

QST

October 1966

60 Cents

devoted entirely to
**amateur
radio**

H A M

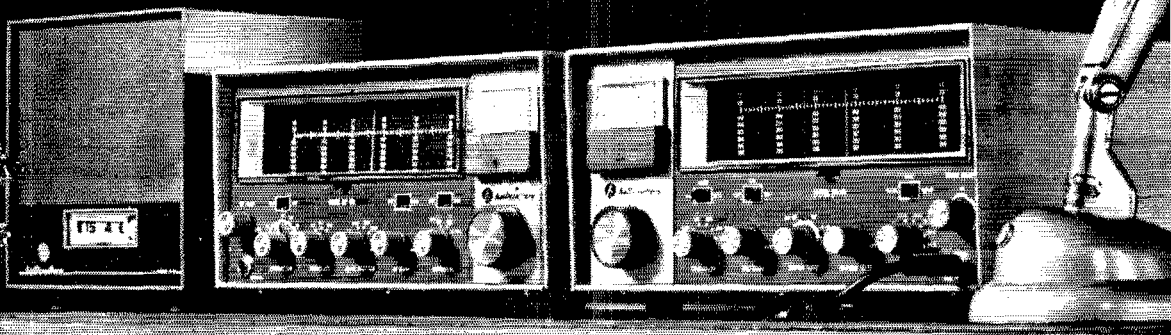
Q U E S T

67



OFFICIAL JOURNAL OF THE ARRL

Hallicrafters advanced technology brings you a new breed of amateur equipment



SX-146 Receiver

This is an amateur band receiver of advanced design employing a single conversion signal path and pre-mixed oscillator chain to assure high order frequency stability and freedom from adjacent channel cross-modulation products. The SX-146 employs a high frequency quartz crystal filter and has provision for installation of two more crystal filters. The receiver may also be used from 2 to 30 mc, with the exception of a narrow gap at 9.0 mc, with the connection of auxiliary oscillators. The highly stable conversion oscillator chain may be used for transceiver operation of the matching HT-46 transmitter.

FREQUENCY BANDS: 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0 mc (28.0 to 28.5, 29.0 to 30.0 requires extra crystals at users option).

SENSITIVITY: Better than 1 μ v for 20 db S/N.

TUBES AND FUNCTIONS: 6JD6 RF amplifier; 12AT7 Signal mixer and cathode follower; 6AU6A 9 mc IF amplifier; 12AT7 AM detector—AVC rectifier—product detector; 12AT7 USB—LSB crystal oscillators; 6GW8 Audio amplifier and audio output; 6BA6 Variable frequency oscillator; 6EA8 Crystal heterodyne oscillator and pre-mixer; Plus diode power supply rectifier, ANL diode and AVC gates diode; *6AU6A—100 kc crystal calibrator oscillator; *Harmonic generator diode.

PHYSICAL DATA: Size: 5 $\frac{7}{8}$ " x 13 $\frac{1}{8}$ " x 11". Shipping wt., 28 lbs.

FRONT PANEL CONTROLS: Frequency: Power off CW-upper-lower and AM; Audio gain; Band selector—3.5, 7.0, 14, 21.0, 28.0, 28.5, 29.0, 29.5; Selectivity—.05, 2.1, 5.0 kc (0.5 and 5.0 kc filters optional extra); Pre-selector; RF gain; AVC on-off; Cal. on-off; ANL on-off; Phone set jack; S-meter.

REAR CHASSIS: S-meter zero adjust; Internal-External oscillator switch; Slave oscillator output; External oscillator input; Antenna socket; Speaker, ground and mute terminals; Grounding stud; AC power cord.

POWER REQ.: 105/125 volt—50/60 cycle AC—55 watts.

I-F SELECTIVITY: Uses a 6-pole crystal filter to obtain a nose-to-skirt ratio better than 1 to 1.8.

Amateur net, \$269.95

Model HA-19 plug-in, 100-kc quartz calibrator available as accessory. Amateur net, \$19.95

*Part of HA-19 calibrator.

HT-46 5-band transmitter

All new from the ground up! Here's the "new breed" transmitter that matches your SX-146 . . . works independently or may be interconnected for transceiver operation.

FEATURES: 180 watts PEP input on SSB; 140 watts on CW; Frequency control independent or slaved to SX-146 receiver; Upper or lower sideband via 9 mc quartz filter; Built-in power supply; Press-to-talk or optional plug-in VOX; grid block for keying for CW.

FREQUENCY COVERAGE: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 mc and 28-30 mc in four 500-kc steps. Crystal supplied for 28.5-29.0 mc coverage. Other plug-in crystals at user's option.

TUBES: 6BA6 VFO; 6EA8 Heterodyne crystal oscillator and mixer; 12AT7 Carrier oscillator-third audio; 12AT7 Mic amplifier; 6EA8 9 mc I-F amplifier and AALC; 6AH6 Mixer; 12BY7 Driver; 6HF5 Power amplifier; 0A2 Reg.

FRONT PANEL CONTROLS: Frequency Tuning; Operation-Off, Standby, USB, LSB, CW-Tune, Standby LSB USB; Microphone gain; Driver tune; Carrier level; Band selector; Final tune; VFO selector—Transmitter-Receiver; Dial cal.; Calibrate Off-On; Meter MA-RFO.

REAR APRON FUNCTIONS: AC Cord; Ground lug; Fuse; Key jack; VOX accessory socket; Antenna jack; Receiver input (for transceiver); 11 pin control socket; bias adjust.

PHYSICAL DATA: Size: 5 $\frac{7}{8}$ " x 13 $\frac{1}{8}$ " x 11". Shipping wt., 26 $\frac{1}{2}$ lbs.

HA-16 Vox Adapter, \$37.95

Amateur net, \$349.95

R-51 Speaker,

4 x 6 inch oval speaker and attractive 24 hour clock.
amateur net \$34.95

*"Quality through
Craftsmanship"*



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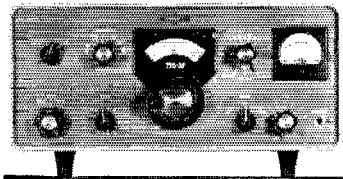
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Export: International Division

Available in Canada from Gould Sales Co.



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73, Old Man! No matter what language it comes booming in on, you've made a good QSO. And you can work the best with Collins' S/Line. One star of this *complete* fixed station is the 75S-3B, featuring *sharpest selectivity* on SSB, CW and RTTY — optional filters that give you up to three degrees of selectivity in CW/SSB, and with a filter socket for AM-rejection tuning, AGC, and spinner tuning knob. Contact your authorized Collins distributor today. You'll be surprised to find how little it costs to own the finest.



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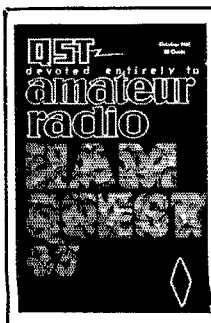
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OUR COVER
What's "Hamquest 67"? Read all about it on page 9. Then pitch in to help your local club and ARRL in this joint membership drive.

QST

OCTOBER 1966

VOLUME I NUMBER 10

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-CONTENTS-

TECHNICAL —

Why Key Clicks?.....	George Grammer, W1DF	11
Field-Effect Transistors.....	Jim George, W7AWH	16
Yagi vs. Quad.....	Robert E. Fitz, W4RBZ	20
Gimmicks and Gadgets		
A 300-Ohm Standard For The Transmatch.....		22
A V.L.F. Receiver Without Tuning Capacitors or Coils		
John M. Tiffany		23
V.F.O. Stability — Recap and Postscript		
George Grammer, W1DF		26
Building Your Own Arrays for 50 and 144 Mc.		
Edward P. Tilton, W1HDQ		33
Recent Equipment		
Knight-Kit TR-106 Transceiver.....		42
Knight-Kit V-107 V.F.O.....		43
Parks 432-3 Converter.....		44
Technical Correspondence.....		46
New Apparatus		
Omega Multirange Panel-Meter Kit.....		108
Millen No-String Illuminated Slide-Rule Dial.....		108

BEGINNER AND NOVICE —

A Transmatch For Balanced and Unbalanced Lines		
Lewis G. McCoy, W1ICP		38

OPERATING —

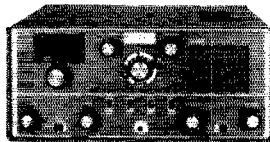
ARRL International DX Competition		
Ellen White, W1YYM		58
Armed Forces Day — 1966.....		80
21st ARRL Simulated Emergency Test Announcement...		82
Thoughts on RACES and ARPSC.....		84
Sixth World-Wide RTTY Sweepstakes Rules.....		98

GENERAL —

Station Design For DX.....	Paul D. Rockwell, W3AFM	48
"QSL . . . Solid Copy".....	John G. Troster, W6ISQ	51
97.73 — or Bust!.....	David A. Lien, WA6YMY	52
GBA.....	Louise Ramsey Moreau, WB6BBO	55
A Noise-Silencing I.F. Circuit for Superhet Receivers		
(reprinted from <i>QST</i> , February 1936)		
James J. Lamb		96

ARPSC.....	84	IARU News.....	90
Coming Conventions.....	98	League Lines.....	10
Correspondence From Members	93	Operating News.....	112
Hamfest Calendar.....	98	Silent Keys.....	158
Happenings of the Month.....	88	Station Activities.....	117
Hints & Kinks.....	56	World Above 50 Mc.....	104
How's DX?.....	99	YL News and Views.....	109
Index to Advertisers.....	182	25 Years Ago in <i>QST</i>	25
"It Seems to Us . . ."	9		

SPACE PACKAGE



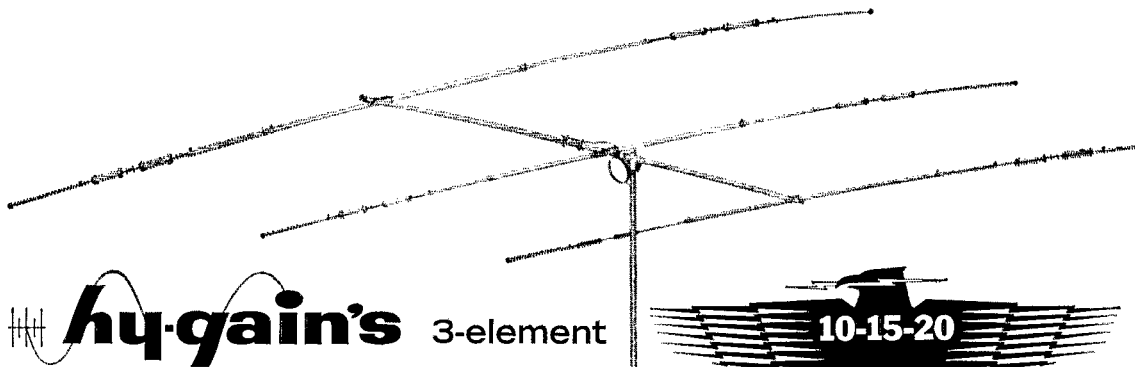
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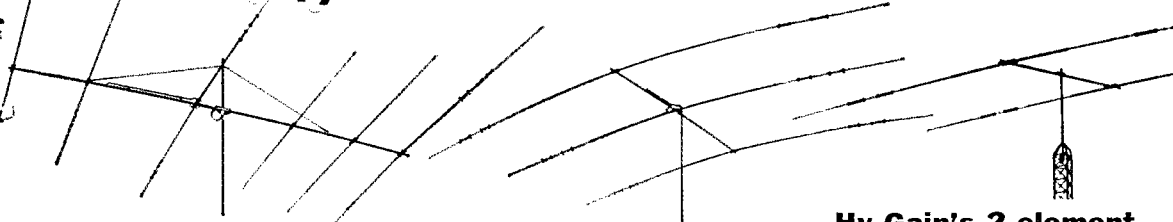
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- **Delivers uncompromised full-sized performance on 10, 15 & 20 meters**
- **Takes maximum legal power**
- **Exclusive time-proven Beta Match**

Try as you may, you just won't find another three-element tribander for 10, 15 and 20 meters that will even begin to compare with Hy-Gain's Model TH3Mk2. Some say it's the individually tuned, large diameter Hy-Q traps that make the difference by providing full-sized performance on each band. Others say it's the spacing of the elements on the 14 foot boom. Still others claim it's the ex-

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Provides the very ultimate in tribander performance. Takes maximum power. 24' boom. Exclusive Hy-Q traps and time-proven Beta Match. Model TH6DX **\$149.50 Net**

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Fantastic performance in limited space. Takes 600 watts P.E.P. 12' boom. Exclusive Hy-Q traps and Beta Match. Rotates with heavy duty TV rotator. Model TH3Jr. . . . **\$74.50 Net**

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Installs most anywhere. Delivers outstanding performance. Takes maximum power. 6' boom. Exclusive Hy-Q traps and time-proven Beta Match. Model TH2Mk2 **\$74.50 Net**

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Hy-gain ELECTRONICS CORPORATION
8402 N.E. Highway 6 • Lincoln, Nebraska 68501

Section Communications Managers of the ARRL Communications Department

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

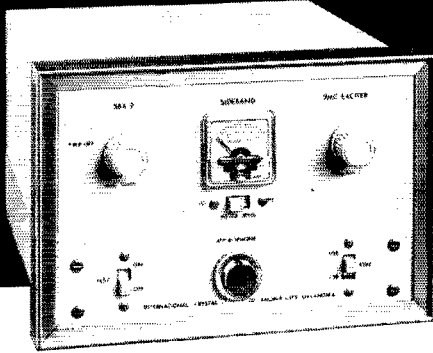
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The SBX-9 Exciter-Driver and the SBA-50 Mixer-Amplifier provide the perfect combination for 50-54mc SSB operation. Performance, versatility and reliability are incorporated into this new SSB pair. A tremendous value at a low price!



