, K9BPO

[Signature: Backhalligan Jr. W. J. Halligan W9AC]
K9YVA has a new 40-meter dipole and is making FB contacts. A new call heard is W9ACU, HUB, K9ZOO and K9HIC are 6-meter s.s.b., stations. W1U, winner of the AIEE, will transmit a message to the last node of the WPAD on the 16th. The AIEE Bonus is held on the 12th.

K9RH holds the prize for best band use at the last meeting. K9RRYK was the winner in August. K9YVA is planning to attend the W2SE meeting and the Rochester DX Club meeting in New York in August. K9YVA announces the visit to the WPAD is June 12th.

K9YVA requests a call for W2SEY as a Silent Key. K9YVA is on 15 meters with a K6M-2 and a 290-200. The transmitter is held by W2SEY, the ASCH in charge. K9YVA sends a request for a new ham ticket for W2SEY. W2SEY is holding a vacancy in the ASCH.

K9YVA requests regular monthly reporting of activities. All amateurs are invited to report to the ASCY on monthly report cards.

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**Kit HX-11** .......................................................... $43.50

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**Kit HD-11** .......................................................... $14.95
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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! 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.

Cat. No. 240-302-2 Wired and tested with tubes, crystals and crystal filter . . . Amateur Net $619.50

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 $1229.00

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 $619.50

E. F. JOHNSON COMPANY - WASECA, MINNESOTA
29 Antenna Systems to be Given Away!

Here's your chance to win one of 29 complete antenna systems as a prize in the Hy-Gain Operation Skyhook Contest. Grand Award is a complete system covering 3.5-500 mc (80, 75, 40, 20, 15, 10, 6, 2, 1.8, and 1.5 meters). Second prize is the new 20-40M Duobander. Third Prize, the Hy-Tower. Fourth, the TH-4 Thunderbird... 55 prizes in all.

Here's All You Do!

On an official Entry Blank obtained from your favorite Hy-Gain Distributor, simply complete in 25 words or less the sentence: "An efficient antenna system is essential to the operation of my Amateur Radio Station because...

Send your Entry to the Contest Manager, care of Hy-Gain Antenna Products before midnight, October 31, 1953, Greenwich Mean Time. Operation Skyhook is open to all licensed amateurs throughout the world, except those cities, states and countries where contests are prohibited by law.

Contest Rules!

Purchase of equipment is not required to enter, or to win. However, winners who have purchased any Hy-Gain Antenna System between October 1, 1951 and December 1, 1951, can receive a free entry form and purchase privilege in addition to their prize. Winners will be notified by mail December 1, 1951, and proof of purchase is required to qualify for refund.

FIRST PRIZE
COMPLETE ANTENNA SYSTEM FOR 3.5-500 MC DS-1, TH14, 402-B, RBX-1 AND 2BD
Tower Not Included

ENTER hy-gain's Operation Skyhook TODAY!

SEE YOUR FAVORITE DISTRIBUTOR FOR OFFICIAL ENTRY BLANK

Hy-Gain antenna products
1135 No. 22nd St. • Lincoln, Nebr.

RNKL, vice-pres., VTU, secy.; KOWZ, treas. Club members are active on 2-meter mobile f.m. and KNQG is a new call in the group. More monthly traffic reports are solicited from the phone net operators. FPC has added servicing to its duty of e.w. traffic to the State Traffic Patrol. The 2m Prairie Club has three new calls on its roster. KNQF, KJTH and KNOM-XH. KQYJ has a new HT33A. Jim operates from Milwaukee e.d. station ID as liaison to the state traffic nets. KZQKI now is operating a new 500-watt 144 mc with an HQ-800C, and WYS is operating a new HT-40 and SX-140. Join the ARC and the Wisconsin section's traffic nets. Full membership only. All reports on the WIS-ARC Traffic Net.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harald A. Wengel, W0HYA—PAM; KOKJR, RM1; K17Z, The North Dakota 74-Meter Phone Net reports 53 sessions with 305 check-ins; maximum check-ins was 225; 120 minutes of formal traffic handled. 25 informal with 12 relays. The North Dakota Post Office Net reports 5 sessions for July with 31 check-ins: maximum 40; minimum 10; 140 minutes of formal traffic and 3 informal. One appointment was renewed in this period. CAQ, RM2 ORS. Five FPC appointments were cancelled and one ORS, KQTFB for the month of August.

SOUTHERN DAKOTA—SCM, J. W. Sikofoi, W0BWN—SCT; K0ZLP has passed the Technician Class exam. K0YVC has been appointed ORS and OPS. Three weeks after receiving his General Class ticket, YVC was able to work all states and 30 countries. A new call in Sioux Falls is KNOTS. In May Activities, it’s PHR (not PLU) who has worked more than 30 states and one QSO. This is a new Invoker and K0ALT a Valiant, K0ESC, Sioux Falls, and K0PJK, Dell Rapids, are on six meters. K00Z has moved to Madison. K0JCE has a new jr. operator—his a boy! Traffic: W0SCT 199, K0BQI 70, YVC 52. W0JVR 58, W0JVR 18, W0JVR 11, K0JVR 9, W0JVR 7, K0JVR 5, W0JVR 4, W0JVR 3, W0JVR 1. (June) K0JVR 141.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, W0RZJ—Asst. SCM; Charles Marsh, ALW, KOJJY; PAMS: OPX and K0EPT, RM1s; KLG and KOJFE. Having received no reports from TUS for three months, or better in indicating that he was in receipt of reports on this sec. I have appointed a new sec since Bob’s term expired July 1. Our new sec is KOJJY of Wilder. All ECs, please take note of this and forward your reports to him. Congratulations! Minnesota has 122 active members. The club has served over 100 in the instruction of code and theory classes. KOJJY will return to Minneapolis in January. He can be heard on all bands, a.m. with a Johnson Transmit and an AM receiver. ECs K0K and KKK and FPC members K0ALT, K0RGT, age 73, supplied for ARC membership transmitter. This is a 150-watt 500 mc and an 900 mc receiver. EC K0MEQ reports that K0J’s UYV and JVS are new NXL operators. BDO built a 500-watt 6-meter transmitter with a pair of 247’s and an xcv-41 receiver. KOAOZ has a Communicator III and a ten-element horizontal beam. New MUN members are K0WYWW and K0FNFX. K0VPP and DQL, mentioned in the last report, SLD 36, are now working all states as K0JVR 74. K0LH 58, K0JVR 40, BDU 40, K0JVR 38, GPH 37, W0JVR 24, UM1X 32, K0JVR 31, ZK1K 21, YVC 17. K0JVR 9, W0JVR 7, K0JVR 5, K0JVR 3. W0JVR 16, KORDA 18, K0JVR 13. K0JVR 12. MGT 12, W0JVR 10. (Continued on page 128)
The Hy-Gain Duobander was designed specifically for the 20 and 40 Meter bands since sun spot activity has caused fewer openings on the 10 and 15 Meter bands. This beam consists of three full-sized elements on 20 Meters and two reduced-sized elements on 40 Meters in a lightweight, compact antenna.

**DUOBANDER**

Two band operation is made possible through a new Hy-Gain development — the linear decoupling stub, eliminating the use of inductance and capacity traps, yet performs extremely efficient decoupling of the various Duobander sections. The decoupling stubs also perform the second function of reducing the overall length of the 40 Meter element to about 1/2 normal size.

The linear loading principle replaces the loading coil for increased efficiency, while the Hy-Gain Beta matching system makes possible maximum gain and low SWR into a single 52 ohm coax feedline. Perfect pattern symmetry is accomplished through a broad band balun.

Power capabilities: 5KW P.E.P., 3 KW AM; forward gain over a tuned dipole 20M - 8.1 db; forward gain over a tuned dipole 40M - 4.9 db; F/B ratio, 20M - 20 to 30 db; F/B ratio, 40M - 15 to 20 db. Boom is 24 ft., longest element approx. 40 ft. All aluminum construction with hardware iridite treated to military specifications. Turning radius: 24.2 ft. Weight: 54 lbs. Model DB-24, $149.50.

**DOUBLET**

HY-FAN DOUBLET TAKES UNLIMTED POWER ON 40 & 80 M

The new Hy-Gain HY-Fan doublet is a complete antenna system designed for efficient operation on 40 and 80 meters. It is fed with a single 52 ohm coax transmission line and will handle unlimited power on both bands. The HY-FAN is constructed of the highest quality copper clad steel stranded wire and cycloc insulators, and is furnished complete with the Hy-Gain coaxial center insulator assembly. The fan configuration eliminates traps, increases bandwidth and the HY-FAN is virtually impervious to all weather conditions.

The SWR is less than 1.5 to 1 on both bands. Net wt. only 3 lbs. Overall length approx. 130 ft. Model No. 2BDP, $19.95.
First to mass produce three band antenna systems for the 10, 15- and 20 meter bands, Hy-Gain Design Engineers now offer their latest series of tribanders — the Thunderbirds. These beams incorporate the solid state "slim traps", withstanding 1 KW CW or AM and '2 KW P.E.P.

3 Element Thunderbird
The Standard tribander with 14 ft. boom, longest element 26 ft., and 2" OD boom. Elements telescope 1 1/4 - 3/4". Less than 2:1 SWR. 100% rustproof. Weight: 33 lbs. Model TH-3, $89.95.

4 Element Thunderbird
This full sized beam permits design of array for maximum gain and F/B with no compromise for matching. A 2" OD boom and 1 1/4" telescoping to 3/4" elements are all aluminum. Longest element, 32 ft. Full sized boom spacing of 16 ft. Interlaced fourth element makes possible choice of optimum spacing on all three bands. Dipole shunt fed with 52 ohm coax. Factory pre-tuned. Weight: 88 lbs. Model TH-4, $117.50.

2 Element Thunderbird

Great Circle Indicator
Multi-colored 16" Wall Map with beam width and direction shown by moving wedge of light. 10° at perimeter. Centered East, West, or Midwest. Compass rose also available. Countries and call areas outlined and labeled.

ROTO-BRAKE

Brake and Rotator
Spring actuated, solenoid released braking unit with 1000 in. Lbs. rotating power, 5 in. Tons braking power. High capacity starting torque motor assembly. Limit switches prevent continuous rotation. Mounts in 10-18" steel tower. Mount kits available for less than 10" dia. towers, pole or pipe masts, or telephone pole masts, $34.50 each. Includes control box and Indicator. Weight: 42 lbs. Model RBX-1, $199.95.

CONTEST CLOSES OCT. 31, 1961!!
The popular Hy-Gain Multiband Verticals are self-supporting and require very little space for installation. As with all Hy-Gain antenna systems, top grade construction has been used throughout, with additional emphasis on handsome appearance.

**VERTICALS**

**Trap Verticals**

The Hy-Gain AVS Series incorporate the solid state "slim traps" which offer minimum wind loading and clean line silhouette. These antennas are completely factory pre-tuned with no further adjustment necessary, maintaining an SWR of 2:1 or less across the entirety of each band. 52 ohm coax feed line. True 1/4-wave marconi resonance on each band makes possible low angle DX radiation pattern. The Trap Verticals may be ground or roof mounted.

**10-20 Meter Verticals**

This Trap Vertical operates on the 10, 15 and 20 Meter bands with excellent efficiency and SWR of 2:1 or less. Completely weather-proof nylon base assembly makes the antenna self-supporting. It is 13.5 ft. high and weighs 9 lbs. Model 12AVS, $21.95.

**10-40 Meter Verticals**

Operating on the 10, 15, 20 and 40 Meter bands, this Vertical includes the Hy-Gain Capacity Hat feature, as well as the weather-resistant nylon base mount. It is 21 ft. high, weighing 10 lbs. Model 14AVS, $27.95.

**The Hy-Tower**

This trapless, multi-band vertical utilizes a stub decoupling system for the automatic band selection of the 10, 15, 20, 40 and 80 Meter bands with high efficiency and very low SWR. It is 52 ohm coax fed, and completely self-supporting with no guy lines required. The tower height is 24 ft.; a 2"-3/4" OD top mast extends the overall height to 50 ft. X-braced steel tower, 15" at base is of maximum strength, commercial construction. Weight: 100 lbs. Model 18HT $129.50.

**Base Support**

Three cycloal vertical base insulator assemblies insulate and support the Hy-Tower.

**Accessories**

Roofmounting kits are available for each of these Trap Verticals, the Model 12RMK for the 12AVS, weighing 6 lbs. ($9.50) and the 14RMK for the 14AVS, weighing 7 lbs. ($11.95).

The Model LC80 Loading Coil kit will add 80 Meter operation to the 14AVS, weighs 4 oz., and sells for $7.95.

The Model 6MK kit will add 6 Meter operation to either the 12 or 14AVS, weighs 6 oz., and sells for $4.95.

ENTER OPERATION "SKYHOOK" TODAY!
Each of the Hy-Gain Monobanders incorporates the exclusive Beta matching system, factory pre-tuned for an SWR of 1.5:1 or less. They are 52 ohm coax fed, allowing tuning for maximum gain and F/B. The 40 Meter "Hy-Seven" also uses the "linear loading" concept which reduces element length and maintains generally higher efficiency than coil loading.

40 Meter Monobander
Hy-Gain's "Hy-Seven" is a 2-Element, reduced size antenna due to incorporation of the "linear loading" concept which also increases its efficiency. Boom is 16 ft.; longest element, 43 ft., all aluminum. SWR 1.0:1. Also available tuned to commercial frequencies. Can be stacked with existing installations; extremely light weight. Weight: 24 lbs., 5.2 db gain; 15-30db F/B ratio. Model 402B, $99.75.

20 Meter Monobander
A full size 20 Meter array of commercial construction, with elements adjustable over entire 20 Meter band. Elements are telescoped three times to minimize sag. Boom is 212 in.; longest element, 35 ft. 9 in. Weight: 29 lbs. All aluminum construction. 8 db gain; 25 db F/B ratio. Model 203B, $65.95.

15 Meter Monobander
A ruggedly built antenna adjustable over the entire 15 Meter band, yet may be rotated by heavy duty TV rotators. Quick to assemble and install. Boom is 142 in.; longest element 23 ft. 10 in. Weight: 30 lbs. 8 db gain; 25 db F/B ratio. Model 153B, $38.50.

10 Meter Monobander
Weighing only 18 lbs., this antenna is small enough to be rotated by any TV rotator. Elements are adjustable for maximum gain over entire 10 Meter band. Easy to assemble; no further adjustments needed. Boom is 104 inches; longest element, 17 ft. 10 in. 8 db gain; 25 db F/B ratio. Model 103B, $32.95.

All Hy-Gain Monobanders may be stacked in the conventional manner.

ANY LICENSED AMATEUR MAY ENTER!
All Hy-Gain VHF Hi-banders® are constructed of heavy wall 1 3/4" dia. heat treated alloy aluminum tubing booms and 3/16" dia. solid rod elements. They are built to withstand extremely high wind velocities and heavy ice loading conditions. Optimum spacing and advanced high Q element design result in tremendous forward gain and excellent F/B characteristics. All VHF antennas match any impedance coaxial or parallel transmission line (52 and 72 ohm coax plus 200, 300 and 450 ohm parallel line).

2 Meter, 5 Elements
Ideal for semi-permanent or portable applications this beam is extremely light weight, factory pre-tuned and easy to assemble. Can be either coax or parallel fed. Beta matching system. Boom is 5 ft. 4 in.; longest element 41 3/4 in. 9.0 db gain. Weight: 2 lbs. Model 25, $8.95.

2 Meter, 10 Elements
Tremendous forward gain and excellent Front-to-Back characterize this light weight, popular 2 Meter beam. Can be rotated by any TV rotator. Coax or parallel fed. Boom is 12 ft.; longest element, 41 3/4 in. Beta matching employed. 13.4 db gain. Weight: 5 lbs. Model 210, $14.95.

1 3/4 Meter, 11 Elements
Pre-tuned folded ratio dipole is used for low loss 450 ohm open wire transmission lines in this 220 mc beam. Optimum spacing and high Q element design. Boom is 12 ft.; longest element, 27 in. 14.2 db gain. Weight: 4 lbs. Model 111, $13.95.

3/4 Meter, 13 Elements
One of the highest gain and efficient extended multi-element Yagi’s ever commercially manufactured for the amateur. Specifically designed for 430 mc operation, this beam has a boom length of 8 ft.; longest element 13 3/4 in. 16.1 db gain. Weight: 2 1/4 lbs. Model 313, $12.95.

SEE YOUR HAM DEALER FOR ENTRY BLANK!
Completing the Hy-Gain Ham line are the Hy-Gain 6 Meter Beams, Halos and Ground Planes, specifically designed for specific purposes. These antenna systems share the same top construction attention afforded every model in the Hy-Gain Antenna Series.

6 METER BEAMS

6 Meter, 8 Elements
Factory pre-assembled, this beam may be rotated with any TV rotator and includes the Hy-Gain exclusive Beta match. SWR less than 1.5:1. 52 ohm coax fed. Boom is 18 ft. long; longest element, 9 ft. 8 in. 10.1 db gain; 25 db F/B ratio. Stacking instructions included. Weight: 8 lbs. Model 68B, $32.95.

6 Meter, 5 Elements
Simple and easy to install, this beam is easily rotatable. Elements and boom are factory pre-assembled. Include all details for stacking. Hy-Gain Beta matched for 9 db gain; 25 db F/B ratio. Boom is 9 ft.; longest element, 9 ft. 8 in. Weight: 5 lbs. Model 65B, $18.95.

HALOS

2 Meter Halo
A 52 ohm Beta matched halo configuration, 1 1/4" dia. of heavy wall, 1/4" dia. aluminum tubing. Cylindrical bracket accepts any 1" mast. Factory pre-tuned but adjustable over entire 2 Meter band. No external matching. Up to 15 db gain over vertical whips on horizontally polarized signals. May be stacked for additional gain. (Model HHS-2 Stacking Kit, $3.00). Weight: 1 lb. Model HH-2, $5.95.

6 Meter Halo
High mechanical stability and minimum wind resistance with 1" dia. aluminum tubing halo, Beta matched, and mounts on any 1" mast. Tune to resonate quickly any frequency in 6 Meter band. Thoroughly weatherproof. Weight: 3 lbs. Model HH-6, $12.95.

GROUND PLANES

100-500 Mc Ground Plane
Covering any frequency between 100 and 500 megacycles, with solid 1/8" aluminum rod radials. Weight: 3 lbs. Model GP-SC, $14.97.

50-500 Mc Discone
Vertically polarized, omnidirectional broad band antenna for covering 50 to 500 megacycles without adjustments. Low angle radiation, unity gain, 50 ohm nominal impedance, SWR less than 1.5:1. Weight: 9 lbs. Model DS-1, $29.97.

WIN ONE OF 55 PRIZES!
**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!

**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

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**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."

**W6KML**

"The 664 surpasses its claims in difficult operational environments."

**ZL1HY**

"During QSO's... everyone preferred the 951."

**W3JHN**

"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."

**PY20K**

"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.


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 soak 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.

Lowest-Cost Ceramic Cardioid Available...Includes Every Feature Essential For SSB Operation. Flat, Smooth Response From 300 To 3,000 CPS!


First True Crystal Cardioid With Variable-D Design. Combines High Output With Excellent Noise Rejection At Modest Cost!


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!
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.

2403 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 every continent except Europe (589). I have also worked enough stations for my WAG, WAS, WAJAD and ADXC awards, and 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:

K4ZRA's INSTALLATION

THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL

GOTHAM
2539 Christie Place
Owensboro, Kentucky

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 WASC certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 25 to 100 watts plate input and the receiver was an old military ARQ-7 (Hallicrafters reboxed SK-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 up 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,

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.

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FACTS
ON THE GOTHAM
V-80 VERTICAL ANTENNA

• If K6IN 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 winds.
• 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 transmitter.
• 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.

YOU COULD WORK WONDERs WITH A GOTHAM VERTICAL ANTENNA!

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow
GOTHAM, Dept. QST
1805 Purdy Ave., Miami Beach, Fla.
Endorsed check or money order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15. $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name: ..........................................................
Address: ..................................................
City: .......................... Zone: ... State: ......

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FEATURE FOR FEATURE
THE BEST
ALL-BAND BUY!

The GR 211 assures outstanding all-band reception. It is designed for general coverage from standard broadcast through 34 mc band, including WWV, foreign & Voice of America.

Compare these quality features:

• Printed circuit techniques and advanced design for extra sensitivity, better, quieter reception, even on highest frequency bands.

• 6 tubes, transformer-powered (NOT AC/DC) for higher over-all gain, better signal-to-noise ratio.

• Circuit features leading to higher sensitivity include quality, high-Q, permeability-tuned coils.

• Two full-vision, illuminated, slide-rule type dials provide instant identification of broadcast and short-wave frequencies.

• Vernier tuning knob counter-weighted for smooth, non-critical short-wave tuning.

Amateur net price $69.50

GONSET
DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIFORNIA
THE ONLY DUAL CONVERSION RECEIVER PRICED UNDER $100!

The new GR 212 is a deluxe dual conversion receiver that offers the radio amateur a host of highly-desirable features. In handsome industrial-designer styling, the GR-212 provides superlative performance at modest cost!