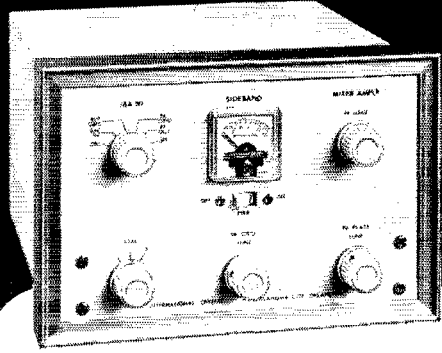
Model SBX-9

SPECIFICATIONS:

Exciter-Driver 9mc

- Tubes:** 6BH6 Oscillator
12AX7 Audio
7360 Bal Modulator
6BA6 RF Amplifier
- Filter:** Four crystal half lattice
Carrier Suppression 45db min.
Unwanted SB Atten. 40db min.
- Output:** Provides voltage drive for mixer such as SBA-50
- Controls:** Carrier Balance
Microphone Gain
Test Switch
USB-LSB Switch
- Metering:** RF output for balance adjust. Two sensitivity ranges available with front panel switch.
- Misc:** Relay included for push-to-talk operation. Crystals for upper and lower sideband included. Requires high impedance microphone. For operation on 117 vac 60 cycle power.
- \$125.00**

Order direct from
International Crystal Mfg. Co.



Model SBA-50

SPECIFICATIONS:

Mixer-Amplifier 50-54mc

- Tubes:** 6U8A Oscillator-Mixer
12BY7A Amplifier
6360 Linear power amplifier
Requires 9mc sideband signal from SBX-9
- Drive:** SSB single tone 10 watts
- Output:** SSB single tone 10 watts
- Controls:** On-Off Power
PA Grid Tune
PA Plate Tune
PA Load Tune
Metering Switch
- Metering:** Oscillator
9mc Drive
Buffer Grid
PA Grid
RF Out
- Crystals:** Three positions, uses 3rd overtone 41-45mc range. Crystal frequency = final frequency - 9mc
- Misc:** Accessory socket provided for connecting keying circuit to SBX-9. Comes with three crystals. Specify frequency when ordering. For operation on 117 vac 60 cycle power.
- \$145.00**

INTERNATIONAL

CRYSTAL MFG. CO., INC.

18 NO. LEE • OKLA. CITY, OKLA. 73102

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



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Southwestern Division

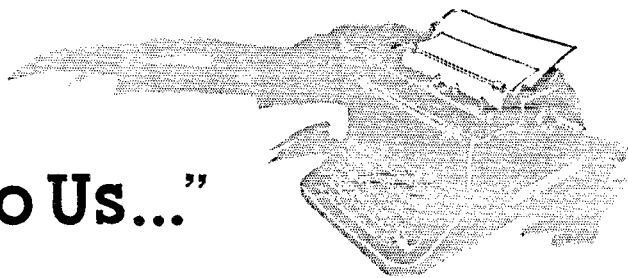
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"It Seems to Us..."

HamQUEST '67



Unity.

Not acquiescence, but unity.

Strength through unity — that's what is needed.

THERE are some 275,000 radio amateurs in the United States and Canada, yet only about 81,000 of these are members of the ARRL and only about 40,000 are members of local radio clubs. We radio amateurs are individualists, there's no doubt of that. (And if there is doubt, come and read the Hq. mail sometime!) But despite our many and varied interests and likes and dislikes, we have a common goal, a common hope — we want amateur radio to be a continuing and dynamic occupant of the radio spectrum.

The world grows ever more complicated. The garrulous inventor is replaced by a team of scientists. The airplane pilot requires a crew of mechanics, meteorologists, and flight controllers to guide him on his way. Even the lonely mountaineer requires at least one other man on the rope.

So it is with radio amateurs. We all need the association and support of our fellow radio amateurs. 80,000 of us are banded together in the American Radio Relay League. 40,000 of us are banded together additionally in local amateur radio clubs. That's only a fair showing, and it could be better. That's the reason for HamQuest 67 — a cooperative program for clubs and the League to enlist substantially expanded membership, in order more effectively to represent and serve the growing needs of the amateur fraternity. It's a program for greater unity in amateur radio.

Why do we need a stronger League? Why do we need stronger clubs? Because each of us alone cannot solve the many problems facing amateur radio, but as a united team we have a strong voice.

What can membership in the club do for you? First of all, you have the sociability and fraternalism of others who have the same interests that you do. Some of them may have already solved a problem that is bugging you. They get together for field days and other types of contests. The club probably runs a

code and theory course from time to time. It has an interference committee which tackles local problems. It participates in local civil defense and emergency communications activities. It provides communications for parades and the like. It gets special training films and slide shows from ARRL Hq. It receives regular bulletins from League Hq. relative to the latest news in amateur radio, much more expeditiously than even *QST* can provide. As a member of a club you participate in as many of these activities as interest you, and you have a chance to be one of those who guide the future of the club.

What can membership in ARRL do for you? It brings you twelve issues of *QST*, which during the course of a year has something for everybody several times over. It permits you to nominate and vote for those fellow amateurs who would like to serve as directors of ARRL and thus guide the future of amateur radio. It provides you with a Technical Information Service, with your technical problems answered by members of the Hq. staff. It provides you with representation before the Federal Communications Commission, the Department of Transport, and the International Telecommunications Union, so that the needs and wants of amateur radio operators are made known to those who establish the national and international regulations. It provides you with WAC certificates and DXCC certificates and RCC certificates and WAS certificates, to acknowledge your operating ability.

A campaign kit has been sent to each of more than 1800 clubs all over the U. S. and Canada. It has ammunition to be used in convincing non-members that they ought to join the League and a club. It tells all about the prizes that you as an individual and your club can earn by enlisting more members. If you are a member of a club and this campaign kit hasn't reached you yet (it was mailed in late August), drop us a line and we'll duplicate shipment.

The future strength of amateur radio, both nationally and internationally, lies in a greater unity — that is, in a greater membership both in the League and in the local clubs. That's what HamQuest 67 is all about.

QST

League Lines . . .

Shortly after you receive this issue, ballots will be going to members in divisions where there has been more than one nominee for director or vice-director. Be sure to exercise your right to vote, and return the ballot promptly. Don't think your vote doesn't count; a recent director election ended in a tie and a run-off—one vote would have tipped the scale. (And it was still close, 12 votes, at the run-off.)

Cop McDonald, WAØNLQ, visited Hq. in August with a highly-interesting demonstration of his slow-scan TV setup. We doubt that SSTV will ever replace c.w. or sideband, but it is an intriguing new mode of communication, with 6 kc. or less bandwidth, and we predict many hams will be using it in the future.

The ARRL DX Contest dates will be the first and third weekends of February and March next year. Heard about the new rules try? KH6 and KL7 back to DX status, at their request . . . the 48 contiguous states plus VE1-VE8 and VO for DX multipliers per band . . . a handsome trophy to DX single-operator continental leaders . . . PLUS elimination of the W/VE quota on c.w.

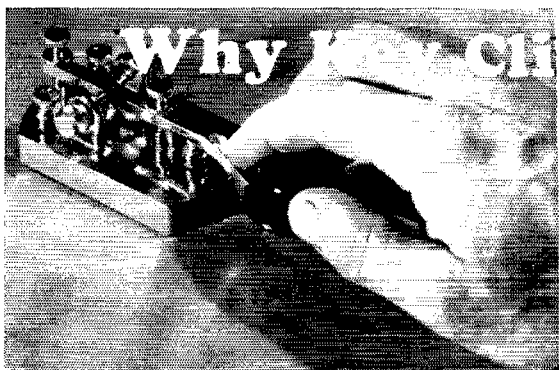
Quite a number of you indicated interest in a life membership in ARRL at \$100. Such a new policy would require Board action, of course, and the subject will certainly be on the 1967 meeting agenda. Gives you plenty of time to fill the piggy-bank, eh?

A European amateur magazine recently reported that ARRL had "lost 14,000 members" the past year. One guess as to which world traveler provided them with that misinformation!

Some associations offer participation in a group life insurance program at rates considerably reduced from those applying in individual cases. Premiums depend on age—e.g., for \$10,000 face value, \$27 annually at age 25, \$88 at age 47. If there is enough interest, the League might sponsor such a program. What say, gang?

How fast can you copy, "Some sages say Mississippi sissies are sissier than Tennessee sissies"? Explorers (High-school age Boy Scouts) attempted it at 10 w.p.m. in the communications and electronics events of their national conference in August. The code tapes, as well as some visual pegboard displays of problems involving resistor combinations and equipment trouble-shooting, were conceived and supplied by the League as part of continuing efforts to interest more youngsters in amateur radio and electronics.

One management study firm says today the cost of writing a business letter is \$2.44, up 30% from 1960. Hq. does it for a lot less, but the percentage increase is probably about the same. How much longer the League can keep operating on a 1960-established dues rate is a question our Board will have to tackle next year.



Why Key Clicks?

The Necessary Bandwidth for C.W. Signals

BY GEORGE GRAMMER,* W1DF

ARE key clicks necessary? There are those who contend that they are, the argument being that at high code speeds "soft" dots and dashes become unreadable. The issue is clouded by personal preferences as to how a keyed signal should sound, just as there are personal preferences about voice "quality". Putting aside such subjective factors, the question "Are key clicks necessary?" can be rephrased: "How much *bandwidth* is necessary for good code transmission?"

There is a long-standing answer to this last question. It is to be found in the international regulations, where the necessary bandwidth is specified as the keying speed in bands multiplied by a factor which is 3 for circuits where the signals are steady, and 5 for circuits where fading is bad. To see how this specification affects amateur practice it is necessary first to review a few fundamental keying definitions.

Keying Speed

The building block of telegraph transmission is the *code element*, the time duration of the shortest keying pulse. In International Morse code the shortest pulse is one dot. Since, by definition, the space length is equal to one dot length, a space is also a code element. This is shown in Fig. 1, where the top drawing could represent a d.c. circuit being keyed in a string of on-off dots and spaces. Such a circuit is shown in Fig. 2. If the string of dots is continuous and fast enough to let the meter's pointer settle down at an average value of current, the meter will read just half what it would with the key closed. This is because the current is off just the same length of time as it is on. We can look at this continuously keyed circuit, therefore, as one in which the keyed signal is alternating about an average direct current equal to the meter reading.

Thus we have an a.c. square wave superimposed on the average d.c. One cycle of this

square keying wave runs from the beginning of a dot through the following space to the beginning of the next dot. This is shown in the lower drawing in Fig. 1. Obviously, one cycle of the keying wave is equal to *two* code elements.

Any repetitive waveform, of whatever shape, can be reproduced by a collection of sine waves in harmonic relationship to a lowest frequency which is the same as the basic repetition rate of the waveform under consideration. This "fundamental" sine wave is also sketched in Fig. 1. If we are sending 25 dots per second, for example, the fundamental keying frequency is 25 cycles per second. By adding the proper harmonics to the fundamental, the actual square-wave shape can be approached as closely as we like. Getting those square corners, though, takes very high-order harmonics -- harmonics whose frequencies may be many times the fundamental frequency. This means that the circuit bandwidth has to be large compared with the fundamental keying frequency if square-wave keying is to be closely approximated.

Fortunately, it isn't necessary to use anything like a real square wave for good keying. It has long been recognized that a keying waveshape which contains only the *third* harmonic of the fundamental is quite sufficient for good copy. This is the reason for the factor 3 in the regulations. On this basis, a 25-cycle fundamental would take only a 75-cycle bandwidth. It is also recognized that when the signal-to-noise ratio is poor a somewhat sharper keying wave is needed; this explains the factor 5, meaning that the fifth harmonic of the fundamental keying frequency is transmitted.

C.w. keying can be clickless — without signal deterioration at any sending speed an amateur will use.

*Technical Editor, QST.

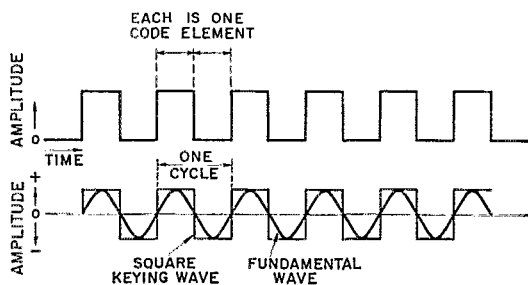


Fig. 1—Upper: A code element is the length of the shortest pulse—a dot or space in International Morse Code. Below: A succession of alternating dots and spaces considered as an a.c. square wave superimposed on the average value of current or voltage. The fundamental sine-wave frequency for such a square wave also is shown.

Keying Speed

Transmission speed is ordinarily expressed in *bauds* rather than in cycles per second. A baud is one keying element per second; therefore one cycle per second is equal to *two* bauds. In International Morse a dash is three code elements long, but since a dot or dash has to be followed by at least one space, a dot is considered to consist of two code elements and a dash to have a total of four. Thus

One dot = 2 code elements
 One dash = 4 " "

Additional space
 between letters = 1 code element
 Additional space
 between words = 2 code elements

The letter C, for example, consists of

Dash — 4 code elements
 Dot — 2 " "
 Dash — 4 " "
 Dot — 2 " "
 Space — 1 " "

making a total of 13 code elements. If it is sent in exactly one second, the speed is 13 bauds, and the fundamental keying frequency is therefore 6.5 cycles per second.

This method of measuring keying speed is exact, while "words per minute" is rather nebulous. The w.p.m. figure is dependent on the selection of words of average length; several such selections have been made, and the resultant w.p.m.-per-baud factor varies from a shade over 1 to about 1.2. Thus a keying speed of 25 bauds can be interpreted as something between 25 and 30 w.p.m. More to the point, a speed of 50 bauds is about as fast as any amateur will go with hand keying, so our opening question boils down to this: What bandwidth is *necessary* for a speed of 50 bauds—that is, 50 to 60 w.p.m.?

It seems reasonable to assume that no one would attempt such a speed, unless signals were good. Under such conditions the international regulations say that the necessary bandwidth is 3×50 , or 150 cycles. This is small enough to be

contained easily within the passband of the narrowest c.w. filters used in today's receivers.

In passing, it should be noted that the fundamental frequency is 25 cycles when the speed is 50 bauds, so transmitting the third harmonic along with the fundamental calls for a keying bandwidth of only 75 cycles. The extra factor of 2, above, comes in because when the keying wave, which is modulation just as much as voice, is applied to a radio-frequency carrier *two* sets of sidebands are generated. Thus the *radio-frequency* bandwidth is twice the keying bandwidth.

Shaping

What we have been discussing so far is the necessary bandwidth for a very special case—an interminable string of dots and spaces of equal length. Actual code transmission consists of dots, dashes, and spaces—the latter of various lengths—and since whatever shaping is used will be applied to the beginnings and ends of dots and dashes alike, it is more appropriate to talk about the rise time at the beginning of each pulse and the decay time at the end. Ideally these two times would be equal. Practically, they are seldom so, although they can be made approximately the same by careful adjustment of the shaping circuits. Also, the *shapes* of the rise and fall of amplitude differ when practical shaping methods are used.

There is a useful approximate formula which states that the bandwidth of a pulse is equal to 1 divided by twice its rise or decay time, whichever is smaller.¹ The rise (or decay) time is defined as the time required for the pulse to go from 10 percent to 90 percent of its maximum amplitude. For a 75-cycle bandwidth this formula gives 6.7 milliseconds as the rise or decay time. Alternatively, we may consider that we have a 200-cycle i.f. passband available in the sharpest receiver, and for such a bandwidth find that the formula gives a rise or decay time of 5 milliseconds.

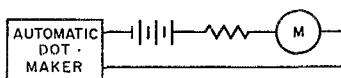


Fig. 2—A d.c. circuit which would generate the square waves shown in Fig. 1.

In other words, a rise or decay time of 5 to 7 milliseconds is short enough for the fastest hand keying speeds and a signal so shaped occupies no more bandwidth than can be handled by the sharpest receiving filter. Furthermore, careful listening tests show that a keyed signal using these rise and decay times *has no clicks*. The transition from key open to key closed, while difficult to describe accurately in words, is a moderately firm thud which does not have any resemblance to the sharp sound that distinguishes an unmistakable click.

¹ Reference Data for Radio Engineers, International Telephone & Telegraph Co., New York; fourth edition, p. 512.

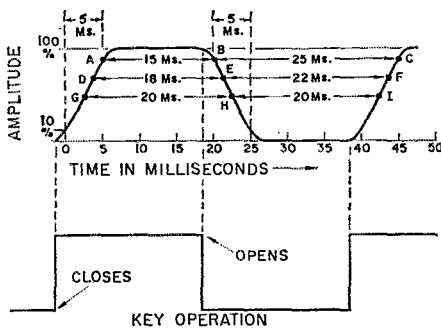


Fig. 3 — A shaped dot and its relationship to closing and opening the key.

Weight

At a speed of 50 bauds one code element occupies 20 milliseconds (1 sec. divided by 50). Fig. 3 shows, in a somewhat idealized way, the effect of shaping with 5-ms. rise and decay times. In this drawing it is assumed that the output rises to 10 percent of its maximum amplitude 1 ms. after closing the key, and decays to 90 percent 1 ms. after opening the key. The effect of shaping is to lengthen the dot duration, overall, but to shorten the time during which the amplitude is maximum. This immediately poses another question: What is the effective length of such a dot?

An ultraconservative viewpoint would be that the dot length is the time during which the amplitude is within 1 decibel of maximum. This is approximately the time between the 90-percent amplitude points. The keying shape shown in the drawing would have a dot length of 15 ms. (A to B) and a space length of 25 ms. (B to C) on this basis. A more realistic assumption would be that a 3-db. drop would establish the dot and space times, in which case the dot

length is 18 ms. and the space length 22 ms. In this drawing the dot and space lengths reach equality when the amplitude is down 6 db.

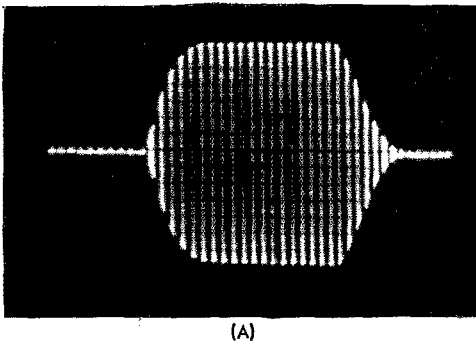
Since reception is by ear and not by machine, the question of the effective dot length cannot be resolved with complete objectivity. There appears to be no actual problem in recognizing the dots as separate entities with shaping of this general order. If they seem light to some and heavy to others, it is easy to change the keying weight slightly so the dwell time differs somewhat from the space time. Or the receiving operator can readily apply audio clipping to a dot that seems short; 6 db. of clipping would make the dot and space times equal in this example. Clipping also shortens the rise and decay times and makes the keyed signal sound "harder" — which some like.

Neither of these measures increases the keying bandwidth. The operators at both ends of the circuit have a great deal of control — control that does *not* increase the interference to stations trying to operate on nearby frequencies.

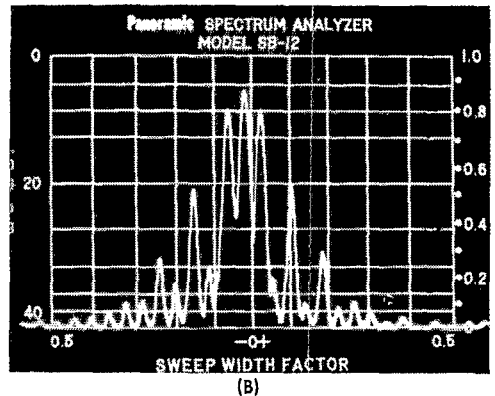
Keying Waveshapes

Most, if not all, shaping systems in amateur c.w. transmitters use the discharge of a capacitor to slow down the break end of a code character. The waveshape of the decay is superficially exponential, resembling the discharge of a capacitor through a simple resistance, but is considerably modified by the circuit conditions. However, the general effect is that the transmitter output decays rapidly at first and then tails off more and more slowly.

This curve is inverted on the make end of the character, rising rapidly at first and then slowly approaching the maximum amplitude. The critical points in both shapes are the starting points, where the change from off to on, or from on to off, begins. With truly exponential curves this



(A)



(B)

Fig. 4—A—Shaped dot generated at a 46-baud rate with approximately 5-millisecond rise and decay times. Vertical lines are from a 1000-cycle signal applied to the Z axis for timing. B—The corresponding frequency spectrum as shown by a Panoramic analyzer. Distance between vertical lines is 50 cycles, for a total bandwidth of 500 cycles for the entire picture. Decibel scale at the left is with reference to the key-down signal amplitude which was set at 0 db. in this and the spectrum plots of Fig. 6. The fundamental-frequency components are 23 cycles on either side of the carrier frequency, which appears slightly to the left of the vertical zero axis. Note that the odd harmonics of 23 cycles are predominant, the even harmonics being relatively small. The 3rd harmonics are 20 db. down and the 5th harmonics are about 28 db. down. Higher-order harmonics are practically negligible. With 7-ms. rise and decay times the 5th harmonics are down 30 db.

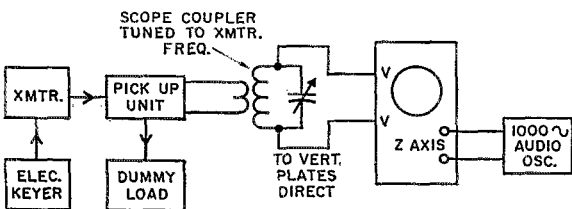


Fig. 5—Setup for obtaining the scope patterns shown in Figs. 4A and 6A. The pickup unit and tuned scope coupler can be made as described in *QST* for October 1964 (also in *Single Sideband for the Radio Amateur*, Fourth Edition, p. 196).

sudden transition from “nothing” to “something” on make would result in a long string of harmonics—*i.e.*, a wide band would be generated. Fortunately, tube characteristics tend to eliminate the sharp corners on both make and break.

A typical dot waveshape with blocked-grid keying is shown in Fig. 4A, where the rise and decay times have been adjusted for approximately 5 ms. at a keying rate of 46 bauds, the highest speed of the electronic keyer used. The corresponding frequency spectrum is shown in Fig. 4B. (If anyone doubts that a keyed signal consists of a carrier and sidebands this picture should settle the question.)

The vertical lines in the scope pattern, A, are the peaks of a 1000-cycle timing wave applied to the intensity or Z axis of the scope. The setup for making patterns of this type is shown in Fig. 5, and can easily be duplicated by anyone having an electronic keyer, a general-purpose oscilloscope, and a 1000-cycle oscillator having a reasonably pure waveform. The vertical lines mark 1-millisecond intervals. Timing is essential with oscilloscopes of the type ordinarily found in amateur stations, since the “linear” sweep is usually not very linear at the 20- to 25-cycle sweep rate required for showing just one dot and its accompanying space at a 40- to 50-baud rate.

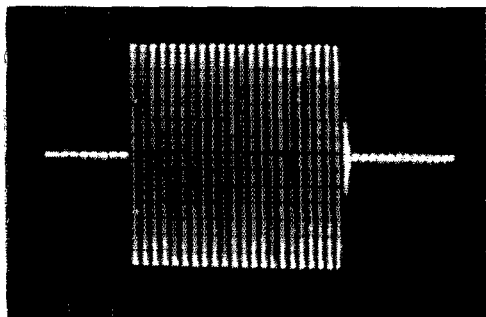
Fig. 6A shows a dot at the same speed as Fig. 4, but with no shaping, and Fig. 6B is the corresponding frequency spectrum. This is a “hard” signal on both make and break, although it should be noted that because it is a good square wave, particularly on the make side, it is less clicky than many signals that can be heard at almost any time on any band where c.w. operation is going on. Fig. 7 is a typical example of a clicky signal recorded off the air. Power-supply regulation accounts for the large spike on make. The immediately-following undulation in amplitude is caused by the power-supply choke; an appreciable length of time is required for the output current to build up through it after the initial “bump” has been supplied by stored-up energy in the filter capacitor.