*Compare these deluxe features:*

- Dual conversion for increased selectivity.
- Variable BFO.
- Sensitivity: At least 6db S+N/N at 1 µv. (Mod. 30% at 400 cps.) Input on all H.F. Bands.
- Two full-vision, illuminated, slide-rule type dials provide instant identification of broadcast and short-wave frequencies.
- Panel-mounted "S" meter.
- Band-spread tuning knob is inertia fly-wheel weighted for smoothest tuning.
- Separate band-spread dial for amateur bands.

Amateur net price $99.50

GONSET
DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIFORNIA
ARIZONA—Acting SCM, Olin L. Murgum, K5CR—PAM; DYL, RM; K5TYW. A check with the EC's shows that 6-meter activity has doubled in the past year and there is quite a lot of 2-meter activity as well over the state. The CAREN had a very successful emergency drill. A tornado hit Little Rock two hours before the planned drill was to be held. The S.E. Arkansas Radio Club finally got the wave guides for its upward-looking array. RDY wrote more than fifty letters before some could be located. Chief technicians use OX, OAZ and ORQ. It's good to see K5ABE without his crane. IAI has a new HT-37. With the help of VQB, WUM has its HTTY working F8. RDY and K5KRO each have a new 10-kw. power plant. K5KRO has a new 3-kw. power plant. K5CIKX has a new shack with a lot more room. The Maricopa County Radio Club has three new Generals and 14 new Novices. Those who were not able to make it in a big way. The wind got K5QYH's 60-ft. crank-up tower and 6-meter beam. DYL has returned from a week's vacation in Hot Springs and EC has come back up in W5-Lamb. Three new ECs are K5YOL, K5YEF and K5MOS. Trail: K5ME4. ALB 4, CIR 4, W5ALL 4, K5YOL 4, CIT 2.

LOUISIANA—SCM, Thomas J. Moreau, W5F3011. The Louisiana Tech Radio Club is back in operation and would like to hear from other college clubs in the state. Its mailing address is Box 404, S., Ruston, La. Rain every day, squalus and thunderstorms had a lot to do with the low activity on the lower frequency band in the area. HLA complains about this condition and his traffic count shows it. K5QXY and K5MSY are running a Delta Chess Net for Sat. at 0900 CEST on 720 kc. Forty-nine amateurs and amateur groups contributed $150.00 to "Project Curveline." An Apache mobile transmitter was purchased and presented to the U.S. Public Health Service Hospital at Chalmette, La. Presenting it was made by CIT, EDY, WZZ, K5CTR and W7T. The Greater New Orleans Hamfest, promoted by four area clubs, New Orleans, Jefferson, Westwold and M.T.A., tentatively is set for Oct. 7 and 8. CEZ has been using the 6N2 he won at the Monroe Convention to check into the RACES Net. K5LZ1 was active in the recent CD Party. UOR reports excellent propagation conditions for 6-meter band with daily openings to many sections of the U.S., Canada, Mexico and the Southern Area. Sporadic-E propagation this year continues to be phenomenal. He is building an SSB linear to be used on 6-meter a.m. in conjunction with a Heath 6H-11. The North Lake V.H.F. Net meets on 51 Mc, Slim, Q5S, recently licensed, is building a 100-watt rig for 6 meters. Two well-known amateurs passed away in August: JPD, Covington; and GAD, Metairie. Trail: W5EIZ 217, M5Q 65, K5QVX 56, W5HLL 4.

MISSISSIPPI—SCM, Floyd C. Teets, W5MUG. The Jackson Club put on a very fine hamfest this year. The S.S.B. Session on Saturday night was very successful. K5QGW won an HT-37. K5PPI won the beam and K5AR won the voltmeter. K5LL1 is on from Brookhaven with a Heath 6H-10. K5OR reports he won a DX60 at the Indianapolis Hamfest. SGTJ5 has a new 6-meter beam. K5MDX reports that he had a fine time in the recent CD Party with 128 contacts. K5RO and K5UL are brothers. Check their traffic report. Not bad, K5UBL reports that he will be on 6 meters soon. JR is building a super-duper receiver and hopes to have it on soon. K5Z is building a new home. Don't spend too much time on your work. Charlie, Trail: K5DRO 204. 5M, ACP 18, W5CTJ5 11, K5MDX 2.

TENNESSEE—SCM, H. W. Ingram, W5RO—SEC; K5OK, PAM; W5EUF, W5P7D and W5QG; RM: K4ARK. K4HIBU has been off the air because of illness in the family and transmitter trouble. K4KNU is NTS for the Oak Ridge Emergency Net. FRI, W5FX is hearing signals from Memphis using an Apache 6B-10 and a Mohawk. K5UVP is chasing DX but says he is not cutting much. W5UQV is operating 30.72 Mc, with 30 watts and a four-element beam. New appointment: K5MIC as EC of Davidson County. Renewed: W5JRM as EC and OAS, W5AWRM as OBE. OAS activity was reported by W5J, W5DWC and K4ARK. O2 activity by W5DWC and K4AR; O3 activity by W5JRM; AREC activity by K5OU. Net reports were made by W5F7P, W5UVP and K4ARK. Club bulletins were received from Oak Ridge and Chattanooga. Oak Ridge reported on an FN Hamfest held at Crossville and net calls in Chattanooga were listed as W5NHU, W5NIBT, W5N4-BW, W5N44B, W5NHJ and W5KQI. Trail: JPD, K4ARK 222, W5PL, W5F4J, W5CFZ 272, W5P7D 107, K5NBW (Continued on page 174)
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GREAT LAKES DIVISION

KENTUCKY—SCM, Robert A. Thompson, W4SUJ—Aet. SCM: W. C. Alcott, W4CDX, SEC: W4BAZ, RM: K4KQW, PAM: W4BZL, V.H.F. PAM: K4LOA, KNN manager: W4NAQH, K4WOT. Reports by Kentucky representative Hoyt Barnett is drafting a new bill for automobile license plates for amateurs to be introduced in the 1963 session of the General Assembly. Your ad for suggestions or comments will be fully appreciated and should be directed to K4WOT, K4HOT is working 6-meter DX, Station activity in MRPN broke a record for July. New members are K4VUD, K4GUTN, W4WID, K4QK, K4UMN, W4BWC, and K4KQW. K4NN reports a traffic total of 27. K4KDPF is back at his active self and hopes to be active next year from U.K. on the club station. Bill’s DXCC now stands at 19. A new Novice from Marysville is W4NCHY. K4HSS is looking for a new home and a new club. W4NQAH has remote control on his rig. RO reports were received from K4ZRA and K4ZQR. You may obtain a copy of the new "Kentucky " A.R.C. "h国民经济 Manual" from the net managers. As most of you know, my term as SCM ended Aug. 15. It has been a real pleasure working with the amateurs of this section. I wish to thank everyone for their support. At this writing my successor has not been selected. However, I hope you will continue your support through him. Thanks;


MICHIGAN—SCM, Ralph P. Theireau, W8FX—SEC: ELR, RM, ECL, SCW, QQG and FWQ, PAMs: K4SKD and K4TTU, V.H.F. PAM: K4GEO. SCM Appointments: MBF, FZ and PT as OES: PT, AHV, W4AYU and K4NCH as OSES: K4KQD, DSE, IB, LLP, PXA and W2Z as FRS, PDO has a ruptured disc in his spine. We are all pulling for you. New officers of the Michigan 6-Meter Club are K4QXU, sec.: K4VJR, K4BOU, MCM, and AJO, vice: K4KUN, treas. This club offers certificates to all out-takers who have worked 6 Michigan 6-meter stations in the past year. Send logs to K4KQG. The Killer Net meets each Sun. at 0300 GMT, K4SMV and K4BLL are working 1250 Mc. The MIRCQ now is pushing RACES, not 14D0. Why not join it? The 6-meter DXing is doing O.K. NOH works P2JR, Aruba, on 50 Mc. Michigan YLs held a hamfest in Midland July 9. The BR/MEN had a new member July 12. The French gang seems to be going for Heath Two-ers, WYC is back from his California trip, ZZ reports a new emergency trailer, thanks to K4AMH. YLPC had a 1777 revue; wagon stolen from his driveway and found it in Chicago, K4UV operated from the Manchester Fair, K4NLM made the U.P. Hootenanny. The Hoth Warrior, K4QKVS has a "new" BC-432, NOH is using a vertical antenna on 30 and 40 meters. TPS also is using vertical, K4HDR is on the lam till Aug. K4GOU has a new antenna for 40, 20, 15 and 10 meters. EGI says "No 20 H s Sundays." K4QOQ set up the Boulevamber RC station, K4AIK has a new 400-Watt rig, K4BGK has a new Golset G-70 mobile, the Netside Bay Fish Net meets on 3980 kc. Sun. from 1730 to 1830 GMT. K4RXXE/K4RXH (Kalamazoo) wants to hear from all Novices interested in forming a Novice Net. Write W4Vo, suggesting your preferred days, times, -- for possible inclusion. Traffic: Julian K4N7Z 24G, W4VWI 17, K4KQ 159, ELR 132, W8OCC 119, JPT 102, FWQ 65, K4KQ 83, W8OUL 8, ZEB 45, TBP 35, FX 30, K4KQD 29, W9EKT 24, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23, K4VOW 23.

OHIO—SCM, Wilson E. Werkman, W3W1—Aet. SCM: J. C. Erickson, S8AE, Sec: HNP, RM: K4RZK, DAE, VTP and K8S0Q, PAM: K8SFYP, Field Day is past and aerial plans are being made for next year. The Canton ARC’s Feedline is in press. A machine-made book of pictures of the club’s P.O. operations and it states that K8K BBE, BRIK, BZ1 and DIP are new Novices. K8UKH and YLK receive operating licenses. K8P0L received his Eagle Scout badge. OYV joined the QCA, K4SEM, and YAB went active on the West Coast. K8ZTN vaccinated in the annual outing of the Council’s 1900 Sweepstakes Trophy. Dayton ARA’s R-C Car reports the club held an auction, K8QO joined Silent Keys, and a mobile, Mission ARC’s H.A.R.C. tells of its FD setup. The item 2F statement in News Day’s "The West News" is that QC has ended.

(Continued on page 149)
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his tower blown down in a wind storm and KE6XJ's father gave her a Navy 40- and 80-meter transmitter. Paul Rug R.C. R.C. R.C. Rug held field on the Otoe VA Hospital grounds, K6BV is in Korea, TGX displayed and discussed telephoto and facsimile systems, and the amateur radio shows in Arizona, CUFZ and DJJ are new Novices. There was a Junior Ham Station with a new operating schedule by Herbert A. Hix. Hix received his HiW award No. 135, Toledo's Ham Club gave a Ham in the Park show April 15th. The HIC Ham Radio Station in the Toledo Public Libraries. The Toledo's 1964 like K5VR, the Dayton Volunteer Firemen's Auxiliary, 150 new members. The Dayton Volunteer Firemen's Auxiliary, 150 new members. The Dayton Volunteer Firemen's Auxiliary, 150 new members.

how to locate & eliminate radio and TV interference (and Edition Revised & Enlarged) by Fred W. Dornin. The book tells what to do and how to do it. The original version of this 'standard' has been revised and brought up-to-date. The book is well written, and it is a practical book on location and elimination of radio and TV interference. New and improved electronic components are used in the text, and the book is well written. The book is well written.

how to use grid-dip oscillators by Rufus P. Turner K5AI. The book is very interesting and well written. It is a practical book on grid-dip oscillators. It is useful to all kinds of radio receivers and transmitters, as well as to television receivers. The book is well written. It is a practical book on grid-dip oscillators. The book is well written.

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DOES YOUR TRANSMITTER HAVE AN AUDIO CLIPPER?

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![Diagram of 200V Transmitter Audio Limiter & Indicator Circuit]

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NORTHERN NEW JERSEY—SCCM, J. Sparks Re-mercy, KMRF—S8C; WA21AY, RM; K2YNL, PM; KA3LG, V.H.F. PAM; K3KVR, Se-tom nets: NJN daily at 2200 GMT on 2905 kc., WUPN Mon. through Sat., at 2200 GMT and Sun. at 1300 GMT on 3005 kc. N.J. 6 & 2 at 0000 GMT Thurs. and Sun. on 5115 kc. and at 5200 GMT Wed. and Sun. on 147.75 Mc. The above times are based on EDT. New appointees are W2DPM as OES and K2YFE as OO. The NJN report 51 sessions held, attendance 5P2 and traffic 207. N.J. 6 & 2 report 22 sessions, attendance 150 and traffic 43. K3CSEY and the New Jersey Coast V.H.F. certificate, K2HHS received the Zephyr V.H.F. Award. K2KBU and W8QOP visited K2UFM. The new 2200 V.H.F. RC has been moved to New Jersey. KBNU is now active on 40 meters from his new QTH in South Plainfield, W10LZ has a new DH-23 preselector. Appointments renewed: K2AGJ as OES, W2CCF as OO and OES, W2QGG as OES, K2QJ as OES, W2QZG as OES, K2QFT as a new Mon.-Key, W2OYMN, W2OMN, W2KNOW and W2KVP for new TCBs. In the section, K2SDC has completed construction of an 8-ft. parabolic dish. Now he needs some coax for 1360 Mc. W2NXI says he has contacted many of the Ohio stations, BPL cards were awarded to the following for July traffic: W2CCF, W2QZG, K2HHS and K2UCX, W2QSP had K2QRK on Ohio. K2QSP is operating mobile from Ohio. W2QAP has working 15 states with his v.f.o. on 40 meters. K2VJZ has a new WRL-DSH-100. K2KUQ has to cross the county line to pick up her mail. Traffic: (July) K2UCY 601, W2CCF 384, W2QZG 358, W2QGG 287, K2YNL 265, WA2AP 165, W2QNL 142, K2HHS 136, K2PVH 114, W2QSP 110.
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MIDWEST DIVISION

IOWA—SCM, Dennis Burke. W0NWFB—SEC: KO-
EKNX. Thanks to BUR, our retiring SCM, for his valu-
able assistance, Ill. EC for Storey Counties. OSCAR
activity continues.

Field Day was the best ever with 522 contacts. Benton
County reports KN5UP KNN300 and KAF are new hams.

NWX, Alfa West Division, reports MECO is now
Marshalltown recently. KOEXX, an SEC, is busy or-
ganizing the 99 counties and doing a splendid job—the
local OVCs, our own OVCs, numerous OVCs.

Form his OVC duties; I am very proud of our many teen-
age hams. 10 is doing well using 2102 on the new Tri-

bender beam. Congratulations to John, Gene and Arnold.

I understand the Sioux City Club was high on the
tower pole in FV activities. I would like reports from the
8 counties in the area. Thanks for all help.

Iowa MOMS—Gratulations. 75-Meter Phone Net report for June: QN1 1073, QTQ 423 sessions 25. Traffic: (July) W0G2N 445, LCC 157, K5U 99, RC 1053, K5J 73, KIS 187, K273, N7B 84, KOKA 75, FPL 33, W0R15 15, YVQ 15, K0ZLN 12, WVR 9, W0FDM 7, KOHIC 7, U9A 7, W0WPL 6, W0W5Q 6, W0C6Q 6, K0XMB 5, W0-fl 5, K0fl 4, QW4 4, QTV 3, POI 3, VSU 2. (June) W0LXC 2133, LGG 1071, FZO 340, SCA 368, BDR 522, NWX 3.

KANSAS—SCM, Raymond E. Bokor. WOFNS-
8958: KOE, HM, QOG, PAN, KQFPE, V.H.P., PAM: HAJ, SCOTT, net: KPR 437, Wed. Fri. at 1432, Sat. at 1400 NCS KQKQ, FIIQ, IPR, reports 17 sessions; QNI 866, high 41, low 10, average 22.8: QTQ 75, high 10, low 10, average 4.4, QKS, duty on
to 3610 ke, at 0000Z, NCS KQKBX, IPR, SAT, FAL, 
ta. Q11, high 3, average 1, QTQ 121, high 10, low 0, average 4.4, KSN 2923 ke, Mon. through Sat.
at 0000Z, KOEMB NCS (Weather Net), YL Net, 3040 ke, at 1500Z, NCS KOEH, HBN, Army 7200 ke, through Fri. at 1900Z, K0KONZ, ANT, K0H1, YWT, LTV, 15 sessions, QN1 161, QTQ 30, The Second
Centennial QSO Party will be held 9-10 PM and the
Sunflower Centennial Certificate will be awarded to
U.S.A. stations with 25 contacts. non-U.S.A. stations
10 contacts. These awards are very unique and celebrate
the State of Kansas 100-year birthday. For further infor-
mation contact the Sunflower Centennial Commis-
sion, PO Box 380, 1231 E. Douglas, Wichita, KS 67201. We understand Kansas is falling down badly on 20 meters in making
and answering calls for contacts. Endorsements: WYK
and DEL as Class 100. We may call a Kansas session
meeting the latter part of October sponsored by Wichita
Clubs, WARC and ACARC. The date will be announced
in a future issue. The Newton Club names the first 10
Military Director and is Aert, Adj. General in the Kan-
sas Nat. Guard. Traffic: (July) W0OLI 350, MAH 184,
ORQ 39, IPR 32, Q11 4, K0QPE, 10, EFL 15, W0FL 9,
KOHIF 8, WOFPU 7, K0GIO 2, QKS 2. (June) KOELI 7, W0WFD 4.

MISSOURI—SCM, C. O. Goseh, WOBUL—Net
reports (July): BIM 3385 ke, 2260 GMT, M-W-P, 13 ses-
sions; QNI 124; Q1N 404; KOEXX 4; QTV 3, KOTFH 8, K0MRR 2, MSN (3715 ke, 2220 GMT, M-W-P, 22 sessions; QNI 413; QTQ 100; NCS KQGFA 4; KOEMB 4; KOFPK, KOEPK, KOHEP 4; MON (3380 ke, 0100 GMT, M-P, 26 sessions; QNI 109; Q1N 109; NCS, O14, K1C 4, RTW 3, KOQCO, KOFR, WJP 2, net: K0VYX 2770 ke, 2200 GMT, 33
sessions; QNI 9; QTQ 0; NCS O14, HBN (7280 ke, 1905 GMT, M-F, Report of activity on this net will appear in the Kansas activity report next month. The six next months, Appointments: KOFPK as OHC. En-
dorsements: TOU with O14 as OHC; RTW and KO-
YUX as OHs; OVS as OVC. Cancellation: KOEPK as
OO (by request). The Southwest Missouri Amateur Ra-
tor Club, Inc. (Springfield), offers WAMI Certificate (Worked All Missouri Counties) with a minimum of 33
counters required of the 100 site in the state. Additional
information may be obtained by contacting club mem-

bers or by writing the club at P. O. Box 291, Springfield.
MO. KOIAU reports construction of a 500-watt
K0PF will be attending Ro. House at the end of the
next five years, he says, K0PBCA, ex-K0QPI (Fr. Leardori Wood), will be looking for contacts on the H-

arranty. 21-Mc, bands, ECC and EEC (EOC) and
a faculty at Ozark College (Carthage) are from S-Land.
LFE's V.H.P. Hamnet July 9 at Bowling Green, had
275 attending, 226 registrations and 45 M-H. mobiles.

(Continued on page 152)
your choice of 2 GREAT EICO® TRANSMITTERS...

**90-WATT**

**CW TRANSMITTER #720**

Kit $79.95  Wired $119.95

"U.S. Pat. #D-184,776" — ELECTRONICS WORLD

Ideal for veteran or novice. "Clean" 90W CW, 65W AM-phone with EXT plate modulation, 80 through 10 meters.

**60-WATT**

**CW TRANSMITTER #723**

Kit $49.95  Wired $79.95

"Compact, well-planned layout. Clean-sounding, absolutely hum-free carrier, stable." — ELECTRONICS WORLD

Perfect for novice or advanced ham needing low-power standby rig. "Clean" 60W CW, 50W AM-phone with EXT plate modulation. 80 through 10 meters.

**New!**

**VARIABLE FREQUENCY OSCILLATOR (SELF-POWERED) #722**

Approaches crystal stability, 80 through 10 meters.

Kit $49.95  Wired $79.95

Delivers 30W undistorted audio for phone operation, can plate-modulate transmitters having RF inputs up to 500W. Unique over-modulation indicator. Cover E-5 $4.50.

**New!**

**CITIZENS BAND WALKIE-TALKIE #740**

Complete with rechargeable battery and charger, 9 transistors, 1 diode, Full superhet, U.S. made.

Kit $54.95  Wired $79.95

by variable "pi" network, Single & multi-channel models.

From Kit $59.95  Wired $59.95

**New!**

**GROUND METER #710**

Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.

Kit $29.95  Wired $49.95

**VACUUM TUBE VOLTMETER #221**

Kit $25.95  Wired $39.95

**GRID DIP METER**

**PEAK-TO-PEAK VTVM #232** & exclusive "UNI-PROBE®" Kit $29.95  Wired $39.95

Kit $27.95  Wired $49.95

**5" PUSH-PULL OSCILLOSCOPE #425**

Kit $49.95  Wired $79.95

**DYNAMIC CONDUCTANCE TUBE & TRANSISTOR TESTER #666**

Kit $69.95  Wired $109.95

**BF SIGNAL GENERATOR #324** (150kc-455mc) Kit $29.95  Wired $39.95

Kit $59.95  Wired $89.95

**TV-FM SWEEP GENERATOR & MARKER #368**

Kit $69.95  Wired $119.95

---

EICO, 3300 N. Blvd., L.I.C. 1, N. Y.  
\[ Send free Catalog & name of neighborhood distributor. \]
\[ Send free "Short Course for Novice License." \]
\[ Add 5% in the West. \]

ENGINES: Excellent career opportunities in creative electronics design. Write to the Chief Engineer.
THE FIRST MULTIBAND COAXIAL ANTENNA for 6-10-15-20 Meters

needs no ground plane radials—

Ideal for . . .