Checking With a Receiver

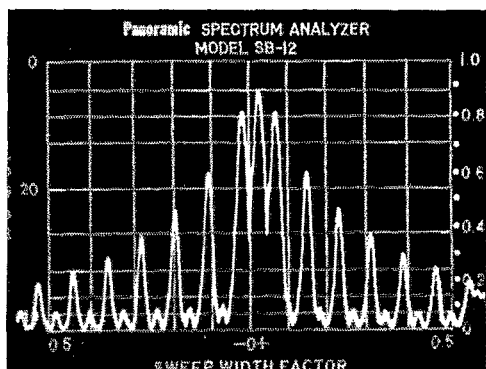
Although a setup such as Fig. 5 is useful and instructive, it takes no elaborate monitoring equipment to arrive at a satisfactory adjustment

of keying waveshape. Your receiver will tell you everything you need to know, provided you use it properly.

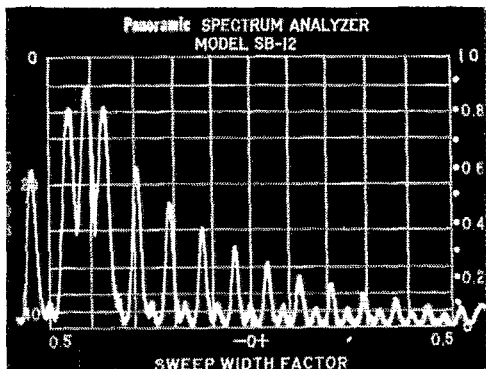
The transmitter’s output should be fed into a dummy antenna—a reasonably good one, not just an incandescent lamp or two. Lamp resistance varies too much with current, and the



(A)



(B)



(C)

Fig. 6—A—Dot with no intentional shaping; conditions otherwise the same as in Fig. 4. There is a finite decay time inherent in the keying system, but the rise time is quite short. B—Corresponding frequency spectrum over a 500-cycle bandwidth; carrier frequency slightly to the right of the vertical zero axis. C—Same as B, but with the carrier set at -0.4 to show outlying components not visible in B. Bandwidth to the right of the carrier is 450 cycles. Note that the odd-harmonic components have not dropped to -40 db. in this range.

thermal lag may cause the results to be misleading. Good dummy antennas are not expensive, and every amateur station needs one for all types of transmitter testing.

The antenna should be taken off the receiver so there will be no overloading. Set the audio gain control to maximum, tune in your key-down signal, turn on the b.f.o., and decrease the r.f. gain until the signal is about S9. Make sure that this setting of the r.f. gain is within the linear control range—that is, the signal should not sound the least bit mushy or thin, and an increase or decrease in gain should change the audio output in proportion. Setting the audio and r.f. gains in this way will effectively eliminate any automatic gain control action in most receivers, but if there is a separate a.g.c. switch turn it to “off”; you can learn nothing about your keying if the receiver gain varies while the amplitude of the shaped character is building up and decaying.

After getting these receiver settings right, turn off the b.f.o. and switch to a.m. reception with the widest bandwidth available in the receiver. Now key your transmitter. There will be an increase in background noise when the key is down, but this is normal. (If you have hum on your signal it will also show up, but a properly filtered power supply will show none.) Listen carefully when the key is closed, and equally carefully when it is opened. If there is the slightest trace of a hard click, the shaping is poor and the signal will be taking up a wider band than it should. The most you should get is the previously mentioned fairly soft thudding sound when the key is closed. This may not even be present on break, because of the nature of the rise and decay curves.

After adjusting the shaping to eliminate clicks completely, switch on the b.f.o. again. This will tell you how your signal will sound to others. If it seems unnecessarily soft you may have gone too far in slowing down the rise and decay times. A few back and forth trials should result in clean keying *with no trace of click*. If you are using a

bug or electronic keyer, adjust the keying weight so the dots and spaces sound about equal.

That's all there is to it, except for one thing: If shaping adjustments don't get rid of clicks you've got other troubles. Sparking at the key and contact bounce in a bug or keying relay are the most likely prospects.² They have to be cured before you can begin to control your keying characteristics.

If the shaping job has been done properly, the final test is to switch in the receiver's narrowest filter and detune until the beat note just drops into the noise. Then switch off the b.f.o. At this point you should hear *nothing* when you key the transmitter, even if the filter is as narrow as 200 cycles. If anything at all is heard, the keying is too hard—provided, that is, that the receiver isn't overloading. Overloading will show up as a change in background, possibly accompanied by clicks that actually aren't on the signal. Once again, let us emphasize that the receiver *has* to be operating linearly and with constant gain. If the gain rises 40 or 50 db. when you tune your signal out of the passband (as it can do very easily if the a.g.c. is operating) you haven't proved anything. The same statement goes for any checks you may attempt to make on another fellow's signal.

Slower Speeds

Most c.w. work is at speeds ranging from 15 to 35 w.p.m.—that is, at a rate of about 12 to 30 bauds. Since the required bandwidth is directly proportional to the baud rate, most amateurs can use rise and decay times considerably longer than 5 to 7 milliseconds. On the other hand, shaping of this order does not produce key clicks, as we have said, and confines the transmitted bandwidth to a figure that is compatible with the highest c.w. selectivity ordinarily available in current receivers. There seems to be no need, therefore, to change the shaping every time the sending speed is changed. Once set for no clicks at the highest speed at which the operator will send it may be left alone—provided it can be maintained under the variable conditions thrust on the keying system by changing frequency within a band, on going from one band to another, or by different transmitter loading adjustments. Maintaining the keying waveshape under such conditions is no mean feat. Some of the problems that come up in this connection will be discussed in a subsequent article. Shaping circuits themselves are well covered in the keying chapter in the *Handbook*.

QST

² Sparking at the key contacts usually gives rise to clicks only within the station; although these clicks do not actually go out on the air with the signal they can obscure the real state of the shaping when the station receiver is used as a monitor. See *Handbook* chapter on keying.

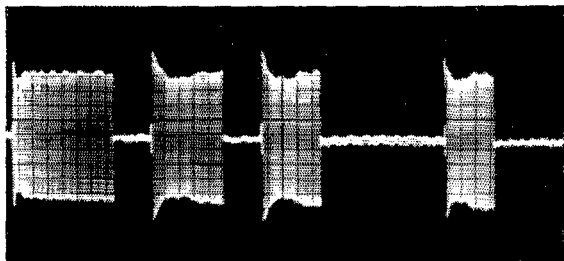


Fig. 7—Scope photograph of a received signal having essentially no shaping. The spike at the leading edge is typical of poor power-supply regulation, as is also the immediately-following dip and rise in amplitude. The clicks were quite pronounced. This pattern is typical of many observed signals, although not by any means a worst case. The signal was taken from the receiver's i.f. amplifier (before detection) using a hand-operated sweep circuit to reduce the sweep time to the order of one second.

**SWITCH
TO SAFETY!**



Field-Effect Transistors

What They Are—How They Work

BY JIM GEORGE,* W7AWH

A RECENTLY INTRODUCED semiconductor device called the field-effect transistor, or FET for short, combines some of the best features of both the vacuum tube and the transistor. The FET is appearing in new electronic circuits of all types and will soon be used in amateur radio equipment. A great deal of excitement centers about this solid-state device which acts much like a vacuum tube, and it is the purpose of this article to describe its construction and operation.

Before getting into device characteristics, let us quickly review some basic concepts in semiconductors. Useful semiconductor material is either p-type, where holes (a hole is actually a place where there is no electron) are concentrated relatively heavily, or n-type which features an excess of free electrons. Both the holes and free electrons are the current carriers in a piece of semiconductor, just as free electrons only are the current carriers in a piece of copper. As a memory aid, remember that the "p" in p-type material stands for the positive charge of the current carriers (holes) and the "n" stands for the negative charge of the current carriers (free electrons) in n-type semiconductor material. When p-type material and n-type material are brought together, a p-n junction is formed as shown in Fig. 1A.

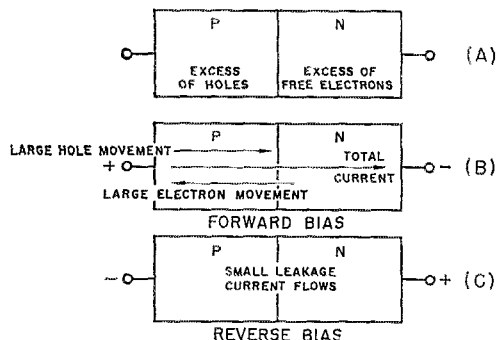


Fig. 1—Action of p-n junction when bias is applied.

The Junction Diode

The resulting action of a p-n junction is well known. When a forward bias is applied as shown in Fig. 1B, a large current will flow. The total current is made up of the electron current plus

the hole current. When reverse bias (Fig. 1C) is applied, only a small reverse current flows—the p-n junction acts as a diode. It is important to note the reverse-bias case. We know that when a voltage is applied to a resistive network, this voltage is dissipated by IR drops until the applied voltage is "used up" by the sum total of all the voltage drops. The same principle applies to the case of the reverse-biased p-n junction diode. We have applied V volts of reverse bias and this voltage must be used up somehow in our circuit, the p-n junction. The resulting action is shown in Fig. 2, where charges are separated in a region close to the junction. Enough charges are moved

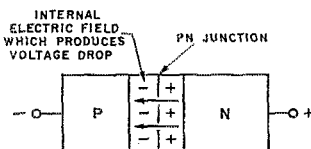


Fig. 2—Reverse bias causes electrons and holes to move away from the p-n junction, leaving a depletion region (shaded area) and no current flows.

until the electric field across the junction produces a voltage drop which is approximately equal to our applied voltage. The important point here is that the region around the p-n junction is now depleted of all its holes and free electrons, thus there are no current carriers available. This region is commonly called the "depletion region" and it sounds reasonable that its thickness depends on the magnitude of reverse voltage which is applied. It will be an important point in the operation of field-effect transistors that no current can flow in the depletion region since there are no current carriers in that region.

The field-effect transistor, for the last few years a tantalizing promise of better things in semiconductor devices, is now rapidly coming into the market at prices attractive to amateurs. We've already shown you one application in Walt Lange's audio oscillator (July *QST*). Here's the background story of the FET—how it's made and how it functions, and why it will be superior to older transistor types in many applications.

* Motorola Semiconductor Products, Inc., 5005 East McDowell Road, Phoenix, Ariz. 85008

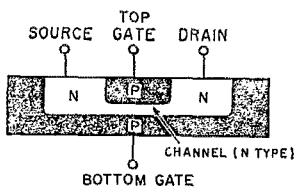


Fig. 3—The junction field-effect transistor.

The Junction FET

Field-effect transistors are divided into two main groups: junction FETs, and insulated-gate FETs. We will discuss the Junction FET, or JFET, first. The basic JFET device is shown in Fig. 3.

First of all, note the location of the terminals where voltages can be applied. The reason for the terminal names will become clear later. A d.c. operating condition is set up by starting a current flow between source and drain. This current flow is made up of free electrons since the semiconductor is n-type in the channel, so a positive voltage is applied at the drain. This positive voltage attracts the negatively-charged free electrons and the current flows (Fig. 4A). The next step is to apply a gate voltage of the polarity shown in Fig. 4B. Note that this reverse-biases the gates with respect to the source, channel, and drain. This reverse-bias gate voltage causes a depletion layer to be formed which takes up

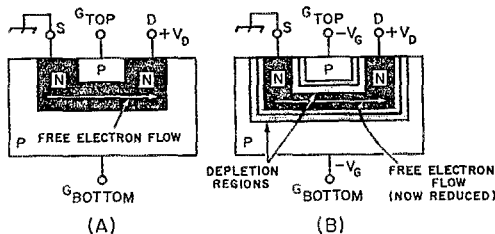


Fig. 4—Operation of the JFET under applied bias. A depletion region (light shading) is formed, compressing the channel and increasing its resistance to current flow.

part of the channel, and since the electrons now have less volume in which to move the resistance is greater and the current between source and drain is reduced. If we apply a large gate voltage, we cause the depletion regions to meet, and in this case the source-drain current is reduced nearly to zero. Since we changed the large source-drain current with a relatively small gate-voltage, we have a device which acts as an amplifier.

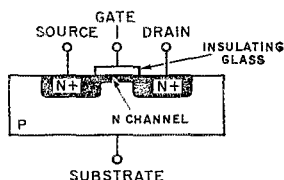


Fig. 5—The insulated-gate field-effect transistor.

Further, note that in the operation of the JFET, the gate terminal is never forward biased, because if it were the source-drain current would all be diverted through the forward-biased gate junction diode.

The resistance between the gate terminal and the rest of the device is very high, since the gate terminal is always reverse biased, so the JFET has a very high input resistance. The source terminal is the *source* of current carriers, and they are *drained* out of the circuit at the drain. The gate *opens* and *closes* the amount of channel current which flows. It is seen how the operation of a FET closely resembles the operation of the vacuum tube with its high grid input impedance. Comparing the JFET to a vacuum tube, the source corresponds to the cathode, the gate to the grid, and the drain to the plate.