Emergency nets and citizens band wherever omnidirectional coverage is desired.

Campers and apartment residents or wherever space is a problem.

A second antenna for low angle radiation.

The New C-4 features . . .

- Full electrical half waves on all bands . . . eliminating the need for awkward ground plane radials.
- Easy inexpensive mounting with regular TV hardware such as simple chimney mount as shown.
- Compactness . . . only 12' over-all height.
- End-loaded to provide maximum radiation resistance.
- Quick installation . . . about 3/4 hour.
- Power rating . . . 300 watts AM.
- Feed line . . . RG59Au or equivalent.
- SWR . . . less than 1.5 to 1 at resonance.

Model C-4

Two other 6-10-15-20 meter antennas:

Model B-24 Four Band Beam

Element length 11" — boom length 5'

Turning radius 7'

Model M-4 Four Band Mobile .5-3/4' high

Fits all standard mounts

(Continued on page 154)
Alack, poor lad. SYLVANIA POWER TUBES and RECEIVER TUBES might have made a 100% QSO out of this monologue. Industrial, military, broadcast, and aviation communications men have been relying on SYLVANIA TUBES for years for solid copy. Get them today at your local franchised SYLVANIA INDUSTRIAL TUBES DISTRIBUTOR.
FIELD ENGINEERS

ACF Electronics seeks to add experienced field engineers to its professional staff. Accepted applicants will be assigned to engineering teams operating in this country and abroad. The positions are permanent and offer an uncommon opportunity for rapid personal and professional advancement.

The positions require an EE degree or equivalent. Background in one or more of the following areas is desirable:

Design and/or maintenance of analog/digital computers, radar, or TV systems. Flight, navigation, aircraft piloting techniques and instrument flight. HF long distance or meteor-burst communications systems. Scatter systems. Propagation prediction. Communications, R&D systems. Short wave (amateur) radio.

Differential pay for overseas assignments. Applicants must be willing to work in areas where dependents are not permitted for periods up to one year.

All applicants will receive consideration for employment without regard to race, creed, color or national origin.

Please send resume to:
Manager, Professional Staffing, Dept. F-1

ACF ELECTRONICS
DIVISION

ACF INDUSTRIES

Riverdale, Md. (Suburb of Washington, D.C.)

3 watts in his Casey Bay lobster boat, Radio and electronics classes begins again in Bangor about Oct. 1. See Bangor AMTokume or the School Dept. for details. The Bangor AREC/RACES Net conducts weekly mobile hunts Wed. at 1900 on 28.200 Mc. The Augusta Chapman family has an all-family: W4E, W4F, W4G, K4KTJ and K4OKC. To see all recent visitors to K4MDM, the V.A. station, thanks to K4BZD, station manager, K4GSG, K4GCI. Capt. Dick has been doing a wonder job, and has activated the Dow Air Force Base MARS station. The St. Croix Valley Amateur Radio Club had a gathering at Colden-St. Stephen Frontier Field. Those who wish to check their equipment submittal certificates should check their expiration dates and send them in to the SCM for endorsement. All clubs are urged to become ARRL affiliates. Obtain a copy of your SCM or GQR, your SEC, for details. Traffic: KI3MR 87, IJ3 54, JNN 35, WISXX 3e, KIRB 8, MBB 28, MDM 17, DUG 12.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—AOQ is our SEC. LAY is EC for Whitman. Appointments endorsed: AOQ as OPS; HLQ as OBS; STW as W4AV; W4AV as NOC; LMZ as OES, DFS as PAM for four years. BNS has moved to Methuen, RY is the new call of ex-WB6Q. A new call of ex-WQH is W4YR. The Eastern Mass. Meter Net had 21 sessions, 224 stations, 142 traffic. K4VQ has a Genet III and a three-element Hilltopper on 6 meters. K4MIVN is next—next week. W4PHS, K4JBD moved to Florida. KNITCCE is the 12-year-old brother of KIMYN, KIMEM has a new HPO-59. WPRF worked PEPINF and 4W4L. KINTS is on 6 meters with a three-element beam and will have 50 watts on 2-6 meters. The North Attleboro RACES will have a "Field Day" to test emergency capability. K4MIL and GOE worked K4KKC on 6 meters, and are hearing VO and VE8G. KQJLT is building a c.w.o. station. TDG has quite a list of DX contacts—24 states in 24 hrs. and 25 states in 24 hrs. 24 stations, 4-6 hours. K4-303, several beams and dipoles. N4T has been endorsed as ORS. OPS, was notified the CD Party has W4X and W4X is the number. The Northeast ARC is now an AARRL affiliated Club. K4HR is on 144 and K4QIC says VE4IQ is coming through on 2 meters. K4KKS went to Florida for two weeks and is building a 2-meter transceiver. K4QJQ has a 2-meter Net certificate. W4Q was on vacation. W4V is now district Chief in the Somerville Fire Dept. K4QRT got married out in California. K4HFO spent a week in Maine. OKF has a ground-plane and a cubical quad. Also as our PAM he sent out a new list of members of our 2-Meter Net. W4HJW has a 1-kw. rig on 100-10 meters. K4GTA has a new 100-10 meter build and on the air. PTE conducted a QW for contests. K4DIO had some new DX contacts on 6 meters. K4HJU is a separate antenna for all bands. New officers of the Reading High School A.A.H.OA are K4RJU, pres.; K4LW, v.p.; B. Schneid, sec.; J. Scott, treas.; K4QNO has a Globite Hi-Bander for 2 meters and a new three-eleven beam. K4LW was a winner in the Harpster Sweepstakes. K4MM is on the air very little. K4LON has a new HQ-170. HQO is mobile on 70 meters. K4NRTT is on a DSN pipe. The North Attleboro Net had 246 stations and 127 traffic. K4NISP. Rowley, has a DX-20 and an A.R.-receiver. Traffic: (July) W4MQ 194, W4BMI 135, W4E 110, W4LX 121, W4P 102, DFS 06, OFK 85, K6F 80, W4Q 80, W4Q 99, P4T 31, 5IV 31, DOM 29, K4DST 26, J4G 26, QNQ 23, W4TG 22, W4MX 21, J4W 12, C4U 2, C4T 9, W4W 7, 6W 7, W4WV 7, K4U 5, K4MCB 4, W4R 2, (June) W4A 294, K4JL 48, WIWU 16, K4MCB 16. W4QI 16.

WESTERN MASSACHUSETTS—SCM, Pete T. Porey, W1HJ. W1HJ-SEC: BHIJ. Letters: K4HJ: DX8, Thank you very much for reflecting me as your SCM for another two-year term. I shall do my best to continue to fulfill the duties of the office. K4HJ with his wife, K4HJ, and children, spent the month of July on the Cape with no ham radio at all. DX8 sent out a bulletin to the Mass. Net announcing a get-together at his summer cottage Aug. 3. AVK is hospitalized at Springfield Hospital. Our sincere sympathy to LDE whom his father recently, K4DAJ has returned to Cornell University as a sophomore. W4A is operating RM from the steam- ers "Messenger" and "Queen of Maine". LDE on 15- and 20-meter s.s., K4IQG is sporting a new Viking Radio. During the Radio's July session, W4AN was held together by K4KL, K4DJ and K4R, with valuable assists by W4N. Traffic: W4VYR 131, W4LX 130, K4J 94, D4J 84, W4FAB 18, K4RL 8, W4DWW 5, K4IQG 2.

(Continued on page 138)
pick your antenna from the Webster Family Tree

Now . . . for your convenience . . . your Webster distributor is featuring a bright new display in his store. It's the Webster Family Tree—loaded with fine antennas—"Band-spanner"—"Q-Top"—"49er" and the latest Webster antenna mounts.

Take this opportunity to judge Webster quality and value. See for yourself—close up—the mechanical excellence—the many exclusive design features that contribute so much to top mobile performance—and the pleasure that comes with it.

And be sure to get your free copy of Webster's informative booklet, "Mobile antennas—simple steps to peak performance."

Pick your antenna—and mount
—from the Webster Family Tree.

Webster MANUFACTURING
317 ROEBLING ROAD,
SOUTH SAN FRANCISCO, CALIFORNIA
NEW HISPANIC—SCM, Ellis F. Miller, WH0Q— SEC: KGOB, PAM: KVG, RM: KTTB. The GSPN meets Mon. through Fri, at 2330 and Sun. at 1330 on 3842 kc, CNEN meets Mon. through Sat. at 1045 on 3843 kc, NHN (e.w.) meets Mon. through Fri. at 1030 on 38565 kc. Appointments: KITTS as RM, Let's all get behind Kurt and help increase the NHN membership. Our sincere wishes for your success. Kurt, for your "appointments": GAH and MJU as EQS, MDP as OQ Class I, YHI as ORS and OQS and QGU as ORS. Thank you all for your continued interest and support. A good year—back with us for the summer and fall. Your support as GSPN net control is really appreciated. QGU has also returned and the excellent traffic report proves his uttering interest in NHN. Many thanks to you both. KIKOB reports that he now has made 270 initial contacts in 20 states on 6-meter phone and has just received the Michigan Weekly Operating Award, Congratulations, Ralph, a very fine job indeed. It would be appreciated if more of you would send in your monthly station activity reports. Traffic: W0GGU 138, TA 110, KIUB 68, WICUE 35, JNC 9, KIIB 8, WIAGM 4, GVN 4, KIHS 4.

RHODE ISLAND—SCM, John E. Johnson, KIAV— SEC: PAZ, RM: SML, PAM: TML, KISPP—31 sessions, 326 QN1, 66 traffic, ORS reports were received from TML, SML and WED. The NRCC of Newport held its Annual Dinner Dance and Banquet on the 29th with a large crowd in attendance. Reports received from members show that everyone had a fine time and the food was excellent. The AQ Club of Ruxford reports KN1HE as a new Novice, a Family Outing Committee was nominated with KN1HE as chairman, assisted by KINSY, K16ID and K1QGB. K16ID was appointed chairman for an R.I. QSO Party Committee, assisted by K1QMB and K1VYN. K1PAM has worked 15 states with his Lincoln receiver and an RT-40 on 40 meters. K1PLP has been working DX on 40 meters from his vacation spot in New Hampshire. K1AHE has completed a new installation consisting of a new motorized control switch so the tower can be loaded for 40 or 80 meters as well as controlling the new TA-35 Jr. beam. K1PLP states that anyone in the Providence Area who is interested in 1200 Mhz, contact him. Traffic: (July) W1SMU 645, TML 331, K1QMB 40, PZK 30, GCQ 29, AVS 14, JNC 10, FNI 10, W1WED 6, K1PAM 4, (June) K1UP 13.

VERMONT—SCM, Miss Harriet Proctor, W1EB— SEC: K1QOB, PAM: HIRG, RM: KRV. Amateur activities in Vermont should start the new season with vigor. Let's have all responsibilities well handled. DPU has moved from Wallingford to Rutland and is now active. K1QOB has been riding the polo bus in her area since June. The Windham RC has had a junior in Rockingham and is planning to build 6-meter rigs. VSA has moved to Charlotte, K1NHD and family are at their new place in Ripton. The Huntington and Middlebury area have worked together again on the Waterman at Lake Champlain. K1NP has raised a roster of amateurs in the Central Vermont area. It has 37 names. W1LAP is a like volunteer to assist with four issues per year of the Green M't. Squad. Our first colored slides of amateur activities in Vermont are expected from the Huntington Club. We wish to include a picture of every operator and his station.

NORTHEASTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGY— K7KBV has been appointed ORS, and new ORS are K7GEC, K7GTL and K7DUS. K7BVD requested cancellation of his OR appointment as he, QEL and K7EEM moved to Puerto Rico to open an electronic servicing business. DPD and his CAP Squad, of Arco were awarded the "Lady of Freedom" Award from the French Government for hospitality shown two French leaders and 5 cadets while visiting AEC and the area. W1GJF Hamstore owners for 1962 are K7EKJ, TH8F and K7KV, all of Idaho Falls. Sponsors of transmitter hunts at the hamfest were DWE, a special for Vlads, the Shelley Tubers, the Pocatello Club and the Idaho Radio Amateurs Inc. of Boise. KNTPAW is a new ham, K7NMS and K7ROS dropped the "N" from their calls. Newcomers to Idaho are K7WZ and K7PNS, formerly K6RT. The FARM Net held 20 sessions during July and reports 91 traffic handled, 34 check-ins and 49 members on the roster. The FARM Net has recommended to to a winter schedule of 1000 hours, 2011, 3011, 5011, K7BY 51, G7V 13, EQ 12, VQ 10.

MONTANA—SCM, Ray Woods, W7SFK—SEC: BOZ, PAM: YH8, RM: K7AEZ. The MPN meets M-W-F at 1900 hours on 8400 kc. The AEON meta T-P-S at 1830 on 3330 kc. Montana amateurs are saddened by the passing of LOD. Of Three Forks. Jean was a well-known operator who had been licensed for many years by a fine ham who will be missed very much. The Glacier (Continued on page 188)
NEW HORNET 40 METER BEAM

MODEL 40M2

Shortened 40 meter 2 element beam

ONLY $59.75

Budget Terms only $5.50 per month

STAR FAMOUS HORNET QUALITY CONSTRUCTION
- Special Cast Aluminum Fittings
- Heavy-wall 6061-T6 Aluminum Elements

STAR 2 ELEMENT ROTARY PERFORMANCE
- Excellent Forward Gain & F/B ratio

STAR LOW COST — Don’t Pay More
- Have Hornet Quality for Less

FAMOUS HORNET TRIBANDERS

AS LOW AS $49.95

Budget terms as low as $4.70 per month

TOP PERFORMANCE ON 10 - 15 - 20 METERS
- Custom Fittings of Cast Aluminum
- Single 52 ohm Coax Feed
- Pretuned
- Heat Appearance

MODEL TB 500 Three Element Tribander
This popular antenna is actually superior to other antennas selling for twice its low price. Handles 500 watts
Cash price $49.95
Budget terms $4.70 per month

MODEL TB 750 Heavy Duty Tribander • Handles 750 watts • Cash price—Only $59.75
Budget Terms $5.50 per month

THIS BEAM THINKS IT’S A PIPELINE

You will think so too!!!
The four triband elements in operation on each band make the difference...

A POWERFUL FOUR ELEMENT PUNCH

- Extra Heavy Duty Commercial Quality Construction
- Handles Maximum Legal Power

NEW MODEL TB 1000-4
- Cash Price Only $59.75
Budget Terms only $9.30 per month

ALL BAND BASE LOADED VERTICAL

ONLY $1295

Model V.75
Popular Design • Time Proven Performance • Quick Installation • 52 ohm Coax Feed • Special Cast Aluminum Base Fitting • Operates on 80 - 40 - 20 - 15 - 10 - 6 Meters • Height 23 ft. Self Supporting

2 METER BEAMS

AS LOW AS $6.75

Model 2M5 — 5 Element Beam • Special Insert Molded Element Fittings • 6061-T6 Aluminum Boom & Elements
• Fast Assembly • Excellent For Stacking • Coax Feed • Price Only $6.75
Model 2M10 — 10 Element Beam Only $12.95
Model 2M5D — Deluxe 5 Element Beam — Large ¾" Diameter elements • Aluminum Boom • Adjust-A-Gam Feed System • Price Only $14.95 • Model 2M10D — Deluxe 10 Element Beam — Price Only $19.95

6 METER BEAMS

AS LOW AS $1295

Model 6M3—3 Element Beam • Large ¾" Dia. Elements • 6061-T6 Aluminum Elements and Boom • Adjust-A-Gam Feed System • Price Only $12.95
Model 6M4—4 Element Beam Price Only $16.95

10 METER AND CITIZENS BAND BEAM

ONLY $19.95

• Assemble for either 10 m or CB Service • 6061-T6 Aluminum Elements and Boom • Adjust-A-Gam Feed System • 3 Elements
• Hornet’s Patented Telescoping Antenna Feed System

DON’T PAY MORE — HAVE HORNET QUALITY FOR LESS

HORNET ANTENNA PRODUCTS CO. P. O. BOX 808, DUNCAN, OKLA.

Please rush the HORNET Antenna indicated below for a 10 day Trial. If Not Satisfied, I agree to return the antenna prepaid within 10 days without obligation.

40M2
- I will pay □ Cash within 10 days □ $5.50 within 10 days and $5.50 per month for 11 months

TB 1000-4
- I will pay □ Cash within 10 days □ $9.30 within 10 days and $9.30 per month for 11 months

TB 750
- I will pay □ Cash within 10 days □ $5.50 within 10 days and $5.50 per month for 11 months

TB 500
- I will pay □ Cash within 10 days □ $4.70 within 10 days and $4.70 per month for 11 months.

Please rush the antenna Model #__________
□ Payment in Full is Included
All Prices f.o.b. Factory

Call Letters

NAME ____________________________
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ORDER DIRECT FROM HORNET & SAVE $$$. . . . MAIL COUPON NOW
A Word from Ward...

"IT'S ABSOLUTELY FREE!"

A solid, well-constructed swimming pool, set up in your back yard, costs around $3,500.00. Yet there's a builder out in California who claims he'll "throw in" a swimming pool absolutely free with every home sold!

A think back, I recall merchandisers who gave away a free vest with every suit, a free hand pump with every set of tires, and a brand new fish bowl, absolutely free, with every goldfish. If a hot-shot salesman was so inclined, he could give away a free stove and a free 12-foot-refrigerator with every garage disposal. The only hitch is, he'd have to sell the garage disposal for $795.00 to make any money!

A you can see, when you carry this business of getting things free to an extreme—it becomes pretty ridiculous. If anyone ever offers to give you anything free—watch out. If it has any value at all, someone, some place, is going to pay for it. And don't be surprised if that some one is you.

Here, at trusty old Adirondack Radio, we have a little more respect for the intelligence of our friends and customers. We don't try to tell them we'll hand out two receivers for the price of one, a free record changer with every speaker, or a free antenna tuner with every mobile whip.

Around here, the only thing free is something of greater value than any of these: our reputation, our integrity, and our determination to give you a five-square deal every time.

Sincerely,

Ward J. Hinkle

Before you buy or trade, wire, write, call or drop in to see WARD, W2FEU

Be Sure to Write for Our Latest Used List

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Ward J. Hinkle, Owner

Park Hamfest held at Watertown was a huge success with JPR as pres., NML as secy., and PL as vice-pres. For the 1962 hamfest to be held at Ancram on the 10th of September, KTOGF went to Wisconsin for a visit. New calls in Harleytown are KZK, MIEK, MFV and MIEU. K2AID, Donna, is a new call in Forth Worth. K4AID is heard from Lewiston. NPY reports that nine hams stopped in Harro to see him in July. K2AFU received her license in Harro. Many of the Montana hams were attending the Big Springs Hamfest in Idaho, some Montana hams took part in a man hunt near Lincoln and were instrumental in capturing the person. Montana hams are requested to join with AREC or if possible with RACES, WAMBO and RHV, who were with us for a while went back to California. Sorry to lose them. Trail News.

KZBRH 100, LDZ 75, WNPV 30, KTOGF 5 (June) KTBKH 232.

OREGON—SCM, Everett H. France, W7AJN—New appointment: UQI as FC for Chekanusa County. EC certificates have been endorsed for RCH, TMR, K7BEV. AJN had one meeting with WKP, the SEC, and two meetings with a representative of the Portland Area V.I.P. AREC Net. Net and membership problems were discussed. A meeting was held by the Affiliated Council of Radio Clubs. Plans still are being made for the National ARRL Convention and a final report should be coming through soon. DERM reports the passing of WARMTW7, DIZ has been very busy providing communications and reports for people in hospitals and on an air crash in Alaska. REG is in the hospital with two crushed vertebrae as a result of falling from an aluminum ladder. WKP and KCMZ furnished communication service between the 10th and the starting line for outboard motor races. K7WID has a new vertical antenna. OSN RRAT Awards were passed to Z7TH and K7TH, ESJ held low-powered dry runs on 3500-kc. Stations participating were SMR, WJUS, AIM, MJO, DlS, KPCVX, K2AID, K7WID. All participants also are MARES members. Your SCM cannot pass these reports. He has no crystal ball or Omnibus board and is not a mind-reader. Please send in your reports, guys. Thanks. Traffic: (July) KTA9F 109, WDBU 151, K7HW 39, JYR 92, WZER 81, DEX 25, DJS 26, W7FTH 24, K7CS 9, KCMZ 6, WDPDT 6, ESJ 4, K7CN 3. (June) W7DTC 13.

WASHINGTON—SCM, Robert B. Thurston, WTPCY—SEC: HNNQ, RM: AAB, PAM: LFA. The Tacoma Radio Club (TRE) now holds code and theory classes Tue., Wed. and Thurs. of each week. K7BOH, operating from the Vets Hospital in Seattle, is on 6 meters and would like lots of contacts. QSK seems to have the inside track on the hidden transmitter hunts in the Tacoma Area. Z7G is out of the hospital and active again. K7PON is passing the Tech. Class exam. K7KUN and K7ONNF passed the General Class exam. K7KNE received his appointment to the Military Academy at West Point and hopes to operate from Oxford. His efforts are being made to put some activity on 2 meters in the Boeing Area. VPW reports vacation and summer outings cutting in on his listening and net work. K7PFM will locate in Redmond for the coming year. K7QBW served noticable from Sumas during the month. JC and K7KIE were active for the first time. K7MAFF has a Valiant transmitter and is operating portable from Enumclaw while working for the Dept. of Natural Resources. KBZU is back in traffic after a long lay-off. OBE left for vacation in W0-Land. NNF is the first W7 to receive the Kroonstad South Africa Award. AMC returned from vacation at Waterton Lakes, Canada. While there he attended the hamfest and won a rack of mucous horns with an oil painting to adorn his new shack. K7NAR, the club station at Naval Air Station. Seattle, now is operating on 6 meters. K7SEO is being transferred to the Boeing Airplane Company. K7MVL really is having a ball with 6-meters. K7KHW is looking for c.w. contacts on 6 meters. The Seattle mobile frequency is 3885 kc. The local Army MARS boys had a meeting and get-together at PL. Lantow recently. The Washington Section Net had 21 sessions with 17 QN1s and 101 QSTs for July. The net frequency is 3533 kc. and the times are 0230Z Monday, through Fri., and 1100Z and 1400Z their ORS appointments. TMO, an ex-Seattleite, was a recent visitor from Reno, Nev. BA received his 200th endorsement on his DXCC. VI built a new electronic keyer and is getting excellent results. QEX has a new Carver, PG6 is awaiting a new Tribander. The Northwest Amateur Radio Communications System, Inc. and the Boeing Employees Amateur Radio Society (Boars) have been given affiliation in the ARRL. HNNQ, the SEC, is planning on a trip around the eastern and northern areas of the state. Trail News: W7TH, WHZK, WHZK, GLEH21, APS 100, ACA 97, K7MAFF 7, 29, W7ST 74, OBE 74, GIP 21, AMC 21, ABE 17, LEU 12, K7KKE 10, WTPCY 8, RTB 3. (Continued on page 149)
NEW DELUXE HL-"O" COILS
15M $5.95
20M $6.95
40M $7.95
75M $9.95
160M $14.95

FIBRE-GLAS ANTENNA
The Feather-Weight with Spring-Steel Strength. Completely weatherproof. Fibreglas covering, minimizes electrostatic noises generated by heat, moisture and foreign particles in the air.
FG-60 60" $4.95
FG-72 72" $4.95
FG-84 84" $5.15
FG-96 96" $5.25
FG-103 103" $6.95

3 ELEMENT BEAM
NO. SR-500
Power gain appr. 5.70Db. Fwd. 10 to 1 inter. rad. from sides & rear. VSWR-L-1 to 1 at band center when fed with 52 ohm coax.
SR-500-10 $24.95
SR-500-6 $12.95
SR-500-11 $24.95
SR-500-2 $10.95

NEW! SLIM-JIM ALL-BAND BASE LOADING ANTENNA COIL
96" WHIP
FOR 10, 11, 15, 20, 40, 80 METERS
SIZE 13 1/2"x 19"
Positive action, just slide whip in or out to loading point and lock nut into position.
NO. 8-1080
$17.95

MONOPOLE ANTENNA
Folded radiating element for installation requiring a ground plane configuration and a wider useful range.
SR-600-2 2 Met. $14.95
SR-600-6 6 Met. $16.95
SR-600-10 10 Met. $24.90
SR-600-11 11 Met. $24.50

WRITE FOR FREE CATALOG

FIBRE-GLAS ANTENNA
The Feather-Weight with Spring-Steel Strength. Completely weatherproof. Fibreglas covering, minimizes electrostatic noises generated by heat, moisture and foreign particles in the air.
FG-60 60" $4.95
FG-72 72" $4.95
FG-84 84" $5.15
FG-96 96" $5.25
FG-103 103" $6.95

MASTER MATCHER & FIELD STRENGTH METER. Automatically tunes entire band by remote control.
Complete $24.95

MULTI-BAND COILS
New plug-in type, operates with std. 3" base. 9" whip. Q of 0.25. 300 W input. Oper. with 52 ohm cable. Factory pre-tuned.
No. 900-10, 15, 20, 40, 75M
No. 999-10, 15, 20, 75M
No. SSB-156-40, 75M
YOUR CHOICE $14.95

TWIN 6-2 METER BEAM
May be rotated by TV roter. Complete with baluns, match, harness to 52 ohm. Vertical or horiz. pol. Trem. forward gain. Excell. front to back ratio. Light-weight, sturdy.
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160WX

Model 232-C 322 Series
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321 or 321C Base Mount—Where no spg. des.—w. sp. rig. type ball Jt. 7.95

All products are for Universal Use-Mobile, Home, Marine, C.A.P., Civil Defense, Emergency, etc.

Master Mobile Mounts, Inc.
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AT LEADING RADIO JOBBERs EVERYWHERE
HAWAII—SCM, John E. Montague, KH6DVG—Novice classes are being conducted by AFM and CLD, AFM being responsible for the code and CLD taking care of the tower. With deep sorrow we note the death of AN7/6, K6MNI/KH6, at Hilo, where he had been a resident for many years. His presence was sorely missed by the members of the Leilani Amateur Radio Club, who held a memorial service in his honor.

NEVADA—SCM, Charles A. Rhodes, W7TVU—Ex-SCM now is KB9Y in Boulder City. The SNARC is focusing on ham radio and it's hoped that the organization will soon be on the air. Plans are being made for a new repeater in the Laughlin area.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K8DYX—Last SCM: Edward T. Turner, W6STY, SCM, W6XU, W6ZL, W6BC, W6REX, W6IR, W6GOM, W6F, W6NQ, W6QY, W6G—W6IRY reports activities in the Santa Clara County APCA and SCARS net. On July 23, a potluck dinner was held at the Newman home in the Sierra Madre area. On July 24, the club held a breakfast meeting in Los Gatos, where W6STY spoke on the activities of the club.

3-BAY INSTALLATION

1. Install foundation unit directly in earth excavation, or concrete, as desired.
2. Attach upper base unit and fasten tower to lower bracket.
3. Raise the tower to vertical position with 9-to-1 winch on pilot base, swap holding bolt positions, and you have a hinge, crank-up/crank-over SELF-SUPPORTING tower. That's all there is to it!

The new Tri-Ex series is available in 37 and 54 foot models (actual full height is exclusive of mast). Design of tower permits use without guys, and the unique 30 degree bracing of alternating design assures highest degree of strength and wind resistance.

STANDARD SERIES

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HEAVY DUTY SERIES

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See your distributor for complete literature and prices on the complete line of Tri-Ex Towers, or write direct to:

TRI-EX TOWER CORP.
2920 WEST MAGNOLIA BLVD.
BURBANK, 3 CALIFORNIA
great response

Naturally. This smart ham is using a University Model 70. It’s dynamic! Now his QSO’s are more frequent with better quality. You’d be surprised at the compliments he gets. He’s also improved his SSB transmissions... found the perfect budget-minded way to increase peak power and intelligibility. And he doesn’t have to swallow this microphone to be heard. All he does is sit back, relax and speak normally. The Model 70 does the rest. Why not let it do the same for you. Comes complete with integral 15-foot 3-conductor shielded cable, Model SA10 slide-on stand adapter and cloth carrying bag. Check the specs. No other dynamic of its type can match the great Model 70! Only $29.95*

SPECIFICATIONS
Frequency Response: 50-14,000 cps (which extends to usable limit in the 18,000 cycle region). Impedance: 30/50; 20,000 ohms. Output Level: 30/50 ohms: —50 db/1 mw/10 dynes/cm². —143 db EIA sensitivity rating; 20,000 ohms into high impedance input; 28 mv/10 dynes/cm². Hum Reference: —120 db/001 gauss. Dimensions: 1-5/32” maximum diameter, 6” maximum length. Shipping Weight: 2 1/4 lbs. Finish: Acrylic silver-gray and non-reflecting black.

*Model 71 also available with on-off slide switch $34.95.

Write for new 12-page catalog with complete details on the entire University Modular Microphone line. Desk T-10, University Loudspeakers, Inc., 80 South Kensico Ave., White Plains, New York.
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*Send New Catalog  Send Reconditioned Bulletin

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Presented by the Telephone Company at its July meeting, W46KU is collecting data for a modulation scope. W48NG is now General Class, W46AU is taking a course at U.C. W46KUN has a new Heath mobile rig. W46KTB is looking for a Viking Ranger. K4UYS has been working the “Top Band” (100). K4VXJ attended the mobile breakfast in Palo Alto, K4DDH is now W46UP. W46QSE has a new Heath Pinnacle 8-meter transceiver. W46QDG has a new jr. operator. W46BNC is now W46BP. General Class, K4WNY is on 3W, and is building a Heath. K46YM is happy, K46YU is the 13-year-old jr. YL of K4VXJ. W46YLJ was finally heard on 25-meter phone and was worked with 599 signals by W46URL. W46YQJ, ORC, made 5076 points in Field Day, The ORC reports its Worked All California Counties certificate is very popular. W46BUN spent four weeks summer training with the Air Force. W46DLJ got the Krocobed 5X6 Award certificate and FQA for all phone. W46BZ is in the hospital. W46CPC is working 10X per day for a 5W U. The first HTH Award Class G and F and C-26, W46BZB is QRT. The change is now the time to check over that ARCE gear for possible winter. Traffic: W46LYX, 8 N1L, W46ECP 5802, K46KX 153. (June) K46OSO 27.

SACRAMENTO VALLEY—SCM. George H. Hudson, W46TVY—SEC: K46VQF, EC: K46KUB, K46QOT and K46BY, OSEs: K46AF W46CJU and W46YQJ, PAM: W46GQ, OQ: W46WLY, W46CQI, K46ER, W46JW and K46IL, ORCE: W46WQO and W46CEF, OSE: W46PIY, OPSE: W46WQO, K46VQF, W46CQI and W46CEF. The annual Stockton to Colusa Outboard Motorboat Marathon was provided communications via 3 meters with W46DOO running the sailboat, K46K, K46LPB, K46MEB, W46QXX, W46JTO, W46ME, K46ER, K46RF, W46KB, K46PK, W46KQ and W46PIY assisting at the repeater stations at Mountain House and at the reporting points along the route. W46JW is busy on 40-meter c.w. chasing DX, K46IL has his W46 and W46B certificates and still has time to turn in a nice record on the traffic nets. W46QXJ has finished the power source for the home-brew 20-watt rig and is checking into the Trinity County C.D., Net Mon, at 9 a.m. 1500 kc, W46GCI and W46QXJ hold the dice colorful between the Trinity County Fair handling traffic and selling ham radio to the tourists. W46AF is on vacation in the Pacific Northwest, W46CJU is active in the NAWC and RN5 traffic nets and NCN meets at 4000 kc on 3005 kc and RN5 at 6000Z-6070Z on 3005 kc. W46BY is on Alturas way, has applied for an ARCE certificate, W46QXJ has joined the ARCE. A new ham in Sacramento is W46TVY, K46YQJ, former Valley QC. QSO and QST sends regards from W46-Land. Your SCM and SEC showed the Northills Radio Club the “Project Hope” film depicting the operation of W46QIY from the “Hope House” in Belfield, during its stop-over in Indonesia. K46CUU is “Ram of the Month” of the Sacramento RAMS. Thanks to all the traffic men for the swell reports and a short reminder for all to support your traffic systems. Traffic: W46CJU 175, K46QYJ 8, W46YQJ 43, K46YQJ 17.

SAN JOAQUIN VALLEY—SCM. Ralph Sarovian, W46YQ, W46QO—W46QO, K46PPI, W46NAS and others are working on a repeater system that should work from one end of the San Joaquin Valley to the other. W46PB is operating on the Mission Trail and enjoying it on 10 meters. K46ROU gave up all traffic liaison for the summer and will be back in the fall. K46ROU received his WAC-YL Award. W46BE and the California Radio Club have hosted a picnic at Moonshy’s Grove, Aug. 12. W46QXU traded his Drake 4A for an SX-111 receiver and likes it. W46QXJ is working on his S.B.S. transceiver for 15 meters. K46YQJ is being heard on 75-meter phone. W46QXJ is working on his s.b.s. exciter. K46KJ got a new Collins 30L amplifier and is using it on 20 meters. W46QXJ is knocing over 1X with its hollombie and 100 watts a.m. W46QOS says that every TV set in the apartment house jumps when W46QXJ is heard on. K46PPI is working on an antenna tuner for his TCB. The mayor of Kingsburg, W66KU, is on 20-meter s.b.s. K46ROU has his beam on a 40-ft. tower. W46BEU is operating on the NCN at 7 p.m. on 3005 kc. K46ZI is taking over a summer vacation from ham radio. W46BYO and K46QPC are operating on the NCN. K46QPC has been appointed an RN5 job for the summer. W46QXJ would like to start a c.w. training period for hams interested in traffic. Anyone interested, please contact W46QXJ. K46RAU is vacating in Yosemite and is checking in NCN. Traffic: (July) W46BB 42, K46ZI 30, K46ROU 40, W46EAl 41, (June) K46ROU 81.

ROANOKE DIVISION

SOUTH CAROLINA—SCM. Dr. J. O. Dunlap, W46GK—K46WJ and W46QPC have worked 60 and been issued net certificates on SCN, one of the finest (Continued on page 144).
DESIGN FOR PERFORMANCE

Here is a straightforward approach to the problem of preventing electrons from returning to the screen region of a transmitting tube. When channeled into beams like those below, electrons reach the anode, where they do their useful work. Penta's exclusive, patented vane-type suppressor grid does the trick.

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The result is outstanding linearity, efficiency, stability. Penta's PL-172, for example, delivers 1000 watts of Class AB1 useful output at only 2000 plate volts...more than 1500 watts at maximum Class AB1 ratings. Introduced in 1955, Penta tubes with vane-type suppressor grids are in important equipment the world over, and their use in high-quality linear amplifiers is growing daily.

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PENTA LABORATORIES, INC. 312 North Nopal Street Santa Barbara, California
nels in the country. KJUV reports 375 stations on the S.S.B. Net in July with 31 formal traffic. Those handling communications for the All Woman Transcontinental Air Race or "Powder Puff Derby" were WACPX, W4VW, K4JDE, K4FJS, K4JNT, K4VBY, K6XJ, K6PIT, K4VCA and W4ABW. K4VT is one of the hospital and doing well with the assistance of his many friends in A.R. An effort to form a State Radio Council will be made Oct. 7 prior to the Rock Hill Hamfest by State League Officials and representatives from all clubs. K4CO has been appointed as PAM to succeed K4HE, who served for two years and accomplished much with the big phone net which had 800 stations participating in July. The Rock Hill RC held a hot dog roast for the Belmont (N. C.) RC members but they failed to show up in the rain storm. The S.S.B. Net has completed plans for its annual supper on Oct. 7 prior to the Rock Hill Hamfest. The picnic at the Isle of Palms was well attended and enjoyed. Hams in the area, Traffic: K4WJR 13, K4BRP 70, K4DZT 68, K4VNU 32, K4DHX 61, W4KCO 58, W4PED 26, K4OUC 23, W4OCH 20, W4VJR 18, K4WW 14, W4GCB 13, K4KZNE 13, K4PIA 2, K4UYH 2.

VIRGINIA—SCM, Robert L. Pollmar, W4QD—Ans., SCM: H. J. Hopkins, 4891 J. SEC: W4VMA. New Officers W4KQL and K4PQ. W4FOR is Radio Officer and EC of Princess Ann County and is busy setting up equipment and holding drills. W4AMP, ex-K4LZBPK, now has his W4AS and W4AC and is 74/54 for DJXCO. K4ZVT now is in Germany awaiting a DLI call. W4DIA has a new antenna and is coming on the nets with 300 watts. K4GQ reports that K4QUM installed a sectored dense traffic on 7200-ke., s.s.b., 0600 GMT. K4LIL reports into VFN on e.w. while the modulator is kaput. Old VFN and W4CQE are back on the air from a new QTH in Catawba. The new RVARC is going strong and is still negotiating with the old RRARS in the Roanoke Area. The Virginia 6-10 GHz Net turned in a nice traffic total in spite of the general traffic slump. We still are a long way from one hundred per cent reporting of all ORS and ORS anticipate. Let's hear from all appointees, even if your total is a goose egg. Many reported enjoying the summer weather and vacations; we hope the time will come when the nets will be ready for another bang-up season. W4FOR, W4SHJ and K4DOR/VAU made BPL, all by originations. Traffic: (Jul) K4DOR/VAU 28, K4QUM 27, K4DSX 21, W4SHJ 21, K4QIX 15, W4DIA 13, W4BHIA 103, K4KMP 20, K4WI 83, K4QO 56, K4DZT 34, K4CN 51, K4OUC 30, K4FSS 29, W4TE 21, K4LID 18, K4ZVT 15, K4HAN 10, K4HP 7, W4QX 7, W4VNX 7, K4IA 6, W4GCE 4, K4UTK 4, W4OYV 3, W4BZE 2, K4ELG 1, (June) W4BGP 21.

WEST VIRGINIA—SCM, Donald B. Morris, W3JM—Congratulations to the following amateurs on their work during the Charleston Flood: K8BIT, CLX, K8CSG, K8DIT, K4HLE, K8HID, K8DNJ, K8JNM, K8DIN, K8M0B, K8M9Q, K8NY, K9RFW, K8FQC. Other amateurs were reported if their services were required. The East River ARC visited Greenbank Telescope. The Oceangoog Radio Society of Eastern Panhandle has applied for affiliation with ARRL and is active with the State Radio Council. JI6I visited this club as well as L4W for ARRL Headquarters, NTV operated portable from Montgomery County during vacation. K5JFC is the newest member of WACVY. K8MMZ won the 160 award for West Va. and attended Marshall. K8CSG prepared an excellent report on the Charleston Flood. K8UQY has stepped up activity, working morning e.w. nets on 40 meters. Q46 has a new mobile rig, K8UOJ has a new 6-meter mobile rig. Remember the West Va. C.W. Net meets on 3570 kc, at 7 P.M. and the W. Va. Phone Net on 2800 at 6:30 P.M. Also look for state s.s.b. stations on 2800 kc. Traffic: W8PTI 81, W8N 45, K8SG 36, QYX 29, W8HZA 28, K8HID 22, LOU 15, W9NP 8, JI6I 6.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald S. Middleton, W6NIT—SEC: S.B. PAMS: CNW and L3H, RM1: MYB, ORS: K8GCC and K8OEP. Irene, K8QD, writes that a good friend moved an antenna pole to get her back on the air, JHP mobile, U.S. Navy retired, participated in his first transmitter hunt July 23 while passing through his home town. Pueblo. The Steel City Amateur Club was having its monthly transmitter hunt on 20.4 Mc. The PARA honored ex-SCM DML with a cake and a QST membership-subscription at its monthly meeting. Gene moved to Ladunta Sept. 1. WWJ reports finishing a Heath wide-band unit on 50 mc and SWL work good. FEO is taking over as manager of CWW for MYB. MYB has had a change in work hours. The Col...
"Terrific!...Unbelievable... Best rig—ever"!

Here are a few unsolicited comments from owners of Clegg VHF equipment

From Ohio:
"...I am a quality control supervisor with a leading electrical manufacturer and this Zeus transmitter is to me the finest piece of workmanship that I have ever purchased or inspected..."

From New Hampshire:
Richard E. Hayes, K8UXU
"... We feel that our new Zeus is the best thing that ever happened to us since we have been in ham radio (5 years) ..."

From Florida:
Hazen & Beatrice Bean, K1JFQ
"... 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. ...
"

From California:
Jack Edlow, K4YIW
"... 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 ...
"

From Pennsylvania:
Jeanne & John Walker, WA6GEE
"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 ..."

From Puerto Rico:
Dr. A. Schlecter, K30EC
"... 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 ...
"

From New Jersey:
Pedro Fullana, KP4AAN
"... I would like to tell you I am more than delighted with the operation of the Zeus. Have had nothing but good reports from other Hams ...
"

From Georgia:
Donald E. Gillmore, WA2QCQ
"... This set is terrific. I've had terrific results with it. It's the best rig — ever."

George E. Misshack, K4QOE
"... 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 QS1 and back through the above haywire we were able to put 4.4 watts into the antenna as measured by a RF ammeter! ..."

Ken Phillips, K8CHE

Clegg LABORATORIES
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145
NEW MEXICO—SCM, Newell F. Greene, KM1QL—Asst. SCM; Carl W. Franz, KZTHX, SEC; HCC, Pam. ZU, V.H.F. PAM; FPB, RM; ZHN, CA is a new CO. The Albuquerque Chapter of the��ie Amateur Radio League has the Worked All New Mexico Counties Award. The Los Alamos Club is losing its fine club house. A new school building is to occupy the site. K1UYF has a new invader to aid him in his contesting. YPC/M, at National Guard Camp, handled a pleitany of tourist messages back home. The lineup of calls changes as nets move back to winter schedules. The Breakneck Club meets daily Sun., at 1700 MST on 2838 kc. K1GJO should be back in barns at his new QTH after several months at school. Traffic: W5XHN 942, URB 48.