Insulated-Gate FET

The other large family which makes up field-effect transistors is the insulated-gate field-effect transistor, or IGFET, which is pictured schematically in Fig. 5. In order to set up a d.c. operating condition, a positive polarity is applied to the drain terminal. The substrate is connected to the source, and both are at ground potential, so the channel electrons are attracted to the positive drain and we now have a d.c. source-drain current. In order to regulate this current, we apply voltage to the gate contact. Note that the gate is insulated from the rest of the device by a piece of insulating glass so this is not a p-n junction between the gate and the device—thus the name insulated gate. When a negative gate polarity is applied, positively-charged holes from the p-type substrate are attracted towards the gate and the conducting channel is made more narrow; thus the source-drain current is reduced. When we connect a positive gate voltage, the holes in the substrate are repelled away, the conducting channel is made larger, and the source-drain current is increased. As can be seen, the IGFET is more flexible since we can apply either a positive or negative voltage to the gate. The resistance between the gate and the rest of the device is extremely high because they are separated by a layer of glass—not as clear as your window glass, but it conducts just as poorly. Thus the IGFET has an extremely high input impedance. In fact, since the leakage through the insulating glass is generally much smaller than through the reverse-biased p-n gate junction in the JFET, the IGFET has a much higher input impedance. Typical values of R_{in} for the IGFET are over a million megohms, while R_{in} for the JFET ranges from megohms to over a thousand megohms.

Characteristic Curves

The characteristic curves for the FETs described above are shown in Figs. 6 and 7, where drain-source current is plotted against drain-source voltage for given values of the gate voltage. Note the similarity to the family of a vacuum-tube pentode as shown in Fig. 8, where

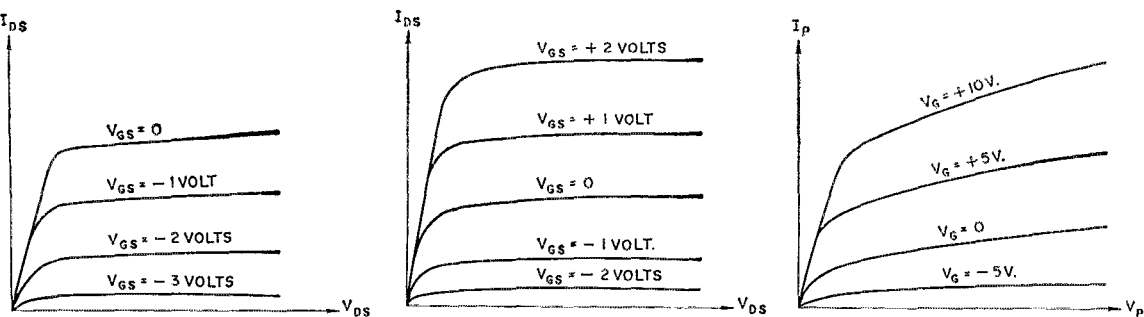


Fig. 6—Typical JFET characteristic curves. Fig. 7—Typical IGFET characteristic curves. Fig. 8—Typical vacuum-tube characteristic curves.

plate current is plotted against plate voltage for varying amounts of grid voltage.

In discussing the JFET so far we have left both gates separate so the device can be used as a tetrode in mixer applications. However, the gates can be internally connected for triode applications. When using the IGFET the substrate is always a.c.-shorted to the source, and

become useful only when we apply a gate voltage which causes a channel to be formed. IGFETs can be used as enhancement-mode devices since both polarities can be applied to the gate without the gate becoming forward biased and conducting current.

A depletion-mode unit corresponds to Figs. 3 and 5 shown earlier, where a channel exists with no gate voltage applied. For the JFET we can apply a gate voltage and deplete the channel, causing the current to decrease. With the IGFET we can apply a gate voltage of either polarity so the device can be depleted (current decreased) or enhanced (current increased).

To sum up, a depletion-mode FET is one which has a channel constructed; thus it has a current flow for zero gate voltage. Enhancement-mode FETs are those which have no channel, so no current flows with zero gate voltage. The latter type devices are especially useful in logic applications.

Circuit symbols approved for FETs are shown in Fig. 9. Both depletion-mode and enhancement-mode devices are illustrated.

Applications

Some applications for FETs are shown in Figs. 10 and 11. In Fig. 10 a JFET oscillator is pictured, and a versatile FET d.c. voltmeter (FETVM) is shown in Fig. 11.

The voltmeter features two Motorola 2N4221 JFETs and offers the high input impedance (22 megohms on all ranges in Fig. 11) of a v.t.v.m. but with more stability. The circuit is essentially a differential amplifier which works on the prin-

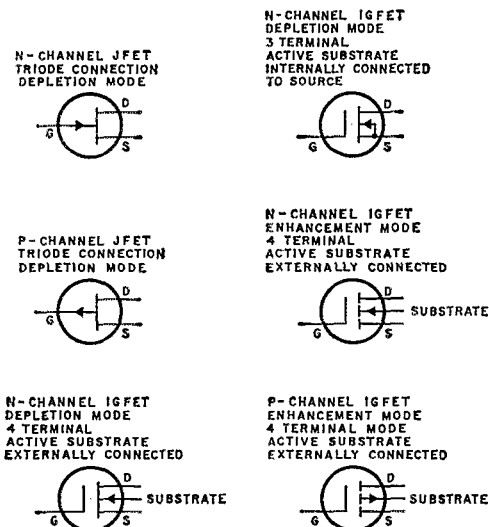


Fig. 9—Symbols for most-commonly available field-effect transistors.

only the insulated gate is used to control the current flow. This is done so that both positive and negative polarities can be applied to the device, as opposed to JFET operation where only one polarity can be used, because if the gate itself becomes forward biased the unit is no longer useful.

Classifications

Field-effect transistors are classed into two main groupings for application in circuits, enhancement mode and depletion mode. The enhancement-mode devices are those specifically constructed so that they have no channel. They

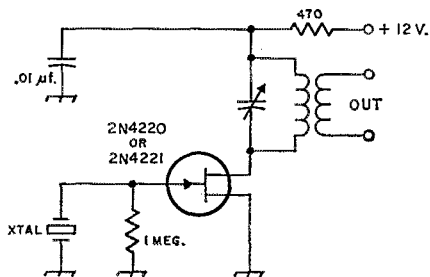


Fig. 10—Typical JFET crystal-oscillator circuit.

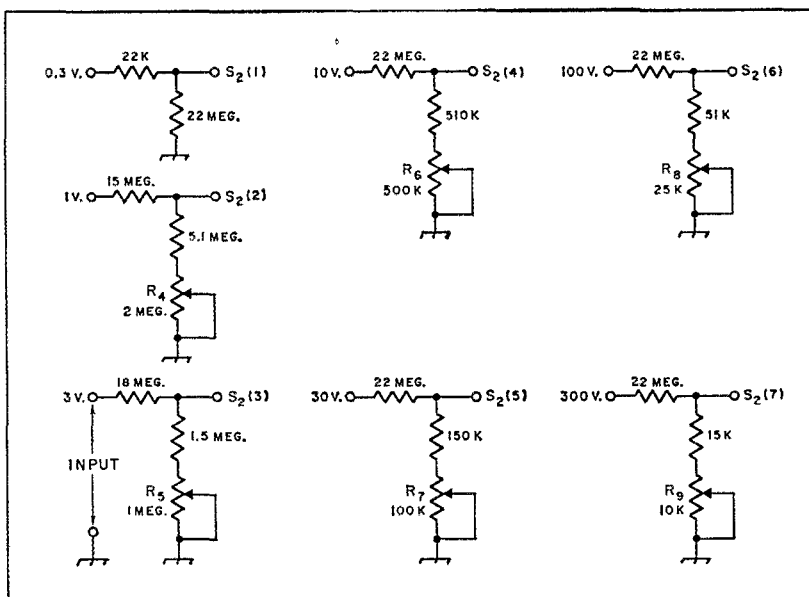
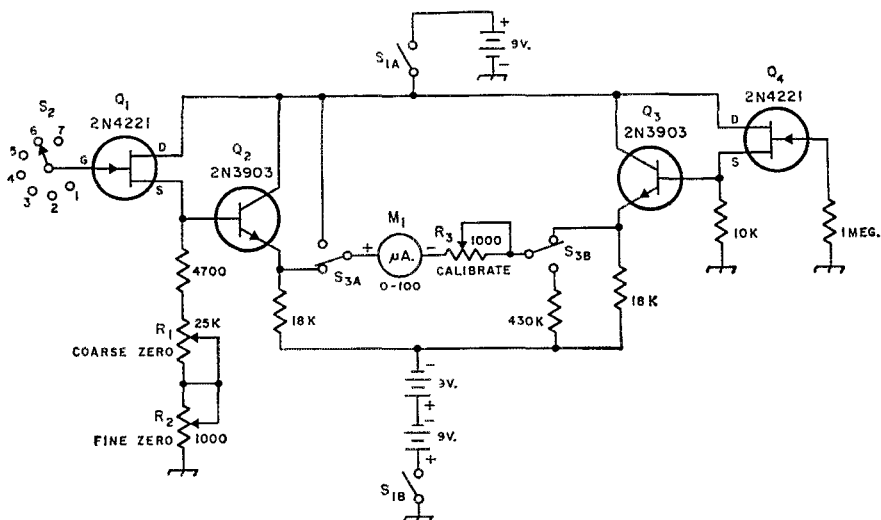


Fig. 11—D.C. voltmeter circuit using field-effect transistor. Resistances are in ohms ($K = 1000$); fixed resistors are $\frac{1}{2}$ watt. The second position of S_3 is used for checking battery voltage.

M_1 —0-100 microammeter.

S_1 —D.p.s.f. toggle.

S_2 —D.p.d.f. toggle.

S_3 —Rotary, 1 section, 1 pole, 7 positions.

R_1 R_2 R_3 —Linear controls (R_2 and R_3 are panel adjustments; R_1 can be internal).

R_4 — R_9 inc.—Trimming potentiometers, for internal mounting (Mallory MTC or equivalent).

principle that the current through a resistance is directly proportional to the difference between the voltages at its ends. When R_1 and R_2 are adjusted so that the voltage at the emitter of Q_2 is equal to the voltage at the emitter of Q_3 , with no input signal, the voltage difference is zero and no current will flow through the meter.

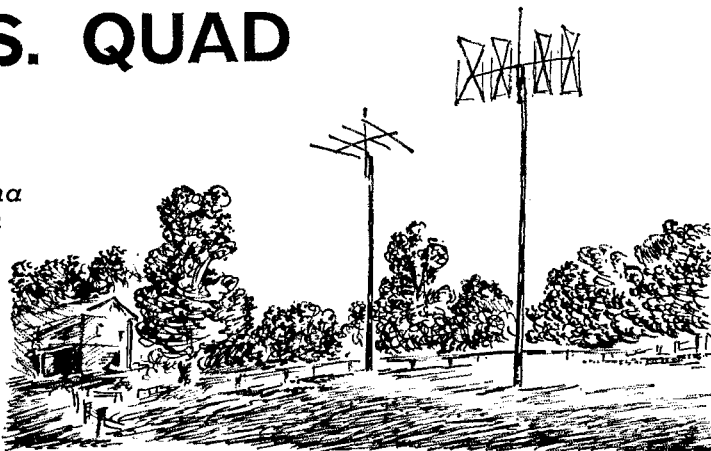
When the voltage at the gate, G , of Q_1 is raised to 0.3 volt the voltage across the meter circuit also is approximately 0.3 volt since the source

followers and emitter followers have a voltage gain of approximately one. R_3 is then adjusted to give full-scale meter deflection. The calibration resistors, R_4 — R_9 inclusive, are individually adjusted for exactly full-scale deflection on each range when the maximum voltage for that range is applied to the input terminals through the range switch, S_2 . An accurate voltmeter should be used to check the applied voltage when setting

(Continued on page 164)

YAGI VS. QUAD

Establishing Antenna Superiority Through Reception Reports



An artist's sketch of the spacious antenna site of W4RBZ. The beams are mounted 80 feet above the ground on telephone poles spaced 150 feet apart.

BY ROBERT E. FITZ,* W4RBZ

AFTER more than 30 years of hamming from a series of temporary and semipermanent locations, my first act upon retirement from the Air Force was to settle at a permanent location on a small farm in Tennessee and install a pair of the biggest telephone poles I could acquire.

The many discussions I had on the ham bands regarding the Yagi beam *vs.* the cubical quad led me to conclude that the ideal sport would be the on-the-air comparison of the two: I wanted to know exactly which antenna I should keep as the ultimate. These QSOs concerning the Yagi and the quad did not convince me that either one of them was vastly superior to the other. A big percentage of the quad men seemed only to be comparing their quads against tribanders or small beams that had been used in the past.