WYOMING—SCM, Lind D. Bronson, W7AMU—The Pioneer Express Net meets Sun., at 1300 MST on 2427 kc. The YO Net is a e.w. net, on Mon., Wed., and Fri., at 1300 MST on 2610 kc. ABC is starting single sideband net, and a Drake receiver, R7K, is covered left by R7K, who writers to be repaired. TQU, of Wheatland, home-schooled at the Wyoming Hamfest. The Wyoming Hamfest was a big success, with 38 hams registered and a total of about 200, including XYLs and harmonies, attending. Thanks to K1AHO and his helpers for the fine banquet, programs and the CM South had a picnic at Veddelon Lodge Aug. 27. K1MIA is in Idaho on business, HJ demonstrated the coping of the hamfest at Dechutes Hamfest. Traffic: W7RIH 21, EHI 21, CQX 5, AMU 4, AMU 3, QGL 2, NAM 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dougher, K4AOZ—SEC; K4DA, RM; W4RQ, Pam.; K4PTM, K4PFX. New appointments: K4GQA as OBS and GO, Class IV. W4TOI has a new shack, W4OJU reports new station in Springville. W4N7H, W4K7V, W4KHF, W4BYY, W4K7V, W4N4L, W4NAXZ, W4K7V, and W4N7BA are all operating. An Apache Transmitter and an RX-110 receiver, W4NAXZ has a new call, W4ABX. Welcome to new Huntsville station W4N4S. K4AHO reports relocation of the Birmingham ARC Mobile Net, which meets Thurs., at 1900 CST on 20,650 kc. K4KPH is on s.a., with a new 20-W, W4N4Z has a new 20-W receiver. K4N4B is now with Western Electric in Winter Park, N.C. W4RQG welcomes to AENB K4JUW in Birmingham and K4BYL in Mobile. Congrats to K4LNA on receiving an AENB certificate. K4KFD has a new Drake 2H receiver and a 20-A s.a., exciter. K4GQA also has a new Drake 2B, K4TV is mobile on 75 meters. K4WIV has traded the DX-48 for a Valiant and is the new president of the Decatur ARC. W4QOG reports a new AENB contest coming up, which runs from Aug. 1 to Oct. 31. All teenagers are invited to check in with AENB, 3936 kc., 1630 CST daily. The following received AENB certificates: K4QV, K4TRJ, K4WIV and K4RSY. K4DJJ voted the most outstanding member of the AENB for the past 3 months. W4QOG belongs to AENB, CST. Ed K4JUW, K4WA, K4FTC, K4B6I, K4ZLZ and K4VAN, W4BFM and his XYL enjoyed a marvelous vacation to Niagara Falls and other points. L.C. Mooney received AENB certificates: K4KJD, K4YKA, W4USB.
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.

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$385.00 for your Collins 32V-3 see page 151

WESTERN FLORIDA—SCM. Frank M. Butler, jr., W8KLH—ARRC; W8MLE, PAM; W8WE, RM; K8UIK. A fine picnic was held in Fort Walton by members of the phone and cw nets. Many thanks to K8QO, W8P1, K8IOG and others who made it a success.

K8AFT/4 is now OES in Fort Walton, on 8 and 2 meters at present with plans for 220 and 352 Mc. W8K0P and W8MLE attended the Weather Bureau-Civil Defense Hurricane Conference in Tallahassee and presented the amateur net facilities. W8J1P has moved from Carabelle to Panama City but remains active in W8PN. W8KAC, W8HCC, W8HCW, W8HWV, W8KIV, W8L0B, W8L1O and W8L1N will keep you informed.

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(Continued on page 151)
From Polytronics:
THE POWERFUL POLY-COMM "62" B, VHF TRANSCIEVER

For Novice, Technician and General
COVERS BOTH THE
6 AND 2 METER
BANDS

The unbeatable Poly-Comm "62" B covers 250 kc either side of both bands for C.A.P. use... it has 18 watt power input... S meter doubles as tune-up meter, actually samples R.F. for maximum output... 100% plate modulation... V.F.O.
or crystal control for transmit... built-in 115 VAC/12 VDC power supply... triple conversion on two, dual on six... (crystal controlled)... delayed AGC... all oscillators voltage regulated... squelch and automatic noise limiter... sensitivity: better than .8 microvolts on two, better than .2 on six for 10 db S/N/N ratio... selectivity: (6 kc @ 6 db pt.) and stability assured by all temperature compensated circuits and Hi-Q IF stages utilizing 12 tuned circuits... single knob bandswitching... sparkling modulation for solid contacts... complete with under-the-dash bracket and ceramic microphone.

$349.50 amateur net COMPLETE
O.C.D.M. Model "62" CD...$349.50 COMPLETE

Now fully perfected, the Poly-Comm "62" B is the result of extensive field testing all over the United States. It's designed to satisfy the most critical amateur. Owners of the 6-2 A who have not been contacted are invited to return their unit for free conversion. Your dealer has, or will shortly have, the "62" B in stock. "62" CD model available Oct. 15.

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WIGA, the s.a.b. base station in the AREC Plum. WhiBiK, from Pennsylvania, is written WIKI, formerly in Taffiesose, is now working in Orlando, Pennsylvania. The NCS club is starting soon and theory discussions are held. Several graduates of the first course, including W4KBNX, are now on the air. The Curry Field Club is active again, using the call W6KKX/4. KDJW has been awarded an R.N.E certificate for his participation. W4XAP now has all the logs out of the DX100. The V.I.P. Club will provide all communications at the Fiesta Sports Car Races, July 21 and 22, W8DZ 87, K4VND 48, KIOL 23, K1BDF 21, K4QC 20, (June) K4QC 22.

GEORGIA—SCM, William P. Kennedy, W4CTF—
463 PM, PAX, 2100, W4CTF. SCM; W4HCX and W4ACF; K4MSY, 3185. K4OCT meets on 1st and 3rd Sun., Tues., 8:00 P.M., Thurs., 8:000 on Sun.; GS men meet Mon., through May on 3565 k.c. at 1000 EST and 2200 EST, W4ACF as N.C.; the 75-Meter Mobile Net meets Tues., 8:00 P.M., Thurs., 2200 k.c. at 1200 EST, K4VYD as N.C.; the GPVU Net meets Thurs., 2200 k.c. at 0000 EST, K4ZRS as N.C.; the Atlanta Ten-Meter Sideband Net meets Tues., 2200 P.M., at 2200 EST, K4GGE as net net.; the Georgia S.B., Net meets Mon. through Fri. on 6072 k.c. at 2200 EST, K4TLE as net.; the Atlanta Canner Radio Club held near Atlanta July 6, K4VYD, 8:00 P.M. K4DNN Sun., morning net control, W4PMJ Thu., evening net control, W4YIY Thu., evening net control. K4VYD: K4GDT, W4DZQ, W4CTF, W4CTF, W4CTF.

WEST INDIES—SCM, William Lover, KP4Y,
C.I. Radio Officer; MC. Present at the first meeting of amateurs with c.d. authorities on July 7 were TIN, K5Z, ASY, Aguadilla, CH and ALY Rio Piedras, DJ Hato Rep. OE and CK Villa Caparra, 3C Cumanas. TIN was chosen as N.C. on 3825 k.c. on Wed. at 8 P.M., K5Z is N.C. on 3825 k.c. on Mon. at 8 P.M. and 8 AM, 3C is N.C. on 2200 k.c. each Sat. at 8 P.M. All KP4 stations are urged to cooperate in this immensely important work. Contact CH or MC for RACES procedure books. Virtually every KP4-Land was V4KPK, K4WBS, K4PM2 and W4WZ. CH is now CP4QKYL, B.C. A.M. is now K4MMY at Enid, Okla., where he is taking jet pilot training. ASY.was stationed in Minot, A.M.B. vacated in Canada, JS left Aug. 15 to live in Miami, A.M.C. returned from Biloxy, Miss. NV has a new Drake 2A and assembled a Heathk. W4DZQ, W4ACF, N.C. of the Antilles Weather Net, transmits and receives on 3035 kHz and 7245 kHz, to reach more weather reporting stations. A.E.B. has set up a weather reporting and transmitting equipment and is testing with the A.E.B. G4 has a 150-kw emergency power plant. V597ST is on 2200 kHz, with a DKM-100. DXG is in S.C., with a kw, and a three-element beam. ASK monitors all received signals with an oscilloscope and receives an S.W. card from Turkey, A.W.H. has a new Chevymobile and the Comanche (inset together to be carried anywhere in emergency along with 6- and 12-volt power supplies. A.R.B. reports a group of VF stations have an emergency and disaster net with N.C.S. in Triniad on 7330 k.c. 1000-1200 GMT and on more time in 1200-2400 GMT. No pirate or private traffic can be accepted. Federal traffic will be arranged with the Island Federation and U.S. Governments meet. A.E.B. has been sponsored by a U.S.-owned station. A.M.B. is in the process of sponsoring a KPI-SCB contract during Sept. and Oct. A.W.H. suggests a ham swap some time. W5NIP is operating W5NIP from Fort Totten in Ithaca, N.Y. 95 k., KIPT 20, A.W.H. 5, DJ 4.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert P. Hill, Jr., W6JQB—
P.O. Box 2889, W6BFX, W6ROF and K4YWL, PAM. W6BFX, W6ROF and K4YWL. SCM: K4YWL and K4YML stations contracted for July. W6JQB, W6GTH and W6GTH. Congratulations! This is a new chapter in the history of the Los Angeles Section on W6JQB. Congratulations to Mr. Bernard H. (Pop) Linden, who was in charge of the Los Angeles Office and District 11 of the C.F.C. for 26 years and for 45 years in Government Service. We

(Continued on page 32)
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300.00—Pacemaker
260.00—Navigator
240.00—6NZ Transmitter

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385.00—32V-3

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Name_________________________ Call________

Address______________________
expect to hear you on the air soon. Pops! W6DJB replies to the fine letter between N6DP and N7BG. WAGOUK is learning Braile in order to help sightless children in radio. W6BIK reports a nice CD party score here in poor conditions. W6DDB, who is only 13 meters, K6UYK moved the rig from Long Beach to North Hollywood. W6HBU is working K2K-Laud station in about a dozen miles. W6EQRN has a new call, 303! W6JBD is fresh back from vacation in Yellowstone. W6ABM has the new country, Danaa! K6CDW is holding for the High Sierra station, K9WYV. W6OWN will be moving round trip to New Jersey! W9VZQ is working KM-1 on the San Diego-Coronado Ferry! The SoCal 6 Net is now looking for linked work between 80-meter c.w. and 6-meter phone. Contact K6PZM or W6DBM, W6BEBL reports some work on San Diego on 20 M. W6KVRB reports the OSCAR Fly-over Test. K6CPJ has a new one confirmed. ONBK! K6X5X reports some good opening on 120 meters. K6LYJ is on board the GHW in Manhattan Beach on 1255 kHz, most of a 600-mile path through the snow! Support your section nets: On V.C., the Southern California Net (SCN) on 2000 ke. at 0300 GMT daily; on phone the SoCal 6 Net on 5641 Mc. at 0300 GMT daily. Traffic: (July) W.W.PF 1073, W6GTH 541, W6RQP 779, K6FD 3596, W6GNN 362, W6ADJB 101, W6AEPF 154, W6KCOZ 145, K6X1X 119, W6BEC 101, W6ZMB 91, W6FQG 30, W6H2Q 61, K6PZM 34, W6P2Q 48, W6CBE 48, W6AGC 44, W6JQK 30, W6KVRB 20, W6SYH 19, K6MBG 19, W6QWW 8, W6CKX 2, W6BZ 2, W6GWF 1. (June) K6VY 21, W6CRK 21, W6QNN 27, W6AGS 14.

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Asst. SCM: E. W. Pool. SNFO: SEC: K6AEX; RM: LE.

(Continued on page 154)
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For the Ham on the move — now for the first time a KW is available to you for mobile use — AC input power required is only 550 watts ... use aboard boats, on planes, in emergency communication vans or in fixed station. It's compatible with any 100 watt exciter and has just what you need for top performance.

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Use with the Collins KWM-2 and you have all the power you need for mobile, portable and fixed station single side-band communication on all amateur bands between 3.4 mc and 29.7 mc.
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For any band, 80, 40, 20, 15 or 10 meters, the Ameco Model PH Preamplifier has a better noise figure than most multiband receivers, 23 db. minimum gain, will improve image and spurious rejection with its two tuned circuits. Especially effective on 10 or 15 meters.
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AMERICAN ELECTRONICS CO.
178 HERRICKS ROAD, MINEOLA, L. I., N. Y.
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The new main insulator of WSQG. The Glass-Line is between the two guy insulators running to the lower left. The copper link between the center guy insulator and the upper right guy insulator is for the dead-end feeder of a Zepp antenna.
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DEALER & DISTRIBUTOR INQUIRIES INVITED.
One month I failed to make a report and I received so many queries as to why, I decided that I would make a report if I had to quote FCC regulations, I think the FCC should add a few questions on Safety First before granting a license of any kind. I lived on the air recently that a ham climbed a telescoping antenna tower while it was fully extended—result, two broken legs and one broken arm. Don't take a chance and remember that no job is so important that it cannot be done safely. BOO has named as AM. Jim is to be congratulated on the fine job he has done in the past and as EC for his county. YWCO was on vacation in California, attending the San Fernando Valley Hamfest and won first place in the 75-meter transmitter hunt. Seems like Walt is a natural hunter regardless of where he is. KSQWR has made R9PZ the second month. Looks like Ben is trying for the record. Don't forget the West Gulf Division Convention to be held in Kerrville Oct. 13-15. I hope to see you there. With the world situation as it is, I would suggest that every amateur make an effort to become affiliated with a civil defense organization. Our hams are doing their share. Write the proper authorities for details.
OKLAHOMA—SCM. Adrian V. Rea, WS9DRZ—SEC. KS9KW is looking for reports from you ECs. His address is 1220 S. Owasso, Tulsa, Okla. New RMS are: OK2F, KAGZQ, KSOLO, KSOQX. New PAM is KS9OA. KS9NCX and KSOOW have just received ORS appointments, and KSOOV an OBS appointment. Hats off to the Tulsa W.H. boys for a job well done.
SOUTHERN TEXAS—SCM. Roy K. Gregston, WS9FQJ. SEC. AIRL. The Gulf Coast Amateur Radio Council has been organized in Houston with the following officers: KFER, chairman; CE. vice-chairman: PM, publicity; and KS9AP, secretary. Now the time to begin making plans to attend the West Gulf Convention to be held at Kerrville, Texas, Oct. 13, 14 and 15. QF9, U9Q, DRZ, BNC, AIRL, QEM, KS7J, KS9BD, KS9JX and KSTRY, together with the communications for c.d. from Oklahoma, will be operating at Region 6 Headquar ters for OCDAM in Denton, Texas. This was a very informative meeting and we got some good information to carry to the clubs on our visits. According to FCC regulations and OCDAM rules, the amateurs are being given the chance to head up all c.d. communications and we all should get in and help, not only for our amateur radio, but we owe it to our country. KSVEN is back on the air with a new HT-57. The El Paso gang handled the communications for the recent Powder Puff Derby, and as usual did an excellent job with it. KSTRY, State Communications Officer. visited the Corpus Christi Amatuer Radio Club, and handled the communication in the state second to none if we will get it hot out. So let’s go. HQR is on the air with a new W6/SLine. QK9 has a new KWM-2. KSTRY has a new KWM-2. Traffic: K5WIC 175, ABY 55, SCT 15, FFIP 1.
SOUTHERN TEXAS—SCM. Roy K. Gregston, WS9FQJ—SEC. AIRL. The Gulf Coast Amateur Radio Council has been organized in Houston with the following officers: KFER, chairman; CE. vice-chairman: PM, publicity; and KS9AP, secretary. Now the time to begin making plans to attend the West Gulf Convention to be held at Kerrville, Texas, Oct. 13, 14 and 15. QF9, U9Q, DRZ, BNC, AIRL, QEM, KS7J, KS9BD, KS9JX and KSTRY, together with the communications for c.d. from Oklahoma, will be operating at Region 6 Headquarters for OCDAM in Denton, Texas. This was a very informative meeting and we got some good information to carry to the clubs on our visits. According to FCC regulations and OCDAM rules, the amateurs are being given the chance to head up all c.d. communications and we all should get in and help, not only for our amateur radio, but we owe it to our country. KSVEN is back on the air with a new HT-57. The El Paso gang handled the communications for the recent Powder Puff Derby, and as usual did an excellent job with it. KSTRY, State Communications Officer, visited the Corpus Christi Amateur Radio Club, and handled the communication in the state second to none if we will get it hot out. So let’s go. HQR is on the air with a new W6/SLine. QK9 has a new KWM-2. KSTRY has a new KWM-2. Traffic: K5WIC 175, ABY 55, SCT 15, FFIP 1. CANADIAN DIVISION
MARITIME—SCM. D. E. Weeks, VE1WBB—Asst. SCM’s: H. O. Birdly, VO1CZ, and A. E. W. Street. VE1KX, SEC: BL. Deepest sympathy is extended to the relatives and friends of KB7ZI and KI7Z, who have joined the ranks of Silent Keys. Newly-elected officers of the NBARA include W9F, pres.; B, and L, vice-pres.; MZ, sec.-trea., VE9HR. VE9JH reports that KB7A and VE9JW have been transferred from Gopor Bay. B. also reports that he and VE9WQ provided communications for the Goose Bay Volunteer Fire Department, while it was in session and handled 56 messages, 3CLJ (KX7J recently visited the section. Congratulations to
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VC and ACJ and their XVs on the arrival of new daughters. Your correspondent, for personal reasons, does not wish to be recognized for the coming SCM term. I would like to thank the many who have kindly assisted in the work of this office. Details regarding nominating and other procedures will be announced elsewhere in this issue. VO1KX has been transferred to Dartmouth. K2SQM/VE1 has been active from his summer home at Pepper's Cove. The NCARC has established beginners' classes for young amateurs. These interested should contact AGT. Trifle: VO2H 68, WW 88, VEOM 29.

ONTARIO—SCM, Richard W. Roberts, VE3JNG—The Niagara ARC held its Annual Dinner Roast at Port Weller recently, DPO is on Wednesday and will be seen at the Ontario ARRL Convention in Windsor. The Northtown Old Timers have, since last year, been an ARRL affiliate. 100 per cent. How about that? The executives of the Gateway ARC, North Bay, are DKA, pres.; BAW, vice-pres.; BBY, secretary-treas.; BEY, EGY, and DEX, directors. Overton is now in Michigan and has moved all his gear from Burlington. He has a new Thunderbird beam.

The Searoro ARC and the Northtown ARC combined for a hidden transmitter hunt in Toronto. Registration forms and programs for the Ontario ARRL Convention may be had from your SCM or CXX, Windsor, Ont. His QTH is 301 Gladstone Ave., Windsor. Executives of the Ottawa Valley Mobile Radio Club are RCB, pres.; BST, vice-pres.; BYT, secretary-treas.; YLL, member. They have a new-2 meter beam. BCJ will be mobile soon. AS3 is moving to New Brunswick. BON is leaving Canada for a few years. RCB is at present in a mobile in London. YLD is enjoying his new QTH at North Bay. ARF and DVM are portable at Lake Mazinaw, Ont. DXX has returned from NY-Land. He had an interesting trip and met many members of the YLRL. RN is back on mobile. AML is mobile for the summer and will be at the Ontario ARRL Convention. Our ARRL Canadian Director, W4KJ, has been very active in all phases of ham radio during the summer. Noel also will be at the ARRL Ontario Section Convention in Winterton, N.L., Canada. DVM, Miffliner, are now Chas A. 6L6, visited VE0SM in Nova Scotia, C.D., at Windsor.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—We were delighted to attend the R.A.Q.I. Provincial Convention, held at Le Tuque on Aug. 5 and 6. Some 106 names with their families attended. A dance on Sat. evening was a great success, and the hidden transmitter hunt on Sun., was won by A8V. Fifteen aspirants took place and first prizes were distributed. You are reminded to support your traffic nets: OQN (c.w.) on 3535 ke. at 1900 daily, and the Que. Pool Net on 3790 ke. at 1845 daily. The golf game long planned by VV, BR, BK and GK unfortunately was called in the “seven inning” minimum. VV has a fairly complete log book, and was invited to appear in 1917 if anyone is interested. While most clubs QRT for summer months, the Lake Shore Club car runs on the mainland, consisting mostly of ex- and ex-ex members of the enthusiastic group. At the Aug. meeting 4HJ visited. He is now living in Montreal. Many of the boys enjoyed vacation, V.A. and family fished, V.B. and family sailed, and 4BH and family bought a car and saw much of the country. IL went South, dropping in at the Bahamas and Bermuda. BB and his XYL visited London, England. AAY believes in leisure, lounging on his veranda while using the new s.s.b. gear. AYL was married July 25, WT also took the fatal step on Aug. 5. ADQ is fishing in Ontario. News of the month is a forthcoming v.h.f. experiment conducted by ARF and friends. An airborne transmitter on a balloon is contemplated. A sad note: KJ1 died quietly about July 13. His son, XJ, will carry on with EC. Trifle: VESDR 146, WT 14, EC 35. AGM 24.

ALBERTA—SCM, Harry Harrold, VE5TQ—SEC: BY, PAN; FO, OX; HM, OBS; HM, ORS; WQ, OES; DB. At present the Alberta section is disorganized and I need the help of all of you. On my recent trip I did not have a chance to meet some of you and now that you have had time to think things over I hope to hear from you. I need reports, also we have lots of appointments open. If I don't hear from you I am not of much use to you or the position that I hold. I will be visiting the different clubs when they start in the fall, so hope to meet more of you then. Our membership at present is very low so, fellow, let’s see what can be done about bringing it up. My recent trip took in as far away as Calgary and Prairies. Also we attended the International Ham fest at Waterton Lakes with some 585 present and it was a howling success. Next year's hamfest will be held at Airdo. Montana. BHI is very happy with traffic from the north, WQ is on 40-meter c.w. and is happy with traffic. Let's hear from you, fellows. Trifle: VEHOM.

Continued on page 158
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BRITISH COLUMBIA—SCM, H. F. Savage, VE7F—The British Columbia Emergency Net held its Galabrid over a Chinese Dinner with a good attendance and discussed the affairs of c.w., traffic-handling, AAF, RAI, WO, M. Mater, the Okanagan International Hamfest held at Okanagan Falls was a real hamfest. Some A licensed amateurs on both sides of the line had a real time with their families. A mention should be made to the organizers on how well they kept the program and to the time of events. Thanks to KS, KQ, XW, the XYL of BQ, and others, it sure was nice to see JD, who had just received his licence, at the hamfest. NL is not improving after his stroke. BFU will be an active YL with a DX-100. GJ has a 2-meter pipe-line into Vancouver, fixed and mobile. NW is plagued with summer static and fading so the traffic count is down. Traffic: VE7FK 79, BDP 76, M33 39, JQ 10, AMW 7.

MANITOB—SCM, M. W. Watson, VE4JY—The ARLM has announced it will sponsor a hamnet at Winnipeg in 1962. KP was the recipient of a handsome gift at a gathering of hams at the home of KN at Brandon. Ken was married on July 22 and is making his home with his XYL in Winnipeg, NB, our OBS, is leaving a time installing a new Clovane in his Buick. A ham pipe was held Aug 13 at St. Laurence Beach. EC TL reports a novel and lively activity on July 22 as follows: At the request of the treasurer of Lake Wimmen swimmer Claudia McPherson the AREC group set up EC reen Grand Marais to the boat accompanying the swimmer. The (Gilloch Pipe) formed a human chain and the QSO was completed. Full cooperation was given to the local radio stations and TV stations and questions of the public were answered by FS. Much favorable comment was heard on this phase of amateur radio. Traffic on the net seems to be taking a hold along with the members.

NAA—1961

(Continued from page 62)

All of these people are enthusiastic hams working together at a pretty amazing Naval radio installation.

As a Matter of Fact...

...all of communications is fascinating, and the advances made in recent years are quite startling to those of us who can remember how things were done in the "good old days." There is much more being done at NAA than we have room to tell you about, but there and elsewhere in the Navy there are some mighty interesting communications assignments which offer a challenge to everyone taking part.

If you still have your military service ahead of you, you'll find that your amateur license and experience can stand you in good stead. You will have to pardon the writer for being slightly prejudiced toward the Navy, although he will admit that interesting communications assignments are also plentiful in the other services. The real point is that your amateur radio experience can be a real asset both to yourself and to the country.

This is certainly true at NAA, from the commanding officer right down the line.

* The author, a Commander in the Naval Reserve, recently spent two weeks' training duty at the new NAA.
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(Continued on page 90)
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LEO: Rush me the following bargains:

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ADDRESS ____________________
CITY & STATE ___________
needed to tune an entire v.h.f. band with a single converter crystal, with the exception of those which have a special range just for this purpose.

Some receivers cover 14 to 15 Mc. on one range. With these you can change converter crystals in order to tune successively-higher 1-megacycle segments of a v.h.f. band. Examples: For 50 to 51 Mc., you use the 36-Mc. crystal shown. To cover 51 to 52 Mc., you merely put in a 37-Mc. crystal. To cover 144 to 145 Mc., you need the 43.333-Mc. crystal specified. Replacing this with one at 43.667 Mc. gives a 131-Mc. injection frequency, and coverage of 145 to 146 Mc. No change other than the crystal need be made for at least two megacycles coverage with such a receiver.

Many experienced v.h.f. men use a special technique with two-dial general-coverage receivers. They tune the low end of a v.h.f. band with their dials set the same as for tuning the 14-Mc. band, and they tune with the bandwidth dial. (14,000 Mc. is 144 Mc., 14.1 Mc. is 144.1 Mc., and so on.) When they reach the high end of the bandwidth range, they reset the general-coverage dial higher, so that a full turn of the bandwidth dial gives another 300, 400 or 500 kc. of calibrated coverage. This will not give exact dial calibration in tuning progressively higher ranges, but it makes tuning for weak signals easier than when the fast-moving general-coverage dial is used. With receivers having crystal calibrators, it is a simple matter to keep a fairly accurate check on the frequency being tuned in this manner.

So there you have it — the first complete v.h.f. station to be described in many a year, if we exclude the simple transceivers of the self-contained type. You can build the works yourself, receiver and all, and you will have the base on which to build for more power or better receiver performance later on. “Will it work?” the newcomer may ask. Perhaps the best answer is the results that the rig has delivered to date.

At various stages of its design and construction, the station was used, as a whole or in parts, for many hours of operation both 50 and 144 Mc. at the home stations of W1HDQ and W1YDS. Some practice with the simple tuner is needed to learn how to use it with maximum effectiveness, but we both agree that it is capable of hearing at least anyone we could work on either band with 15 watts input. The voice quality with the transmitter is good, and the c.w. signal is above reproach. And the simple receiver is quite capable of handling c.w. and s.a.b. signals in usable fashion, which is more than can be said for some v.h.f. “packaged stations” now available commercially.

As we write, requests for drilling templates are coming by the dozen in every Headquarters mailbag. Nobody builds anything any more? Don’t you believe it — there are plenty of hams who like to build gear, and hundreds of them are already at work on all or part of this station. They will be better hams for it.
COLLINS KILOWATT LINEAR
NEW 30L-1 order it now for early delivery. Collins new 30L-1 Linear Amplifier is a compact unit with 1 KW PEP input. It's the same size as the famous Collins KWM-2. The 30L-1 is compatible with any 100 watt exciter. Other Collins features include: RF inverse feedback; automatic load control; self-contained power supply; silicon rectifiers; and high/low power switch. Amateur net price: $520. The demand for this unit makes it necessary for you to place your order with Electronic Wholesalers now for early delivery.

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938 BURKE ST., WINSTON-SALEM, N.C. • Phone Park 5-8711
Correspondence from Members

(Continued from page 86)

classes in code and theory as well as extending help on an individual basis. This has resulted in a batch of new members, myself included. Alling clubs take note! — Emery L.
Hoffer, WA4ATP, Colonial Heights, Virginia.

BEST REGARDS

(1) Why do so many hams insist on sending "73" when "73" is already plural? Why start these things any-
ways? — James H. Demler, WA9DSU, Hastings, Nebraska.

MORE ON QRP

(1) I’m happy to sign up in K6JSS’s QRP Communications
Club. (Correspondence, August, 1961)

It has been 15 years in ham radio. I’ve never run over 18 watts. Sure, I’ve been steamrolled by many a sallon or half-
gallon and had to QRT in disgust: but I also note among the last 30 lines in my log book are confirmed QSOs, both
phone and c.w., with the four corners of the continent, LUS, and ZL, some of them in direct competition with the big
ones.

The power limitations were set when the population of the
bands was possibly 1% of what it is today: receivers were crude and insensitive; directional beams were the toys
of the wealthy; and s.w.r. bridges, clipping, s.s.b., etc., were a long way over the horizon. It should be a real chal-
genue to see what could be done with 25 or 50 watts. Too many of the fraternity are missing the point that a clean
signal, freedom from TVI, a good flat, and a safe and de-
pendable station are among the marks of the careful work-
man. The ability to bawl a stentorian "CQ" on an any-
frequency, occupied or not, is not much of a distinction. Many
competent and respected hams own and use high power
rigs; but unfortunately the converse (that possession and
use of a high powered rig indicates competence and earns
rewards) is often assumed, too seldom true.

I am firmly of the opinion that a legal limitation to 25 or
50 watts would bring a flowering of amateur radio scien-
te that would flabbergast us all. This might well be modified
in the v.h.f. and u.h.f. bands where there is a good tech-
nical reason for needing more power. Aside from this, there is, at
any given moment, entirely too much RF reflecting around
this globe. — Frank Geute, VE3DFC, Burlington, Ont.,
Canada.

"THE AMATEUR'S CODE"

(1) In the United States, you will find around a quarter
of a million amateur radio operators. Some of these people like
to experiment with such things as television, v.h.f., u.h.f.,
n.h.f., and beyond; others, however, like to work DX, handle
traffic, and receive. All of these people have different in-
terests. Why then, must we try to tell others what they
should or shouldn't do? If there is a "mess" on one band and
you don't like it, then there are other bands made-to-
order for you. There is one thing that some people don't
seem to realize. A few of this quarter million like to get in
there and battle for their QSO's. Some seem to like the
competitive spirit created in these crowded bands. If some-
one doesn't like it there, he should stay away and leave
these already there alone.

I'm afraid that amateur radio is full of little cliques. If
we are going to get anywhere, we are going to have to stick
together as a group and support our a.s. members, the
ARRL. We should respect other people's interests and try to help
them along rather than finding fault with them. I think that
we should pick up the nearest copy of the ARRL Handbook and
read "The Amateur's Code" and above all, go by it. —
Richard A. Silver, K4XV, Hendersonville, Tennessee.

Y! News and Views

(Continued from page 84)

Stop-Over City Chairmen

At each official refueling stop along the flight route a radio
chairman was in charge of amateur communications for the
race. Working closely with W9TGC as stop-over city chair-
men were:

San Diego, Calif. — Barbara Davis, W6VSL: Yuma,
(Continued on page 170).
OCTOBER IS THE BEAUTIFUL FOLIAGE MONTH AND UNCLEDAVE, W2APF, SUGGESTS THAT WHEN YOU TAKE YOUR DRIVE TO ENJOY NATURE’S BEAUTY YOU STOP IN AND SEE TINY, WA2KNH. HE WILL SHOW YOU THESE NEW UNITS NOW IN STOCK.

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Power output: 500 watts PEP  
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Complete coverage of all amateur bands 80 through 6 meters  
Maximum d.c. power input: 75 watts  
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Power input: 200 watts PEP on SSB; 175 watts on CW, FSK and PM; 100 watts on AM  
Price ........................................ $795.00

**HALLI-KIT SX-140 Receiver**
Complete coverage of all amateur bands 80 through 6 meters  
Price (wired and tested) .................................. $124.50  
Price (kit) ........................................... 104.95

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**Report from El Paso**

From Chairman Wade Williams, K5ILG: "The El Paso sector of the Powder Puff Derby communications was a 100% perfect operation. The cross-country frequency, 7210 kc., was handled by Pat Parrish, W5PSB. He was assisted by Al Temple, K5UXP. Being a project of the El Pico ARC, the club station, W5PSB, was set up in Pat's shack at 3850 kc. for local relay work from the airport. This station was manned by Bill Belan, K5UTJ, and Bill Roders, K5ELU. Mobile stations were assigned to two-hour shifts at the official time clock at the airport, and the arrival and departure times were relayed to the East and West coast stations within seconds, via W5PSB. Mobiles participating at the airport were Ery Williams, W5KOK; Betty Belan, K5OY; George Nall, K5GSL; Ralph Wood, K5DZZ; John Ambrose, W5CSB; Trev McNutt, W5KRP; Dick Martin, K5JUG, and Wade Williams, K5ILG, chairman.

"The national radio chairman Carolyn Currens, W5GTC, did a wonderful job of coordinating the communications network."

**Montgomery Stop-Over**

From Chairman Betty Collier, K4ZKN: "It was a wonderful and exciting experience being net chairman for Montgomery. I was asked to serve as chairman when the Montgomery ARC (W4WOO) chose to take the operation. W4RC of Ack Radio Supply Co. graciously sent down and installed for us a KWM-1 and also sent W1ORY to assist in the installation and entire operation. K4UTP and K4DPR did yeoman service erecting the two towers and stringing antennas at Dannelly Field. Bad weather hindered the movement of planes cross country, but by Wed., July 12, a 155-lb. plane landed in Montgomery and then traffic really began to roll. That night 71 aircraft were on the ground. Operations were in four hour shifts, two operators each shift from 4:30 A.M. to 7:30 P.M. Traffic count was 57 formal pieces from pilots, 1492 arrivals, departures and ARTS, 5 radio searches for unaccounted-for planes, and many informal pieces of traffic.

"Amateurs who actively participated in the Montgomery operation were K5A DMN, DPK, ERF, PHH, OVG PFM, QP, K5HST, TBO, TCM, TQF, UJH, UTF, YNR, ZAJ, ZXA: W6s ATF, AUP, HJW, IOZ, OQH, OLN OWQ, PEV, SCZ, VBR, and W1ORY, from Birmingham who was with us five days from sunup to way past sundown doing an excellent job as net coordinator." (Report submitted by Jack Duthrow, K1AOZ, SC6, Ala.)

**Miscellaneous Reports**

Participating at the start of the race in San Diego were Barbara Davis, W6VSP, chairman, were YLas K6s AWP, JZ4, UHH, UTC, VRH; W6s GCD, W6ACBN, W6CQCS, and W6AZK/4N. The girls worked two meters from hotel to airport during the entire race period. In Dallas the W4WWT YL club operated 40-meter sideband during the race. Club members who participated were K5A DLI, GBX, GHX, KDF, MTP, PLC, UHH; K6SJOA: W6s RYX, SPY, W6O, and ZUF. Mrs. George Hardwick was in charge of setting up the ham station at Addison airport. Other YLas reported to have helped W5GTC with communications are W3UUY/2, K3GSO, and K2NMB.

If anyone has been omitted from our reports of those who helped with race communications, please let us know and we'll be glad to make additional notes next month. (The individual reports from the various stopover city chairmen were volunteered without solicitation.) W5GTC summarized that an excellent job was done by all stopover city chairmen and their teams from West to East.

(Continued on page 172)
EML MODEL M-10 MODULATOR

Perfect for Mobile and VHF Rigs up to 25 watts
- Crystal or carbon microphone input
- 13 watts output
- Speech clipping for maximum audio power
- Easily modulated for 18 watts output and low tiding current
- 4 1/2" high x 4 1/2" wide x 7 1/2" deep

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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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MAIL COUPON TODAY!
ON YLRL CONTESTS

YLRL Vice President Onie Woodward, W1ZEN, has asked that the following material be published in order that all contestants in YLRL contests may have a better understanding of the procedure used in checking contest logs. Onie cautions that this is the first attempt of a YLRL vice president to set up a standard procedure for checking YLRL contest logs and that some changes may still be required. Suggestions are invited. The standard procedure that follows is the result of a questionnaire sent to current YLRL officers, the vice president’s committee, and past vice presidents.

1. Score multiplication on contest logs will be very carefully checked.

2. Logs will be checked for duplicate contacts and duplicate multipliers.

3. Logs should show station worked, number of QSO and received, RST or RS, and section or country. If any one of these items is missing, the contact may be considered incomplete. (Time and band are also required.) The numbers are used for cross-checking. The log you submit should show contacts numerical consecutively. Once a number is given or skipped, never change the other numbers. Make a note at the end of your log of any irregularities.

4. Carbon copies of logs must be completely legible. An illegible carbon copy log may be disqualified.

A list of ARRL sections is available from V.P. Onie Woodward, W1ZEN, 14 Emmet St., Marlboro, Mass. Send ape. (See also p. 6, any issue of QST—K4.) All contest participants should be familiar with the various ARRL sections.

The prime point to be made here is that contest rules must be explicitly followed, otherwise logs are apt to be disqualified. Log-checking for the Vice President and her committee gets to be a harder task with each contest. Contest participants be exact, be neat, be considerate, and be sure to have fun in the 22nd YLRL Anniversary Party!

CONTEST FOR ALL YLS
22nd YLRL ANNIVERSARY PARTY

CONTEST PERIOD

C.W. —
Starts: October 25, 1961, 1700 GMT
Ends: October 26, 1961, 2300 GMT

PHONE —
Starts: November 8, 1961, 1700 GMT
Ends: November 9, 1961, 2300 GMT

ELIGIBILITY: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members only are eligible for cup awards; non-members will receive certificates. Only YLRL members are eligible for the Corcoran award. Contacts with OMs will not count.

OPERATION: All bands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

PROCEDURE: Call “CQ YL.”

EXCHANGE: Station worked, QSO number, RS or RST, ARRL section or country. Entries in log should also show time, band, date, transmitter, and power. (Please know your own ARRL section. List available for ape. to W1ZEN.)

SCORING: (a) C.W. and phone sections will be scored as separate contests. Submit separate logs for each contest. (b) Multiply number of contacts by total number of ARRL sections and countries worked. (c) Contestants running 150 watts input or less at all times may multiply the results of (b) by 1.25 (low-power multiplier).

AWARDS: Highest C.W. score — gold cup. Highest phone score — gold cup. Highest phone log and c.w. log in each district and country will receive a certificate. Highest combined phone and c.w. score, YLRL member only, will receive Corcoran Award.

LOGS: Copies of all logs must show claimed score, be signed by the operator and postmarked no later than Dec. 22, 1961, and received no later than Dec. 2, 1961, or they will be disqualified. Send copies of logs to Onie Woodward, W1ZEN, 14 Emmet St., Marlboro, Mass. No logs will be returned. Be sure it is a copy of your log you send for confirmation.

(Continued on page 174)
SURE you are. You're busy working traffic on the nets, you're busy building new gear from QST, the Handbook, the Mobile Manual, the Sideband Manual, busy working DX or contests or just busy ragchewing. While you are busy doing all of these things a staff of 65 folks at the League Headquarters is busy, too. They are busy helping you enjoy your hobby to its fullest.

Thousands of hams appreciate what the League is doing for amateur radio and make their appreciation known through their support and membership in the League. Surprisingly enough, though, there are lots of hams who don't know about the advantages which they are missing. It's up to you, the member, to do a fellow ham a favor by signing him up for membership. At the same time you will be helping to broaden the foundation of amateur radio that makes it possible for you to continue to enjoy the advantages which we currently possess.

QST and ARRL membership $5 (additional Family members at the same address $1) $5.25 in Canada, $6 elsewhere.

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COMING EVENTS

YLRL Anniversary Party — The 22nd annual party for all licensed YA’s at the central section starts Oct. 25 at 1700 GMT and ends Oct. 26 at 2300 GMT. The phone portion starts Nov. 8 at 1700 GMT and ends Nov. 9 at 2300 GMT. Complete rules this column.

TYLDR Anniversary Party — The seventh anniversary party of the Texas YL Round-Up Net will be celebrated Nov. 4 at Brownfield, Texas. The net, which includes some 170 members from several states, has been extended the invitation to converge at Brownfield by the GBRS (Gals at Brownfield), a new YL club. Contact GAB Secy. Irene Lewis, K5LLO, 1004 South 6th St., Brownfield, Texas.

Amo YL Week — The Alamo YL Club of San Antonio, Texas has designated the week of Nov. 5-11 as Alamo YL week. Club members will be active on several bands. The Alamo Certificate will be awarded to U.S. and DX stations who contact 3 club members and to DX stations who contact 3 club members. Send list and 10 cents to Inez Cole, W5WXT, 320 Meadowbrooke Dr., San Antonio, Texas.

Happenings of the Month

(Continued from page 78)

identification transmission the teleprinter(s) at the other end of the circuit run "open" and uncontrolled, and awkward operating procedures are necessary to remedy this difficulty.

S. The application of the present rule to lesser-used modes of emission, such as television, or to special cases such as the use of American Morse telegraphy for the body of communications is a logical principle. In the League's opinion, however, this principle no longer applies to amateur teleprinter emission at its present stage of development. There are an estimated 3000 amateur stations equipped for teleprinter operations.

WIFECORE, The American Radio Relay League, Inc., requests that the Commission institute a rule making proceeding to amend Section 12.82 (a) (2) of the Commission's Rules and Regulations in the manner hereinabove first set forth in order to promote the efficiency of amateur teleprinter operations.

Respectfully submitted,

The American Radio Relay League, Inc.

By PEARL M. KOZAK

Its General Counsel

John Huntion,
General Manager
August 17, 1961

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- SIX CHANNELS 1.6 TO 16 KC

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$255.00 for your Viking Challenger

see page 151

HARRISON
"HAM HEADQUARTERS, U.S.A."

Technical Correspondence

(Continued from page 30)

conditions. Rather than write the whole project off as another inexplicable failure, let us examine some of the terms and definitions commonly applied to mixer crystals. Perhaps we are not all speaking a common language; the amateur may differ with the radio astronomer in his definition of noise figure, for example.

Consider first a crystal-mixer superheterodyne having no image-rejection capability. A broad-band noise source, such as a temperature-limited diode, is applied to the receiver input terminals. Noise power from the external source will enter the receiver through both the signal and image channels, since the front end has no selectivity. Assuming an i.f. noise figure of 10 db., the indicated overall noise figure should be about 6 db., when using a 1N21F crystal. A noise figure measured under these conditions is termed "broad-band."