It seems to be pretty well established that at the lower heights a quad has a definite edge over the Yagi. However, I was curious to know how the two antennas would compare when both were placed at a relatively high elevation.

A 20-meter 4-element commercial monoband beam was installed on one of the previously-mentioned poles. This antenna worked better than any antenna I had ever used before at any location. About two months later I installed a 4-element quad, using the fiberglass arms and aluminum spiders available on the market. A coax switch was mounted on the station control

* Route 1, Springfield, Tennessee 37172.

The merits of Yagis and quads have been expounded through the years, with it being a matter of opinion which antenna is the superior of the two. W4RBZ was fortunate to have enough time and real estate to erect both antennas and make on-the-air comparisons. Here's what he found out.

panel to permit instantaneous switching from one antenna to the other for a rapid cross check.

At the time this article is being written, I have used the two antennas for about three months and have checked both antennas with over a hundred stations. Most of the stations that I asked to give a comparative report were foreign; a definite effort was made to concentrate on the long-haul boys.

Any good engineer or analyst could point out a number of weaknesses in my system of comparison. This I will concede. I have only the standard test equipment available to the average ham; I don't have the capabilities for installing model antennas or conducting elaborate laboratory tests. My only motive was to determine whether a good commercial beam performed as well as, the same as, or better than a typical cubical quad installed at the same height at the same location by a ham of average ability with ordinary facilities and equipment.

First of all, a short description of the antennas is in order. The Yagi has a 36-foot boom and was adjusted strictly in accordance with the directions given by the manufacturer. The quad is mounted on a 30-foot boom in a diamond configuration and was originally installed using the dimensions given in a previous *QST* article¹ and in use by a number of hams. Both antennas were peaked to a fundamental frequency of 14,220 kc.

Each antenna is on a separate telephone pole and the boom of each is mounted exactly 80 feet above ground. The Yagi is about 30 feet closer to the shack, and is nearer to the highway and power lines; however, the quad is closer to some tall trees about 50 feet high. Both antennas are raised and lowered by similar elevator-cage hoisting arrangements.

As mentioned earlier, the quad was originally installed using those element dimensions that

¹ Bergen, "The Multielement Quad," *QST*, May, 1963.

seem to be most commonly employed. During the first two weeks of testing there was practically no difference between the antennas. Then the quad was lowered and completely retuned for maximum forward gain. This seemed to give the quad an edge on some contacts.

After the quad had been in use in this condition for about three weeks, one of the old antenna experts from the West Coast suggested that my quad still might not be peaked for maximum performance and suggested that I try his dimensions. This I did. The quad performance fell off noticeably. For the next 25 or 30 checks almost every station giving a comparison reported either that there was no noticeable difference between the antennas or that the Yagi had the edge. This was most noticeable on the long-haul contacts. Previously, VU2CK had reported on several occasions that the quad had about a one S unit advantage; after this change, Karnik reported that there was no noticeable difference between antennas. The same was true with several 9M2, 9M6 and VK9 stations.

The quad was again retuned for maximum forward gain, and tests were resumed.

I will only cite my experience with the Yagi and quad installation. In general, there was practically no difference in signal strengths on the short-haul contacts, and there was seldom any difference on medium-haul contacts to stations in Europe, Africa and the mid-Pacific. However, on the very-long-haul contacts to the Far East, Asia and the South Pacific, the quad had a fairly consistent 2-3-db. edge. On only a

few occasions was there a big difference in reported signal strengths; this seemed to work both ways, with the quad being given a 2-3-S-unit advantage in a few instances and the Yagi given the same advantage in a few others.

On a number of checks, inconsistencies in the reports indicated that the different angles of radiation of the two antennas had pronounced effects. For example, on one occasion a JA, DU and VK6 were worked in quick succession. The JA contact gave the quad the edge, the DU reported the stronger signal from the Yagi and the VK6 reported no difference in signal strengths. Instances of this nature occurred frequently.

I learned early in the game that, under ordinary conditions of QSB and QRM, one switch-over between antennas did not give a valid comparison; the signals from the two antennas were generally so close in strength that several checks in quick succession were necessary for the other station to be able to give a fair evaluation.

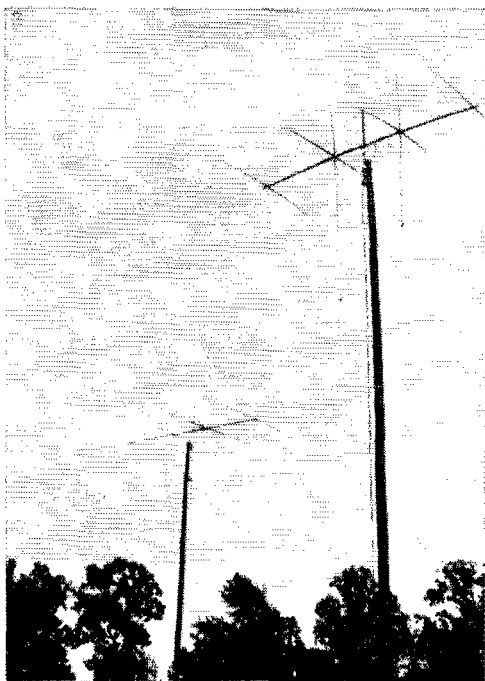
While my quad seemed to have an edge on long-haul contacts, there were still times, under the varying conditions of propagation, that the Yagi put out a stronger signal. The type of antenna in use at the "receive" end was definitely a factor. Shown below is a summary of my last 100 reports, the results of which are typical of my experience over the past three months. The quad was tuned for maximum forward gain for these checks.

Number of stations asked to compare antennas	100
Number reporting no difference between antennas	38
Number reporting stronger signals from the Yagi	17
Number reporting stronger signals from the quad	45

Worthy of note is that there was never any reported difference on long-path contacts. This could be checked on only about a half dozen occasions, but no one reported any difference between antennas on the few long-path checks.

There are several factors, other than signal strengths at the "receive" end of the circuit, that must be given consideration in any final selection of the better of the two antennas. Even when tuned for maximum forward gain, my quad has a better front-to-back ratio; received signals were generally weaker off the back of the quad. The Yagi has stronger side lobes; a number of times, after checks with long-haul stations, a W station quartering off the side would break in to tell me that the Yagi appeared to be stronger during the test. This was also noticeable in reception. I also noted that during periods of heavy rain the quad had considerably less precipitation static.

(Continued on page 166)



This photograph shows some of the details of the quad and Yagi antennas.



A 300-Ohm Standard For The Transmatch

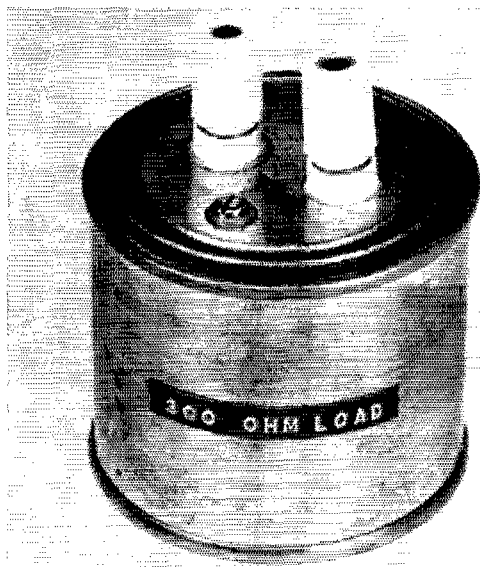
MANY radio amateurs use balanced feeders, and 300-ohm twin lead is a common choice among these operators. Effecting an impedance match between the balanced transmission line and the antenna is difficult to do when one does not have a balanced-line type s.w.r. bridge. Admittedly, a coaxial balun can be inserted between the 300-ohm antenna and the feed line so that a 75-ohm unbalanced s.w.r. bridge can be used, but at the lower frequencies a coaxial balun becomes unwieldy. A coil-type balun transformer can be used, but what if one isn't readily available when needed?

A simple solution lies in the use of a transmatch and a 300-ohm noninductive load. The 300-ohm standard is attached to the transmatch in place of the antenna feed line, an s.w.r. bridge is connected between the transmitter and the transmatch, and the transmatch is adjusted for a 1:1 s.w.r. The dial readings on the transmatch are noted and when the feed line is again connected to the transmatch, the matching network at the antenna is adjusted for a 1:1 s.w.r. with the transmatch dials set at the same position as for the 1:1 condition when the 300-ohm load was attached.

Simple? Yes, but let's talk about the standard and how it's built.

Construction

The dummy load shown in Fig. 1 will handle 20 watts of r.f. power (sustained) and up to 50



The balanced 300-ohm standard.

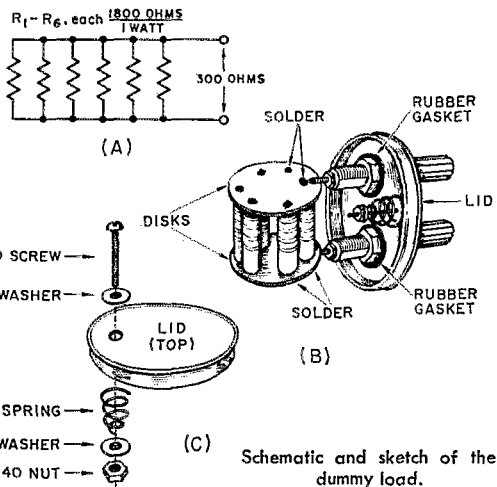
watts for periods of 10 seconds or less. Generally, the station exciter can be used for the antenna tests, keeping the power output within the limits specified for the 300-ohm standard. The standard will present a 300-ohm impedance (non-reactive) from 1.8 to 30 Mc. A deterioration in performance was noted at 50 Mc., resulting in an impedance reading of 220 ohms when the unit was tested on a Boonton 250-A RX meter. Hence, it is not recommended that the load be used as a standard above 30 Mc.

The unit is made up from six 1-watt, 1800-ohm resistors. When parallel connected, the resistance becomes 300 ohms. For best accuracy, 5-per cent resistors should be used, but by hand-selecting 10-per cent resistors, it should be possible to obtain the 300-ohm figure.

The resistors are mounted between a pair of 1-inch diameter copper or brass disks, and are spaced around the perimeters of the disks as shown in Fig. 1B. Make certain that the body of each resistor is flush against the disk before soldering the pigtail to the disk. When soldering, do not overheat the assembly because this can change the value of the resistors.

Two E.F. Johnson binding posts are mounted on the lid of a small paint can (mine measures

(Continued on page 170)



WHILE reminiscing one day with W4GCC, ex-5MO, about the old days of ham radio, the talk got around to the world of 25,000 meters. That was the playground of the arc transmitter of POZ, Nauen, the pure tone of the alternator of WIT, New Brunswick, and several others. That was also the world and time of the Old Man's Young Squirt, when the threat of the Wouff Hong and the Rettysnitch was a thing to be reckoned with. Those were the days when the Young Squirt wound his 25,000-meter tuning coil with No. 24 wire on an oatmeal box and made his own tap switch, using brass machine screws for contacts. Today, the spark, arc, and alternator transmitters are gone, but NAA, now transplanted from Virginia to Maine,¹ is still on the air with its high-power tube transmitter, and the many transmitters of NSS can be heard day and night. The receiver described here was designed and built to listen in on these stations. This receiver does not match the performance of the modern superhet, but it does bring in the long-wave transmissions of time signals and press, and provides good code practice.

Circuit

The receiver consists essentially of three inter-related circuits — oscillator, detector, and amplifier. The oscillator beats with the incoming signal to produce an audio signal in the detector and at the amplifier output. To avoid the need for large coils and tuning capacitors, the oscillator is a free-running multivibrator with adjustable emitter bias for frequency control. Using the values shown for R_1 , C_1 , R_2 , C_2 , and tuning potentiometer R_3 , the tuning range is about 16 kc. to 30 kc. Selecting different values for C_1 and C_2 will shift the range higher or lower if desired. Larger values reduce the frequency. The combination of CR_1 , C_3 , and R_4 assures that the multivibrator starts oscillating each time power is applied, even though potentiometer R_3 may be set to its maximum resistance. Without this circuit, Q_2 could be cut off by the large amount of emitter resistance, reducing the loop gain of the multivibrator and preventing oscillation. However, when power is first applied, capacitor C_3 has no charge and CR_1 conducts, effectively connecting the emitter of Q_2 to ground. Under this condition, the gain of Q_1 and Q_2 is enough to start oscillation. As oscillations build up, C_3 charges positively at the junction of CR_1 , back-biasing CR_1 and effectively removing C_3 from the circuit. Detector Q_3 is untuned and the antenna is connected to its base through RFC_1 . The latter serves in a limited way as an antenna loading coil, but is primarily an r.f. choke to keep out unwanted signals from local broadcasting stations. Capacitor C_4 shorts out any unwanted higher frequency signals that are not completely blocked by RFC_1 .