Now, suppose that an ideal image-rejection filter is inserted between the noise source and the receiver input terminals. Power from the noise source will now enter only the signal channel, and the indicated noise figure will be 9 db., precisely 3 db. higher than the broad-band value. A noise-figure reading taken under these conditions is termed "narrow-band."

If the readings are now repeated, using a c.w. source, identical noise figures of 9 db. will be recorded in both cases. The discrepancy is readily explained. A broad-band mixer, i.e., one that has no image rejection, will measure image-channel noise input as "intelligence." When the "intelligence" is confined to the signal channel, through the use of a preselector and/or a c.w. input signal, the indicated noise figure will exceed the broad-band noise figure by 3 db. Radio-astronomy receivers take full advantage of the broad-band noise figure, since the "intelligence" consists of broad-band noise, which occupies both signal and image channels.

Let us turn now to a brief examination of the mechanism of crystal-mixer noise generation. In the presence of local oscillator excitation, the mixer crystal generates noise sidebands which heterodyne with the i.f. signal to produce noise at the intermediate frequency. Since the image frequency noise is internally generated, it cannot be filtered out or removed by selective circuits unless special precautions are taken to provide a proper termination at the image frequency. In order to make the narrow-band noise figure equal to the broad-band value, it is necessary to place an image frequency short circuit across the rectifying junction of the crystal. It is theoretically possible to adjust the length of the line which connects the crystal to the preselector, so that a short circuit is reflected back to the crystal at the image frequency. In practice, this adjustment is quite difficult to achieve. A careful series of measurements at the Wayne M.I.T. Radiation Laboratory, however, indicated that only about 1-db. improvement in the narrow-band noise figure was obtainable by using a line stretcher to vary the short position. Several workers have reported that the mixer conversion loss, hence the noise figure, is critically dependent on the nature of the image-frequency termination.

Measurements on carefully-constructed narrow-band mixers were recently carried out by the author, using an axon discharge noise source and automatic noise-figure meter. The best noise figure was 8.8 db., with a 1-db. noise figure i.f. strip and 1N21F crystals. Without preselection, the mixers were checked out at 6.5 db.

It seems safe to draw these conclusions:

1) The crystal mixer has nothing to offer at 432 Mc., its performance is easily equalled by a Nuvistor or 6AN4 r.f. amplifier.

2) At 1296 Mc. and above, the simple broad-band balanced crystal mixer is as good as anything else. The use of a sharply-resonant preselector will buy nothing but mechanical complexity. Image response should not prove troublesome at these high frequencies. Any filter insertion loss must be added to the noise figure.

3) Vacuum-tube mixers at 432 Mc. are subject to the same limitations as crystal mixers. Theoretical considerations indicate that a 7077 should give a noise figure of 12 db., while a 6AN4 will be no worse than 15 db. When used with a good r.f. stage, even a 15-db. triple mixer will not contribute more than 0.5 db. to the over-all receiver noise figure, while providing a modest conversion gain.

— Walter S. Glaser, W2VQZ

(Continued on page 178)
ALL THREE SPEAK OF QUALITY
(all three are Collins)

The world’s first SSB Transceiver provides superior performance in a variety of installations. For the amateur who desires 80-10 meter mobile transceiver. Features 175 w. PEP input on SSB; 160 on CW. Let Burghardt’s show you the famous

COLLINS KWM-2
COLLINS 312B-5
COLLINS 30L-1

Used with the KWM-2 for fixed stations this speaker console and external PTO provides separate receiving and transmitting control, directional wattmeter. Burghardt’s also has this

This new, compact linear provides for 1 KW PEP input on SSB and 1 KW dc input on CW. Has self-contained power supply and can obtain driving power from KWM-2 or 325-1. Its many other outstanding features make it much in demand at Burghardt’s. It’s the

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EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner’s alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no booklets, batteries having someone send to you.

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The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have “acquired the code” with the Instructograph System. Write today for full particulars and convenient rental plans.

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Kreco GROUND PLANE ANTENNAS
All Aluminum
LIGHT • STRONG • EFFICIENT

2 METERS MODEL GP-2A $15.00 net
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These models are ordered set to exact frequency
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30 to 50 MC MODEL GP-50A $42.00 net
50 to 100 MC MODEL GP-100A $36.00 net
100 to 170 MC MODEL GP-170A $15.00 net
¾” ALUMINUM PIPE PER FT. $1.00 net

ALL BRASS MODELS AVAILABLE
ASK YOUR DISTRIBUTOR OR WRITE
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P.O. BOX 312 • CONCORD, N. H.
ON Q MEASUREMENT

132 Irvington St., S.W.
Washington 24, D. C.

Technical Editor, QST:

In the article by W7LHJ on measuring coil Q, which appeared in November QST, the point was made, in footnote 2, that most Q-measuring schemes, W7LHJ's included, do not in fact measure true Q, but rather an apparent Q, which is lower than the true Q by an amount depending upon the ratio of distributed capacitance of the coil to the external capacitance required to tune the coil to a particular frequency. Amateurs attempting to measure coil Q with simple equipment may not be aware of this fact.

Fig. 1A represents a coil of inductance L, distributed capacitance C0, and loss resistance R. Viewed at the terminals of the coil, the net impedance may be represented as in Fig. 1B. In terms of L, C0 and C, it can be shown that:

$$L' = L \left( \frac{C_0 + C}{C_0} \right)$$

$$R' = R \left( \frac{C_0 + C}{C_0} \right)^2$$

Then, $$Q' = \frac{2\pi fL'}{R'} = 2\pi fL \left( \frac{C_0}{C_0 + C} \right) \left( \frac{C_1}{C_1 + C_0} \right)$$

Therefore, any measurement of coil Q that measures the resistive and reactive components of its impedance at the terminals of the coil, or injects a known reference voltage in series with the terminals of the coil and proceeds to measure the resonant rise in voltage across the tuned circuit, as in Fig. 1C (which is the scheme employed in most commercial Q meters), will be more or less inaccurate. The result will always be on the low side and may or may not be significant, depending upon the relative magnitudes of C0 and C1 for a particular frequency.

-- C. E. W. Hobbins, W3BFW

75-40-METER DIPOLE IN LESS THAN 80 FEET

4001 South Land Park Drive
Sacramento 22, California

Technical Editor, QST:

What with the current spurt of interest in our higher frequency bands, this writer went back to the April, 1961, QST and reread W4JRW's article (on page 49) about
Record keeping can often be tedious. But not with the ARRL Log Book. Fully ruled with legible headings it helps make compliance with FCC rules a pleasure. Per book ........................................... $5.00

Mobile and portable operational needs are met by the pocket-size log book, the Minilog. Designed for utmost convenience and ease ................................. $3.00

First impressions are important. Whether you handle ten or a hundred messages you want to present the addressee with a neat looking radiogram . . . and you can do this by using the official radiogram form. 70 blanks per pad. ................................. $3.50

If you like to correspond with fellow hams you will find the ARRL membership stationery ideal. Adds that final touch to your letter. Per 100 sheets .................. $1.00

The American Radio Relay League
WEST HARTFORD 7, CONNECTICUT

NEW from SPACE-RAIDER!
The famous K6CT polarized diversity beam — minimizes QSB caused by polarization shift — high forward gain, F/B ratio and side rejection — its superior performance well known to the DX fraternity on 10 meters — tested under all conditions — based on the proven principles of the Yagi parasitic array and the Brown turnstile. Using this beam in the October 1960 DX contest, K6CT had high W6K6 score and is now being reported many times as the only readable signal from the USA — first in and last out.
SPACE-RAIDER is pleased to announce the first of a new family of beam antennas:

Model Specifications Weight Amateur Net
B-10-6 K6CT Polarized Diversity Beam, 6 element, 1 1/2" O.D. Center Sections; 1 1/2" O.D. & 3/4" O.D. adjustable end sections. Boom: 20" O.D., 15' long .125 .19 spacing 32 lbs. $70.00
B-6-12 Coming Soon.
NO COMPROMISE has been made with quality and ruggedness in producing these fine lightweight heavy-duty antennas.
THE NEAREST THING TO A PRIVATE TUTOR
(TELEVISION ILLUSTRATED—JULY 1959)

CODE INSTRUCTION
® ONE OF THE
FINEST CODE

COURSES AVAILABLE

Western Union, Railroad, Navy & Amateur
experience provided background for this course

CONSIDERING THE RE-USABILITY OF THE
RECORDING TAPE THIS IS THE MOST IN
EXPENSIVE COMPLETE CODE COURSE ON
THE MARKET TODAY.

NOVICE TAPE—1 hour of basic instruction using
voice and code characters together and 1 hour of practice
material to 8 W.P.M. ________________________________ $5.50

ADVANCED TAPE—2 hours of practice material 9 to
18 W.P.M. ________________________________ $5.50

Practice material includes both plain language
and 5-character coded groups, letters and numerals mixed.
Top quality acetate tape, 1200' on 7/8 reels recorded
dual track at 3 1/2 ips.

A postcard will bring you the name of your nearest
distributor handling this fine product.

DISTRIBUTOR INQUIRIES INVITED

TAPED CODE • BOX 31E, LANGHORNE, PA.

NOW A... FIBERGLAS QUAD
... by CUBEX

MK III w/Fiberglas Arms. _________only $99.50
MK III w/Auminum Arms. _________only $79.50
MK III w/Bamboo Arms. _________only $67.50

All models use the famous CUBEX
"Ruggedized" support structure
also the CUBEX QUAD FOUNDATION KIT
For "Do-It-Yourself" Quad Builders... _________$27.50
Ask for free brochure "FG"

CUBEX CO.
3322 Tonla Avenue
ALTADENA, CALIFORNIA

a two-band horizontal with loading coils. Only 77 feet plus
insulators, no trans or capacitors. I decided to try it. Perhaps
other city-lot fellows will be interested in my experiences
and notes.

First, as to the loading coils: Let me say that any
good grade of enamored wire will do. W4JRW suggested
Nevlon, but this turned out to be the trade name used by
the Telcon Corp. and, despite the suggestion that it is
supposed to be something special, it, too, is simply a
familiar enamored wire. I used No. 18 as directed and a
one-pound spool was more than enough. For strength,
however, my coil forms are clear plastic rods, 14 inches
long, with a hole drilled one inch in from each end. This
would close winding from hole to hole produced the required
12 inches of coil. The plastic rod was available from a local
hobby shop in the 3/4-inch od. size W4JRW specifies. If
you cannot get 75 or want to use the more economical 9/32-
od. cut the rods 11 inches long and make the coil winding
9 inches. That will give you the identical 129 microhenrys
and, incidentally, shorten the antenna by a half foot.

Next, as you will see from the article in the original article,
there is some latitude in design length, depending on whether
you are addicted to c.w., a.m., or s.s.b. I chose the lengths
in Fig. 3 (April 87) as being closest to my usual sidetone
frequencies, built the antenna and coils in less than two
hours, attached a random length of 52-ohm coax, and put
it up across my roof at 30 feet above ground.

On 40 meter, my best resonance was at 7393. I took a
guess and went to side to length each center wire to
34 feet 9 inches. It wasn't critical, and I hit resonance at
about 7312 where, with 100 watts of measured forward
power, the reflected power rested at zero. At the far band
edge, 7300, the reflected power showed 25 watts or so, and
ditto over at 7100. Thus, within very acceptable limits, the
40-meter portion of this antenna is usable for at least 50 kw.
each side of resonance.

Thus encouraged, I tried 75 meters and the story was
quite the same. For sidetone, I was slightly short, with
resonance close to 3.233 where I worked about 3211. I soon
found, however, that the 4-foot end wires were pretty
touchy and that 150 inch equalled a shift of about 50 kc.
I finally settled for 4841/4 inches with resonance at 3814 —
provided I put the complete antenna back up at the fixed
30-foot height. Bandwidth on 75 proved to be much narrower
than on 40, but I can move a good 23 kc. away on either
side of 3814 before any objectionable amount of reflected
power begins to show. That's very acceptable for the usual
s.s.b. hams.

Raising or lowering the antenna will throw you off just
like it's supposed to, only more so. Adjusting the 40-meter
(long) wires had no observable effect on the 75-meter
operation, and adjusting the 75-meter (short) wires
would not affect my 40-meter conditions. The loading coils
will take all the power you've got, but the outside end insulators
are in quite a field and can crack out from physical strain
with 2 kw. p.s.s. Discontinuity or surplus insulators are quite
OK up to 250 watts. No bypasses is necessary, and simple
52-ohm coax will do perfectly well at this height. If a
radiation pattern exists I haven't found it, since my records
are all about one S unit better with this antenna than with an
all-band vertical which is here on the

All in all, it's a little trouble and costs about $11, but
it's a good antenna. I'm permanently installed at the 33-foot
height with less than 90 feet in total length, and I'm steering
in on these low-frequency bands with the greatest of ease.
The real credit, though, goes to W4JRW.

S.S.B. TRANSCEIVER

S. B., W2BNK

HARRISON
"HAM HEADQUARTERS, U.S.A."

$410.00 for your Johnson Valiant
see page 151

6114 N. Kimball
Chicago 45, Illinois

Technical Editor, QST:

There are many sidebanders using so-called "low-priced"
s.s.b. equipment. This usually means a 9-Mc., exciter and
a general-purpose receiver. Having used a rig of this type
for several years, I came to the conclusion that the main
difference between it and the more expensive s.s.b. stations
was not in the transmitted signal or the receiver's sensitivity
or selectivity, but rather it was the receiver's stability and
the fact that transceiver-type operation is not available.
I designed and built a chassis that solved both these
problems at once, at a total cost of less than $15. The block
diagram, Fig. 2, shows the basic configuration. The BC-458

Continued on page 188
The ANSWERS?

Q. On what frequencies and under what conditions may amateur maritime mobile stations operate?

Q. Is a photocopy of an amateur station license valid during mobile operation?

Q. How do U.S. amateurs obtain authorization to operate in Canada?

Q. Under what conditions may applicants for amateur licenses take examinations by mail?

Score 100%? If not, better get the 46th Edition of the License Manual. Complete FCC and International Rules and Regs governing amateur radio...detailed explanations of amateur licensing...separate study guides for all amateur operator exams. The up-to-date license and regulations manual for all, newcomer and oldtimer alike.

THE AMERICAN RADIO RELAY LEAGUE
West Hartford, Connecticut

THE VHF AMATEUR Our September issue featured an excellent conversion of the ABC-5 VFO for 6 and 2 meters which is rock-stable! Edited by Dave Heller, K2HNP. It uses an entirely new concept in VFO design. Also in that issue were “The P.C. and the VHF man” by K2ZPH, a meter “Heli” by K2UYH, a new SSB column, plus our regular Moonbounce and other columns. August issue contained a “Modi-pal” 6 meter antenna, 100 watts — 6 meter SSB, Preparing from TV, and more see pictures of your buddies and late up-to-date news. Send $5 for sample. Subscription: $3.00 for one year, $5.00 for three years. Published MONTHLY by Bob Brown, K2ZAB. Ask to start with the August or September issue.

THE VHF AMATEUR (Dept. 10-A), 67 Russell Avenue, Rahway, New Jersey.

DO a creditable job of tuning up and testing on 60 through 2 meters with this 52 ohm non-radiating R.F. Load. Rated at 200 watts P.E.P., easy-starting Briggs Stratton engine. Radio shielded, shock mounted.\n
Push button start. No wiring needed...just plug in. Model illustrated, our portable 700 watt plant, 2.3 H.P., easy-starting Briggs-Stratton engine. Radio shielded, shock mounted...runs report less hard than on commercial power line. Fully complete with voltmeter and built-in meter to charge auto batteries. $149.50

1100 Watt Plant (Item 34) same as Item 24 but with larger generator and engine...more than double the output. If ELECTRONIC BRAIN desired, specify and add $100.00. We make all sizes in 100,000 Watts. Write for information.

Mast: Southern Customers Write Dept. 1-1061, Box 65, Sarasota, Fla.

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.

THE WORLD'S THRIFTIEST LIGHT PLANTS

"The World's THRIFTIEST Light Plants"

Exclusive new ELECTRONIC BRAIN provides instant full power upon demand, holds thrifty idle otherwise. Slashes fuel cost...doubles engine life! Available in all plants. Built by experts dedicated to bringing you a better product!

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HAM
EQUIPMENT
FOR
CASH
TRIGGER
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RIVER FOREST, ILL.
(SUBURBAN CHICAGO)
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NEW 6-IN-1 CHASSIS PUNCH!
Designed for the electronic workshop
Now... Punch 6 popular hole sizes with one punch... octals, 9-7 pin, phone jacks, pilot lights, etc. Easy to use—no turning, twisting or vise required. Sizes 1\(\frac{1}{4}\)"—1"—\(\frac{3}{8}\)"—\(\frac{1}{4}\)"—\(\frac{3}{16}\)"—\(\frac{1}{8}\)". Has hardened dies and punches for long life. Plated to resist rust and corrosion. 14 pcs., packaged in handy storage tube.

Wgt. 2\(\frac{1}{2}\) lbs. Amateur Net $4.98 U.S.A.

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QSL FILE—holds up to 1000 QSL’s. Has expandable* action. Includes complete printed index set plus W.A.S., Ox Record Cards and A.R.L. Countries List. Goldplated finish $1.85. Satin black $1.70, Wgt., 1\(\frac{1}{2}\) lbs. Extra card sets $.30 ea.

Stray

KG1CC at Camp Century, Greenland, gets its power from a nuclear power plant, and their first QSO using this nuclear power was with W4ZJN KL7. At the time of the QSO the temperature at Point Barrow was 36 degrees below zero. Since Camp Century is known as “the city under the ice” this was obviously a real cool QSO.

Ever wonder how come so much Air Force surplus radio gear seems to be in use by some European stations? K5PNC, formerly of Romania, says that during World War II local hams used to make every effort to reach a downed U.S. bomber and strip it of its radio gear before the government authorities had a chance to reach the scene.
PLANNING new antennas for the busy traffic and contest season coming up soon? Looking for dope on transmission lines? From basic theory to how to build 'em, horizontal, verticals, rotaries, fixed beams, transmission lines, together with dimensions, photos, drawings, radiation patterns, you'll find the information in the Antenna Book. Better pick up your copy now.

$2.00 U.S.A. PROPER
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WEST HARTFORD 7, CONNECTICUT

CLAROSTAT
“Fixtohm” * 1% precision resistors

The finest in deposited-carbon units. ½, 1 and 2 watt ratings. Meet applicable MIL specs. Varnish or hot-dipped plastic coatings. Competitively priced.

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CRUSHCRAFT

- 2 Meter with mast
  Model # AM-2M $8.70
- 2 Meter stacked COMPLETE
  Model # AM-22
- 6 Meter with mast
  Model # AM-6M $12.50
- DUAL HALO with mast
  Model # AM-26 $17.45

PORTABLE 3 EL.
6 meter beam
(30° x 4° folded)
Model No. A50-3P $10.95

Your Call
1-520-1180

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HALOS

20 HERTZ PULSE WIDTH
105-1200 WATT OUTPUT
60 INCH DIA. DISH ANTENNA

CUSHCRAFT
621 HAYWARD ST.
MANCHESTER, N. H.

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 4½ by 9¼ 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.

W2, K2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J.
W3, K3 — Jesse Bierman, W3KT, P.O. Box 400, Balan-
cynwyd, Pa.
W4, K4 — Thomas M. Moss, W41HY, W26414, Mu-
unicipal Airport Branch, Atlanta 29, Ga.
W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, 
Houston 5, Texas.
W6, K6 — San Diego DX Club, Box 1000, 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, 2001 Gordon Drive, 
Flomaison, Ill.
W6, K0 — Alva A. Smith, W6DMA, 238 East Main St., 
Caledonia, Minn.
VE1, K1 — J. F. Oberg, VE1FP, P.O. Box 663, Halif-
ax, N. S.
VE2 — George C. Geobe, VE2YA, 189 Lakeview Avenue, 
Pointe Claire, Montreal 33, Quebec.
VE3 — Leslie A. Whiteman, VE3QB, 32 Sylvia Crescent, 
Hamilton, Ont.
VE4 — Len Cuff, VE4LC, 236 Rutland St., St. James, Man.
VE5F — Fred Ward, VE5FP, 869 Connaught Ave., Moose 
Jaw, Sask.
VE6 — W. R. Savage, VE6EM, 333 10th St., N., Leth-
bridge, Alta.
VE7 — R. H. Hough, VE7HR, 1201 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 S. Ritchey, Dept. of Transport, Goose 
Bay, Labrador.
KP4 — Joseph Gonzales, KP4YT, Box 1061, San Juan, 
P. R.
KE1 — John H. Oka, KEOEQ, P.O. Box 101, Aiea, Oahu, 
Hawaii.
KL7 — Alaska QSL Bureau, Box 6225, Airport Annex, 
Anchorage, Alaska.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

IS YOURS ON FILE WITH YOUR QSL MGR?

SWITCH TO SAFETY!
FOR Sale: Heath SSB-10 Sideband Adapter, best offer over $70 cash. E. Greenberg, WRKHS, Trenton, Ill. PHEMONAL Ham Sellout! Receivers, transmitters, parts, all top brands, current to address, bulk address, stamped envelope for complete list of bargains. Box 262, Glen Ridge, N.J. NC-183D plus matching spkr. in mint cond. equal to new. List $60.00. W. Silverman, 716 N. 3rd St., Philadelphia, Penna. RME-6000, $275.00 Johnson Navigator, $130.00 Vibronex Origin. In exc. con., $125.00. L. D. M. equipment in a like-new condition. Kenneth W. Merrels, W5HTN, 259 Redrock Dr., San Antonio, Texas. MODEL 15 teleprinter complete with sync. motor table and cover, very clean, perf. upgr. cond. Melvin G. Marslow, W8UUS, 2270 Magnolia Ave., Kalamazoo, Mich. Phone F-4-1502. SELL: Complete K.W. emitn. Band-switching FCO to pair 2501 H Final, 2501 H Modulator. Complete $9 to 10 model in two P7-Metal cabinets with spares 2501 H. 8-Phase transformers except 3 KW RCA mod. 8trnr. Best offer over $25.00 for complete rig. W8ING, Box 485, Coffeyville, Kansas. FOR Sale: "S" Elinc, in mint condition. 7251 with c.w. F.L. Heo static, noise blanker; 3281 with 416 P. S.; lists for $350.00. Selling for $950 to go SSB mobile. HT-30 in exc. cond. 5251 SX-101 MKIII like-new cond. $245.00. W8USK. FOR Sale: Hallirafters HT-32 and R&W L-1001-A linear, $575, in exc. cond. Local buyer preferred. G. A. Diehl, W7-JWH, 20 Wills Ave., N.J. SELL: Gomst Tand T-66 with 3-way power supply and speaker. G77 with 3-way power supply and modulator, all plug-in, cabs. bags, manuals. Mobile Mount, Slim Jim antenna, microphone. $250.00. Ross Ray, K4-PAX. Rte. 1, Fort Mill, Sc., S.C. FOR Sale: 109-watt linear, two 807's GG, pictures. $35.00; command receiver and transmitter, $8.00 each; receiver 384Q 115.00; Harriett L.2, 3 M. X, match antenna coupler, new, $65.00; power unit PE-214, $35.00; tubes 815, 8, $3.00 each; 815, $2.00 each; Chaffee, 24 hour clock, $10.00; Viking Valiant, $350.00. K0ACG, 125 N. Lake Ave., Sioux Falls, S.D. TRADE: For receiver or transmitter, new Eico stereo AF-4: 50 new cover, tubes 6BA6, 12AT7, etc.; good 4100A; 30" wood stand, 44X350B, 44X350A, 11X352A, 16X352A, 47X352A, R.E.R. Mann, 7205 Center Dr., Des Moines, Iowa. SALE OR swap: Receivers NC-109, $125; HQ-110C, $175; 7851, SSB FM/FM meters. B. C. built-in 110 volt switch, $25.00; 1015-15U 88 to 100 mc., new, $225.00; Ilion Ecteter, type 2W in 655; $125.00; direct combiner. type 12AAG-1, 1.6 to 1.8 mc., batteries, $75.00. W2ULD, 1381 Richmond Court, East Millcreek, N.Y. HRO ST1 receiver, Coils 1.7 to 30 Mc. Power supply, sktr., and cond. $150.00. P, R., A. Eubanks, K90TP, 601 E. 32nd N., Oklahoma City, Okla. III. COL-LINS 8/Line station in mint condition. Illness forces sacrifice sale: 754 w/BFO filter and crystal, 325-1, 325-4 strip heater $225.00. Dr. A. F. Shaller & Co., 1895 S. Main, Detroit. R. 10-15.0. $95. Office mike, $10; new 416ls, $20 ea.; n.w. 41All, $100 ea.; large two-transistor portable radio. $45.00. Turner-T 920 mobile mike. $10. Collins 12" sktr., $15. echocarbons $5.00 each. New in case. $15.00; local phonograph, $15 sktr.; filter, $10. Collins antenna relay, 14F. "Frank.", W8FMC, Hauppauge Rd., Smithtown, N.Y. Tel. Andrew 5-1957. BAR-CINS! New tubes: 6EH7, $75; 6146, $2.50; Johnson rotary inductors, $5.00. Many other items. Send for list. K0MVR, 424 1st St., N.E., Cedar Rapids, Iowa. ELFAM PMR7 revr., $95, with 6m converter, $110, AF-67 xmitter with 6m, $100, dual transistor power supply, $25.00. PS-600 CA supph, $25. W4DHS, 100 Capti Blvd., Treasure Island, Fla. COLLINS KW-2 and matching AC power supply, $925.00. Firm! No trades of payments! W8FHZ, J. Thompson, 2605 Hickey Blvd., Kansas City, Mo. Phone JA 2-2558. DRAKE 2-A, in excellent cond. Orig. carton. $250.00 F.O.B. KFDN, Charter G. Bird, 817 E. Pine, Fresno 4, Calif. FOR SALE: Collins condensers in excellent coil. Also will trade for local sale, if possible. $1100. W6MSD, Dave DeArmond, 22828 Diamond Ave., San Diego, Calif. Tel. 3-5601. SELL: Heath AM-2, $14.50; JT-30, $65.00. K1HK. SELL: 62C1as, $13; 304TLs with sockets, $10; Collins PTO, $45.00; BC210T; $60; Electronic compression preamp; $18; CX54B butterfly, accessories; $75; HDVV, etc., large vari. condensers; $15; cabinet racks reasonable; 25 yrs. QST. C.B. o. n.s. w.r.k. 2J, Gill Portland 4, 109 Malin RA, Wilimington 2, Del. 106-90, Serial 70B, $550.00. Both in mint cond. W3HFM, 5 Indian Valley Rd., Telford, Penna. FOR SALE: GPR-90 receiver and matching spkr. Guaranteed new cond. $250.00. Bruce MacPherson, K2OAS, 5 Washburn Rd., Thompson Plains, N.J. COMPLETE mobile outfit, year old, original cartons, manuals, gr. cost. $500.00; Pierson KE9J revr., 15w, untuned, $215.00; Eiki AF-150 swr. Mfld, $150.00, new swr $195.00, antenna relay, $9.00; Shure miuie, 50AG, $12.00; ohm antenna output, $9.50; Rady (2), $8.50, p.o. destination. $449.00, dealer. Ken Ted Meck, 20 Grendale Rd., Cedar Grove, N.J. Tel. Center 4-2124 (mthl), Precut 6-4700 (daytime). OFFICIAL League, license course will be given beginning October at New York City Board of Education Community Center 59, Franklin Gardeeps, R.F. For applications send self-addressed envelope or Contact W2HON. FOR SALE: HT-37, only one old, $350.00, W1GFH/S, Zuromski, 63 M.C. Rd., Box 344, Newman AFB, New Mexico. TELREX 4-element 15m beam, Sell or swap for wood Trip-Bander, W1DXX, 40 Dayton, Worcester, Mass. THE DEERFORD Like new $950.00; MM-1 Scope $65.00; 20A with 506F. F.O. $14,280.00; 2-280A, 1-280A, $125 each, 4-125A $8.00. You pay shipping. P. Kirsh 1038 Rowland Ave., N.E., Canton 5, Ohio.
The No. 61455

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PART I of the new Dictionary is compiled from 37 IRE Standards on electronics terms, organized and published by The Institute of Radio Engineers over a 15 year period. Each definition cites the Standard from which it was taken; where a term is used in more than one field, and has more than one meaning, each is listed under a separate entry.

PART II of this 225 page volume is a Dictionary of Symbols, made up of five IRE Standards: Letter Symbols for Electron Tubes; Letter Symbols for Semiconductor Devices; Graphical and Letter Symbols for Feedback Control Systems; Graphical Systems for Semiconductor Devices; and Graphical Symbols for Electrical Diagrams. A four-page index to graphical symbols is included.

THE INSTITUTE OF RADIO ENGINEERS
1 East 79th Street, New York 21, N. Y.

Please send me ______________ copies of your complete new Dictionary of Electronics Terms and Symbols.

☐ I am an IRE member. Am enclosing $5.20 per copy
☐ I'm not yet a member. Am enclosing $10.40 per copy.

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Company

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City State

191
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We've been trading BIGGER than ever—yet we're literally cleaned out of reconditioned gear. We need your used equipment to fill our empty shelves—and we intend to go all-out to give you more for it than you've ever dreamed possible—so...

OCTOBER IS SWAPFEST TIME!
TRADE UP TO THE LATEST GEAR—MAKE THE DEAL OF YOUR LIFE

"SWAPFEST" is the password! Act now—make your selection of new gear from our 1962 Catalog. Then write (use the "Swapfest" Coupon below), call, wire or visit us in person—tell us what you've got to trade and what new equipment you want us to put in your shack. We'll come up with a great "Swapfest" Deal—a giant trade-in allowance you can't pass up! Now is the time to make the deal of your life!

—Larry Blostein, W9BUD, Allied Ham Manager

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ALLIED RADIO
FILL OUT AND RUSH THIS COUPON TODAY

ALLIED RADIO, Dept. 220-K1
100 N. Western Ave., Chicago 60, Ill. Attn: "Trader Jim" Sommerville, W9WHF

Rush me your "Swapfest" offer. Here's what I want to trade:

________________________________________________________________________
________________________________________________________________________
Here's what I want to buy:

________________________________________________________________________

Name, please print

Address

City_________________________________Zone______State__________
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OF THE YEAR-NATIONAL’S
NEW HAM-BAND NC-155

National is proud to announce a new standard of
comparison for ham-band receivers. In a price
class by itself—the NC-155. With the same
superb sensitivity, stability, and shaped selec-
tivity of the famous NC-270, the NC-155 has the
performance-engineered features vitally neces-
sary for relaxed ham-band operation.

Double conversion on 80 through 6 meters
Sensitivity better than 1 μV for 10 db S/N on
all bands, including 6 meters!
600 cycle CW, 3 kc SSB, 5 kc AM true variable
IF selectivity with National’s Ferrite Filter
Full SSB/CW AGC and separate product de-
tector
Extremely high (60:1) tuning ratio with built-in
Velvet Vernier
High Zero temperature compensation and
voltage regulated oscillators
Many other features, including, of course, the
convenient Flip Foot and National Blue styling

Suggested amateur net  $199.95*
NTS-3B speaker 19.95

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NEW
N-85-R FILAMENT
adds even longer life to these popular RCA Rectifier Tubes

In accordance with RCA's continued policy to provide the radio amateur with the highest performance tubes consistent with the best engineering practice known, every rectifier tube shown here is now designed and built with the new, improved coated filament—N-85-R!

N-85-R filament design prolongs peak emission capability. Immediate "in-rig" benefits to you are; increased rectifier-tube reliability, and longer rectifier-tube life.

Check the chart for the types that fit your DC power requirements. Then order direct from your RCA Industrial Tube Distributor. For technical data on any of these types write: Section J-37-A1, Commercial Engineering, RCA Electron Tube Division, Harrison, N. J.

RCA Rectifier Tubes—with the new N-85-R Filament
(Based on use of 2 tubes in full-wave circuit, choke-input filter)

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Max. Transf. Volts</th>
<th>Approx. DC Output Volts</th>
<th>Max. DC Output Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA-3628*</td>
<td>Half-wave, gas</td>
<td>3500</td>
<td>3200</td>
<td>1.0</td>
</tr>
<tr>
<td>RCA-816</td>
<td>Half-wave, mercury-vapor</td>
<td>2600</td>
<td>2400</td>
<td>0.25</td>
</tr>
<tr>
<td>RCA-866A</td>
<td>Half-wave, mercury-vapor</td>
<td>3500</td>
<td>3200</td>
<td>0.5</td>
</tr>
<tr>
<td>RCA-872A</td>
<td>Half-wave, mercury-vapor</td>
<td>3500</td>
<td>3200</td>
<td>2.5</td>
</tr>
<tr>
<td>RCA-8000†</td>
<td>Half-wave, mercury-vapor</td>
<td>3500</td>
<td>3200</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*For low noise-level applications. †Same as RCA-872A, but has long-pin base.

RCA Electron Tube Division, Harrison, New Jersey

The Most Trusted Name in Electronics
WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands† on which operation is permitted. Changes will, as usual, be announced by W1AW bulletins. Figures are megacycles. A§ means an unmodulated carrier; A1 means c.w. telegraphy; A2 is m.c.w.; A3 is a.m. phone (n.f.m. may also be used in such bands); A4 is facsimile; A5 is television; F1 is frequency-shift keying; and f.m. means frequency modulation, phone (including n.f.m.) or telegraphy.

<table>
<thead>
<tr>
<th>Band</th>
<th>Power (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 m</td>
<td>3.500-4.000</td>
</tr>
<tr>
<td>80 m</td>
<td>3.500-3.800</td>
</tr>
<tr>
<td>80 m</td>
<td>3.800-4.000</td>
</tr>
<tr>
<td>40 m</td>
<td>7.000-7.300</td>
</tr>
<tr>
<td>40 m</td>
<td>7.000-7.200</td>
</tr>
<tr>
<td>40 m</td>
<td>7.200-7.300</td>
</tr>
<tr>
<td>20 m</td>
<td>14.000-14.250</td>
</tr>
<tr>
<td>20 m</td>
<td>14.000-14.200</td>
</tr>
<tr>
<td>20 m</td>
<td>14.200-14.350</td>
</tr>
<tr>
<td>15 m</td>
<td>21.000-21.450</td>
</tr>
<tr>
<td>15 m</td>
<td>21.000-21.250</td>
</tr>
<tr>
<td>15 m</td>
<td>21.250-21.450</td>
</tr>
<tr>
<td>10 m</td>
<td>28.500-28.700</td>
</tr>
<tr>
<td>10 m</td>
<td>28.500-28.700</td>
</tr>
<tr>
<td>6 m</td>
<td>50.0-50.1</td>
</tr>
<tr>
<td>6 m</td>
<td>50.1-54</td>
</tr>
<tr>
<td>6 m</td>
<td>51-54</td>
</tr>
<tr>
<td>6 m</td>
<td>53-58</td>
</tr>
<tr>
<td>2 m</td>
<td>144-147.9</td>
</tr>
<tr>
<td>2 m</td>
<td>147.9-148.0</td>
</tr>
<tr>
<td>2 m</td>
<td>220-225</td>
</tr>
<tr>
<td>2 m</td>
<td>420-450</td>
</tr>
<tr>
<td>2 m</td>
<td>1,215-1,300</td>
</tr>
<tr>
<td>2 m</td>
<td>2,300-2,450</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>3,500-3,700</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>5,850-5,925</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>10,000-10,050</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>21,000-22,000</td>
</tr>
</tbody>
</table>

† Input power must not exceed 50 watts.
§ No pulse permitted in this band.

Notes: The bands 220 through 10,500 Mc. are shared with the Government Radio Positioning Service, which has priority.

In addition, A1 and A3 on portions of 1,800-2,000, as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Power (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minn., Iowa, Wis., Mich., Pa.</td>
<td>1800-1825</td>
</tr>
<tr>
<td>Md., Del. and states north</td>
<td>1975-2000</td>
</tr>
<tr>
<td>N. D., S. D., Neb., Col., N. Mex., and states west, including Hawaii</td>
<td>1800-1825</td>
</tr>
<tr>
<td>Okla., Kans., Mo., Ark., Ill.</td>
<td>1975-2000</td>
</tr>
<tr>
<td>Ind., Ky., Tenn., Ohio, W. Va., Va., N. C., S. C., and Texas (west of 99° W or north of 32° N)</td>
<td>1800-1825</td>
</tr>
</tbody>
</table>

No operation elsewhere.

* Except in state of Washington, 200 watts day, 50 watts night.
† While the over-all bands for Canada are similar, the breakdown by modes is quite different. Canadians should refer to the list which was sent with their licenses.

Technician licensees are permitted all amateur privileges in 50 Mc., 145-147 Mc. and in the bands 220 Mc. and above.

Novice licensees may use the following frequencies, transmitters to be crystal-controlled and have a maximum power input of 75 watts.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Power (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,700-3,750</td>
<td>A1 21,100-21,250</td>
</tr>
<tr>
<td>7,150-7,200</td>
<td>A1 145-147</td>
</tr>
</tbody>
</table>

BANNED COUNTRIES

Article 41, Section 1 of the Radio Regulations attached to the Geneva Convention of 1959 says:

"Radiocommunications between amateur stations of different countries shall be forbidden if the administration of one of the countries concerned has notified that it objects to such radiocommunications."

The United States and Canada, as signatories to the Convention, would not be living up to their treaty obligations if they did not publish and enforce, among their amateurs, the provisions of this section.

Unfortunately, some of the countries have worded their notices to the I.T.U. somewhat ambiguously. The U. S. interpreted these one way, the Canadian government the other. Two countries notified the U. S. Department of State that they no longer objected to international amateur communications, but did not notify Geneva or Ottawa. Thus, we have the slightly confusing situation of one banned list for Canada, and another for the U. S.!

Canada

Canadian amateurs may not work amateurs in the following countries: Laos, Cambodia, Viet Nam, Indonesia, Thailand, Roumania, and Jordan.

United States

The U. S. version of the list comprises Cambodia, Viet Nam and Indonesia.

THIRD-PARTY TRAFFIC

The following countries have entered into third-party agreements with the United States, permitting amateurs to handle relatively unimportant messages:

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Haiti</td>
<td>Nicaragua</td>
</tr>
<tr>
<td>Chile</td>
<td>Honduras</td>
<td>Panama</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Liberia</td>
<td>Paraguay</td>
</tr>
<tr>
<td>Cuba</td>
<td>Mexico</td>
<td>Peru</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>Venezuela</td>
</tr>
</tbody>
</table>

Canada has a third-party agreement only with the United States at present.
WIAW Schedules
(Effective October 29, 1961)

Operating-Visiting Hours
Monday through Friday: 3 P.M.-3 A.M. EST.
Saturday: 7 P.M.-2:30 A.M. EST.
Sunday: 3 P.M.-10:30 P.M. EST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request.

Frequencies
C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800 kc.
Voice: 1820, 3945, 7255, 14,280 (a.s.b.), 21,330, 29,000, 50,700, 145,800 kc.

Frequencies may vary slightly from round figures given; they are to assist in finding the WIAW signal, not for exact calibrating purposes.

Official Bulletins
Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time:
C.w.: Monday through Saturday, 0100; Tuesday through Sunday, 0500.
Voice: Monday through Saturday, 0200; Tuesday through Sunday, 0430.

Caution: Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

Code Proficiency Program
WIAW conducts code practice daily at 0230 GMT, on all c.w. frequencies listed (except 1820 kc.) with speeds of 15, 20, 25, 30 and 35 w.p.m on Tuesday, Thursday and Saturday, and at 5, 7½, 10 and 13 w.p.m. other days. Caution: In the U. S. and Canada, because times shown are GMT, code practice actually occurs on the evening of the previous day. Approximately 10 minutes’ practice is provided at each speed. Current issues of QST carry data on source material for practice copy on some sessions, so that you can check your copy.

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. Dates of these certificate qualifying runs are announced each month in QST in the “Activities Calendar” and in “Operating News.” Any person can apply. Neither ARRL membership nor an amateur license is required.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>3550</td>
<td>3875</td>
</tr>
<tr>
<td>7100</td>
<td>7250</td>
</tr>
<tr>
<td>14,050</td>
<td>14,225</td>
</tr>
<tr>
<td>21,050</td>
<td>21,400</td>
</tr>
<tr>
<td>28,100</td>
<td>29,640</td>
</tr>
<tr>
<td>50,550</td>
<td>145,350</td>
</tr>
</tbody>
</table>

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. — 3355, 7050, 14,090; phone — 3765, 14,100, 28,250 kc.

SUGGESTED RTTY OPERATING FREQUENCIES

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>3620</td>
<td>7040</td>
</tr>
<tr>
<td>14,090</td>
<td>21,090</td>
</tr>
</tbody>
</table>

GMT CONVERSION

To convert to local times subtract the following hours:

WIAW GENERAL-CONTACT SCHEDULE

WIAW welcomes calls from any amateur station in accordance with the following schedule:

<table>
<thead>
<tr>
<th>GMT</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>0030-0100</td>
<td>7255</td>
<td>7080</td>
<td>50.7 Mc.</td>
<td>3945</td>
<td>7080</td>
<td>3555</td>
<td>3945</td>
</tr>
<tr>
<td>0120-0200</td>
<td>3555</td>
<td>3945</td>
<td>14,280</td>
<td>7255</td>
<td>14,280</td>
<td>3555</td>
<td>14,280</td>
</tr>
<tr>
<td>0210-0230</td>
<td>3945</td>
<td>14,280</td>
<td>7255</td>
<td>3945</td>
<td>7080</td>
<td>14,100</td>
<td>7255</td>
</tr>
<tr>
<td>0330-0430</td>
<td>3945</td>
<td>3945</td>
<td>3945</td>
<td>14,100</td>
<td>7255</td>
<td>3945</td>
<td>14,100</td>
</tr>
<tr>
<td>0440-0500</td>
<td>3945</td>
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<td>2000-2100</td>
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<td>21/28 Mc.</td>
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<td>21/28 Mc.</td>
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<td>21,075²</td>
<td>14,100</td>
<td>21,075²</td>
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</table>

1 General-contact period on stated hours begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.
2 WIAW will first listen for Novices before checking the rest of the band for other contacts.
3 Operation will be conducted on either 21,075, 21,330, 28,080 or 29,000 kc.