The oscillator is d.c.-coupled to the base of detector Q_3 through the sensitivity control R_5 and

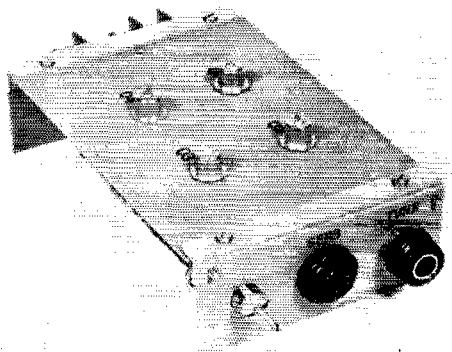
* 2601 Lullington Drive, Winston-Salem, North Carolina.

¹ Baldwin, "NAA — 1961," *QST*, October, 1961.

Simple Transistor Unit Covering 16 to 30 Kc.

A V.L.F. Receiver Without Tuning Capacitors or Coils

BY JOHN M. TIFFANY,* ex-2BQK,
2CGK, W3CQN



The completed v.l.f. receiver. Lengths of aluminum angle are used to fasten the circuit board to the end supports.

The latter are of the same material as the board.

resistor R_6 . The setting of R_5 determines the average bias level for Q_3 . The a.c. signal from the oscillator swings the base current of Q_3 through the optimum operating conditions twice each cycle, and causes pulses to be generated in the collector of Q_3 at the simultaneous occurrences of incoming signal and oscillator voltages. The result is an audible heterodyne signal which is amplified by the circuits of Q_4 . Capacitor C_5 filters residual oscillator voltage.

The current drain of the receiver is 11 ma. at 12 volts. At this low drain, battery operation is practical, although a simple voltage-doubler rectifier and filter, supplied by a 6.3-volt filament transformer, is more convenient. The receiver

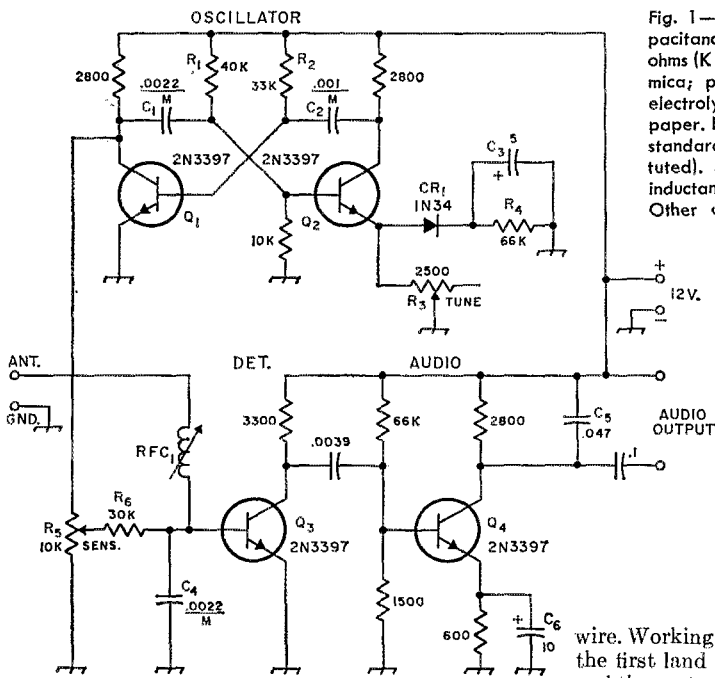


Fig. 1—Circuit of the v.l.f. receiver. Capacitances are in μf .; resistances are in ohms ($K = 1000$). Capacitors: M indicates mica; polarized capacitors are 15-volt electrolytic; others are disk ceramic or paper. Fixed resistors are $\frac{1}{2}$ watt (closest standard 5 per-cent values may be substituted). RFC_1 is a slug tuned width coil, inductance approximately 2 to 10 mh. Other component labels are for text-reference purposes.

will operate over a range of about 6 to 15 volts, but good headphone level is obtained with 12 volts applied. An audio amplifier with medium or bridging input impedance can be used for loudspeaker reception. A single-wire antenna at least 75 feet long, and up to a couple of hundred feet long, if possible, should be used. A good ground is essential. CAUTION! Do not use power or telephone lines as an antenna.

The receiver shown in the photograph uses p-n-p transistors that are not available on the market. The transistors shown in the schematic are n-p-n of the G.E. economy line, and have characteristics suitable for this application. Various types of transistors have been used in this receiver circuit, all with good results. If p-n-p transistors are used, the polarities of the supply voltage, diode CR_1 , and capacitors C_3 and C_6 must be reversed.

Construction

All components, except the terminal board and the two controls, are mounted on a $3\frac{1}{2} \times 5$ -inch laminated fiber-glass, or equivalent, board. All copper is stripped from one side of the board (if both sides are copper-clad) and the pattern of lands (exposed copper) is cut on the apparatus side as shown in Fig. 2. The lands, about $\frac{3}{16}$ inch wide, are used as tie points for all component leads. The six lands at each end are used for input and output connections and miscellaneous tie points. Starting at each transistor location and working toward the edges of the board, the first land is a tie point for the transistor base, the next for the collector, and the outer land is for common positive supply. The two outer positive supply lands are strapped by a

wire. Working inward from the transistors, the first land is for the emitter connection and the center land is for common negative supply and ground.

To cut the lands, mark the pattern on the copper and, using a metal straightedge, score the copper with a sharp-pointed knife blade. Using the point of the knife blade, loosen a corner of the copper to be stripped and pull off the unwanted copper with long-nose pliers or the points of diagonal cutters. When all the unwanted copper is removed, polish both surfaces with fine sandpaper to remove rough edges. Examine the areas between the lands to be sure that all copper has been removed and that there are no shorts between the lands. Drill the holes for the transistor leads and connect the leads to the appropriate lands, grasping the leads with flat-nose pliers while soldering to prevent overheating the transistor. In the case of Q_1 and Q_2 , the emitter lands are not used and the emitters are connected directly to the negative-voltage land. Use in-

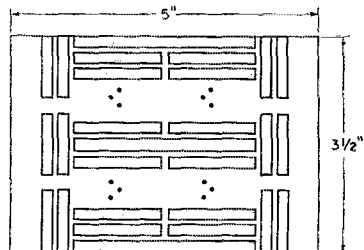
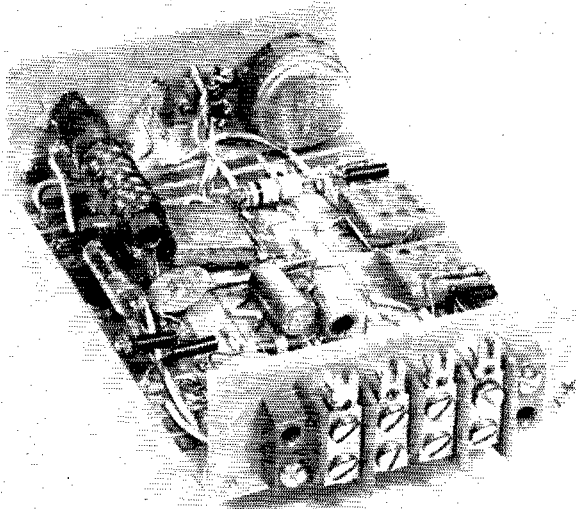


Fig. 2—Components are mounted on a copper-clad circuit board. Dark areas represent lands—the copper that is left after cutting the remainder away with a sharp knife, as described in the text. Note: The transistor terminal arrangement shown is for the transistors originally used. For the 2N3397, the holes should be in a straight vertical line, with approximately $\frac{1}{8}$ -inch spacing.

Bottom view showing the arrangement of components on the under side of the circuit board.



sulation over the transistor leads where they pass over a land used for a different circuit. Solder the component pigtails directly to the appropriate lands, using pieces of insulated wire for any required connections between lands and for leads to the terminal block and controls. The two controls and the antenna loading coil are mounted on an end strip attached to the board by a piece of aluminum angle, and the terminal strip is mounted similarly at the other end of the board. The layout of the components and the wiring is not critical and no doubt many variations would be equally good.

Operation

Apply power to the receiver and rotate the sensitivity control R_5 . A point will be found where the background noise is loudest. Probably one or more of the long-wave stations will be heard, since it is usual to find several of them on the air. The selection of signals and their beat

notes are controlled by the tuning potentiometer R_3 . Each time the setting of the tuning potentiometer is changed, the sensitivity potentiometer may have to be adjusted for optimum strength, but it will usually be somewhere near mid-scale. Adjusting RFC_1 may have some effect on the signal strength, depending on the length of the antenna, but its primary function is that of an r.f. choke at broadcast frequencies, as mentioned earlier, and its effect on long-wave signals is small.

Performance

Using a single-wire antenna about 100 feet long at the writer's East-Coast location, good signals are received from NSS, Annapolis; NAA, Maine; NPG on the West Coast; and NBA, Canal Zone. Since there is no preselection in the receiver, signals at twice the oscillator frequency can also be heard. No interference has been noticed from any of the local broadcasting stations.

QST



... K. B. Warner editorialises about the probable forthcoming shortage of standard parts for the ham who builds his own. In the "good old daze," of course, there being no such widespread variety of components, most amateurs did in fact make most of the components. He even hints that it might be a good idea to stock up on a few tubes in case there are jobs to be done that only amateurs can do.

... Oakes Spalding, W1FTR, recently returned from a two-year cruise on the *Yankee* takes us on a marvelous trip around the world, working Ws back home and certain designated foreign hams. He visits all the classic spots, including Pitcairn Island.

Better read this one.

... Byron Goodman, W1JPE (now W1DX) has a piece on an all-band 80 watter. Built on the popular metallic "breadboard" of the day, there is a string of 6AC5Gs to drive an HY30Z final. It can, of course, be used to drive a final large amplifier.

... S. Gordon Taylor, W2JCR describes an automatic line-voltage regulator, using the familiar filament transformer to boost the line voltage, but also employing an Amperite voltage regulator tube.

... This month we have several pages devoted to the YLs. There are some familiar names, too. What the article is really about is the formation of the YLRL, Young Ladies Radio League, designed to cope with communication emergencies of about whatever nature.

... Ev Battey, W1UE, concludes his two-part article on the secrets of good sending. He goes into considerable detail in this matter of correct character formation, spacing, etc. The dope still applies.

— W1ANA

V.F.O. Stability — Recap and Postscript

In Two Parts—Part II*

An Examination of Some Design Principles, Old and New

BY GEORGE GRAMMER,** WIDF

Remote Tuning

Since the change in drift characteristics with the physical rearrangement of the tank had been so pronounced, two 15-inch pieces of RG-62/U cable were installed to connect the tank to the tube, the latter being mounted on an entirely separate chassis. The thought here, of course, was that this would entirely eliminate conducted heat as a factor.

There followed a series of drift runs which gave somewhat confusing results — sometimes the drift would be positive and sometimes negative. The drift was generally less (in one outstanding case, only about 50 cycles over a 12-hour period) but more variable. Further checking with the hair dryer showed that the coax cable had a negative temperature coefficient of capacitance, while all the other tank components were positive. RG-59/U was substituted and found to have the same characteristic, so it would appear to be a property of the polyethylene cable.

This offers a means for temperature-compensating a circuit using the remote-tuning principle, although it may be harder to apply satisfactorily than regular negative-coefficient capacitors unless the cable is made a part of the complete assembly so it heats in the same way each time the v.f.o. is used.

Heat Transfer — General

From the foregoing, it is clear that the direct solution to 99 per cent of the drift problem is to keep the temperature of the *tank circuit* as constant as possible, or at least to force any unavoidable changes in temperature to occur as *slowly* as possible. The obvious way to do this is to keep the tank far away from heat sources. The entirely separate "remote-tuned" tank box is well justified, provided some care is used in placing the connecting coax cables so they aren't inadvertently subjected to temperature changes. In some cases this may be cumbersome, so in this v.f.o. one-chassis assembly of the r.f. section was attempted. The power supply, usually a potent source of heat, was built separately.

The finished circuit retained the coax cables so the tank could have maximum separation from the tubes, which are at the opposite end of the chassis. As Fig. 7 shows, the tank is in a shield box

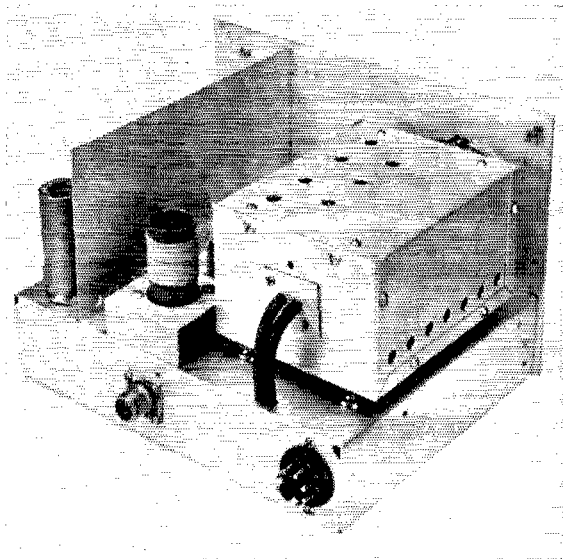


Fig. 7—Tank-enclosure mounting. The shield box is set on half-inch pillars to minimize heat conduction from the chassis to the box. Ventilating holes in the box cover are arranged so air enters at the bottom of the outer side and emerges at the top left. Note that additional sheet-metal screws are used to hold the cover firmly in place.

mounted on pillars. This allows air to circulate underneath, and reduces actual contact with the chassis to a minimum, thus cutting down conducted heat.⁹ Ventilation of the inside of the tank box is provided by a series of $\frac{1}{4}$ -inch holes along the bottom of the outside wall of the cover, plus an equal number in the top toward the opposite side. This allows air from outside the chassis to be drawn through.

To shield the tank box from radiated heat a baffle plate of bright aluminum is mounted right alongside the tubes so their heat is reflected outward from the chassis. Quarter-inch holes are drilled in the chassis alongside the tube sockets and along the bottom of the baffle plate, Fig. 8, to encourage air circulation upward past the tubes. The cover and bottom plate for the

⁹ The pillars in the version shown are metal, but celotex insulation between the chassis and tank box also was tried, with no metal-to-metal contact. There was no observable difference between the two methods.

** Technical Editor, QST.

* Part I appeared in September 1966 QST, p. 22.

entire assembly are made from open-work do-it-yourself aluminum.

These measures are quite effective in keeping the tank box cool. After several hours of operation the box is still just about as cool, as judged by touch, as it was before power was turned on, although the end of the chassis on which it is mounted is noticeably warm and the tube end is even more so. Actually, the measured temperature rise inside the box after a four-hour run averages 6 to 8 degrees F.

In this layout the conversion crystals at first were covered by an aluminum shield, to prevent possible stray coupling between the crystals and the output coil at the rear. This shielded space confined some of the chassis heat. Removing the shield reduced frequency drift in the crystals, and fortunately the shielding was found to be unnecessary.

Parasitic Oscillations

Lengthening the leads between the oscillator tube and the tank invites v.h.f. parasitic oscillations when a good high-transconductance triode is used. In several different physical layouts used for this oscillator parasitics invariably were generated. The frequency ranged from about 50 to 200 Mc., depending on the lead lengths. The parasitic circuit is a simple Colpitts using the interelectrode capacitances to tune the grid and plate leads, as shown in Fig. 9. The regular tank capacitors are so large that they act as a short circuit at the end of the "line" formed by the leads from the tube to the tank.

Various chokes and choke-resistor combinations were tried in the grid and plate leads, and

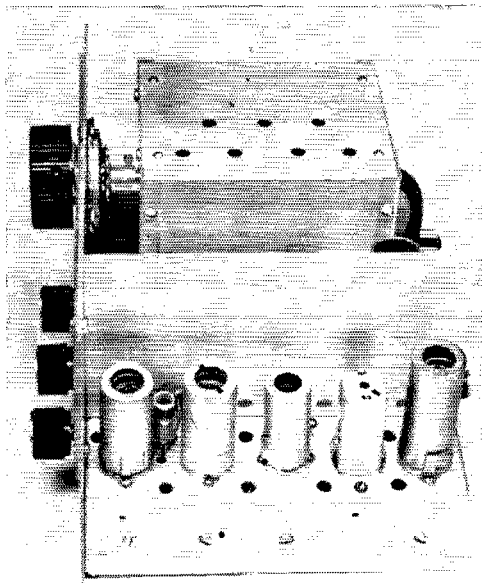


Fig. 8—Heat from the tubes causes convection currents that draw air across the chassis and through the holes in the baffle plate, as well as from below the chassis through the holes along the chassis edge.

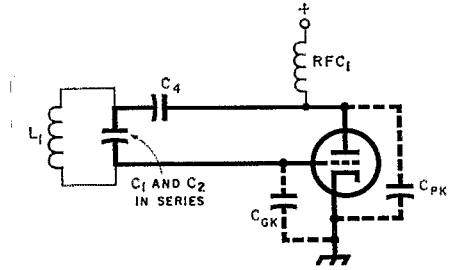


Fig. 9—Parasitic-oscillator circuit formed by leads from the grid and plate to the tank. The inductance of L_1 is large enough, at v.h.f., to act as an r.f. choke. Parasitic oscillations are likely to occur when the leads (drawn with heavy lines) are an inch or more long.

although they always could be made to suppress the parasitic after a little tinkering, the choke size had to be changed with each change in lead length. It is simpler to use resistance only, but since appreciable resistance is undesirable in either lead at the fundamental oscillator frequency the lowest possible value of resistance should be used. At the fundamental, a given value will be equally bad no matter where it is placed in the lead, but fortunately this is not true at the parasitic frequency. A low resistance at a high-current point in a parasitic circuit will be equally as effective as a high resistance at a low-current point. The high-current point in this parasitic circuit is right at the tank capacitors, so the resistor should be installed there. A 10-ohm carbon resistor, R_2 in Fig. 4, has been effective in several oscillator arrangements of this type.

It is more than likely that unsuspected v.h.f. parasitics exist in a great many low-frequency oscillators. The better the tube, the more likely they are to occur. Low power is no insurance against them. They cause erratic frequency changes, "hot" spots and body capacitance where there shouldn't be any, and similar effects. A rectifier-type wavemeter check should be made on any oscillator — just to be sure.

Vibration and Mechanical Shock

It is traditional to say that an oscillator should be "solidly constructed," and if this is interpreted to mean that the construction shouldn't be flimsy, the principle is good. "Solid," though, needs qualification. A bell is solid, but it can vibrate like mad. "Sound deadened" perhaps would be a better description of what is needed. The construction should be such that the oscillator cannot "ring" mechanically.

Since metal transmits vibration very efficiently, it is reasonable to assume that the vibration-sensitive parts should *not* be mounted on metal. Wood does not ring readily, but it is not a very satisfactory structural material for radio gear. The next best probably is a plastic of some sort.

Quarter-inch Plexiglas was used for mounting the tank components in the oscillator shown, and has proved quite satisfactory. Plexiglas is

also an insulator for heat. It slows down the conduction of heat from the box to the tank components, contributing further to making the temperature change, and hence the drift, very slow.

The tank and plastic plate form a single unit, mechanically. This type of assembly is less susceptible to mechanical shock than chassis mounting, since any movement tends to occur *as a whole*, rather than as a series of separate responses. The Plexiglas plate is mounted on pillars at its four corners; a three-point mounting theoretically might be better, but was avoided here because of the possible torsion effects when turning the variable capacitor (any twisting of the assembly with tuning probably would result in backlash).

The insulating base makes it possible to avoid multiple ground paths, which often give rise to intermittent effects.¹⁰ A single ground bus can be used; in this oscillator, it is a half-inch wide strip of aluminum running from beneath the tuning capacitor to the rear of the mounting plate. This strip is the only capacitor ground point; the rotor shaft does not touch the front of the box where it goes through, and an insulated flexible coupling is used between the shaft and tuning dial.

An "air-wound" coil such as Miniductor deserves special attention. The principal problem is the method of mounting; the coil itself, if small, will have very little inertia and little tendency to vibrate. In this case the mounting is a strip of Plexiglas of the same thickness as the coil supporting strips, filed down to make a snug fit and then cemented to opposite strips. The assembly is supported on $\frac{3}{4}$ -inch ceramic pillars. Experience has shown this method to be vibration-proof.

Ordinary chassis mounting suffices for the oscillator tube, since the tube has so little direct effect on the frequency. The triode-pentode is rather free from microphonic effects (none have been observed) because of the small and light elements and the short internal supporting leads, along with very good bracing.

If coax cables are used to connect the tank to the tube it seems better not to fasten them rigidly. They should be clamped together so they will move as a unit under shock. At one time the cables shown in Fig. 10 were anchored midway along their length, but there was less frequency change with both temperature and vibration when this support was removed.

Finally, the shield box containing the tank needs firm bonding all around the meeting surfaces of the base and cover. The box is coupled to the tank, especially to the coil, because of the electric and magnetic fields surrounding the tank components. Poor or intermittent contact between the metallic surfaces will affect the frequency in unpredictable (and usually sporadic) ways. Use enough screws so that the surfaces are everywhere firmly in contact.

¹⁰ Such as those described by Long in the article mentioned in footnote 7.

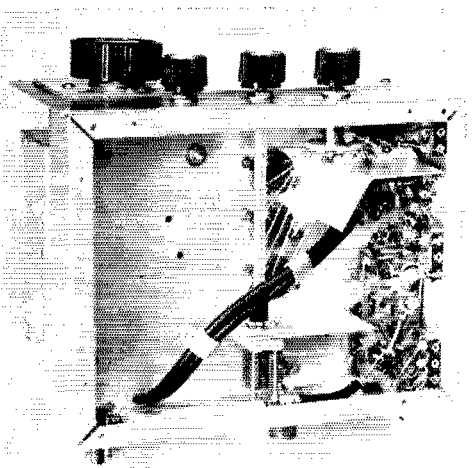


Fig. 10—The coax leads from the tank are clamped together to prevent relative movement, but are not otherwise connected mechanically with the chassis except at the ends where the electrical connections have to be made. This bottom view also shows the amplifier tuning capacitor, which is mounted on a bracket which shields it from the oscillators. The drive shaft is plastic rod.

With the construction shown, the oscillator frequency is completely free from any ordinary shock or vibration effects. Even dropping the entire v.f.o. on a hard table from a height of a couple of inches causes no vibration in frequency, although the shock sometimes is enough to jar the capacitor setting slightly.

The Buffer Amplifier

After taking the pains necessary to achieve stability in a tunable oscillator, it would be foolish to throw any of the stability away. It can happen, when the oscillator is coupled to another circuit, for the reasons stated earlier.

If the buffer is to prevent *any* variations that may occur either in its own plate circuit or in the following stages from affecting the oscillator frequency, its voltage amplification must be very low. This is because Miller effect¹¹ depends on voltage amplification. Low gain is no handicap, because in a conversion v.f.o. system the buffer should supply only a few volts of r.f. to the mixer. The buffer output circuit therefore can be simply a relatively low value of resistance — not more than 1000 ohms.

A second point is that the buffer should operate with close to its normal Class-A grid bias (obtained from a cathode resistor) and without being driven into grid current. With this type of operation the oscillator-buffer coupling can have its least value — an important factor in contributing to freedom from buffer reaction on the oscillator frequency. The buffer grid-resistor value is not

¹¹ Miller effect is the change in input resistance and reactance caused by feedback through the grid-plate capacitance. It depends on both the grid-plate capacitance and the actual voltage amplification, and becomes less when either is made smaller. It is the principal reason for using a pentode with the smallest available grid-plate capacitance.

too important; a 0.1-megohm resistor was used in the circuit of Fig. 11, but the resistance could be varied over a wide range without upsetting things. The coupling capacitor, C_5 in Fig. 4, should have the smallest value that will result in the desired buffer output voltage; a 3.3-pf. capacitor was used here.

The presence of grid current can be detected readily with the d.c. probe of a vacuum-tube voltmeter; there should be no d.c. voltage drop across the buffer grid resistor, R_4 . If any such voltage can be detected in making the initial adjustments, the value of C_5 should be decreased.

In general, it is advisable to operate the buffer with a small value of cathode bias and low r.f. grid voltage rather than to avoid grid current

by increasing the cathode resistance. This minimizes generation of harmonics of the oscillator frequency by the buffer tube and thus helps reduce spurious output in a conversion stage.

Vibration and shock are minor problems in a buffer circuit of good electrical design. Ordinary construction methods suffice. The important thing in layout is to make sure that the buffer plate circuit cannot "see" the driving circuit electrically. This is readily done, in the layout shown in Fig. 12, by continuing the oscillator-tank coax shields as far as possible toward the grid and plate prongs of the tube socket, by mounting disk bypass capacitors over the socket to act as shields between the pentode plate and other elements, and by separating the "hot" components (the oscillator plate choke, RFC_1 , and the buffer plate load resistor, R_7) as much as possible.

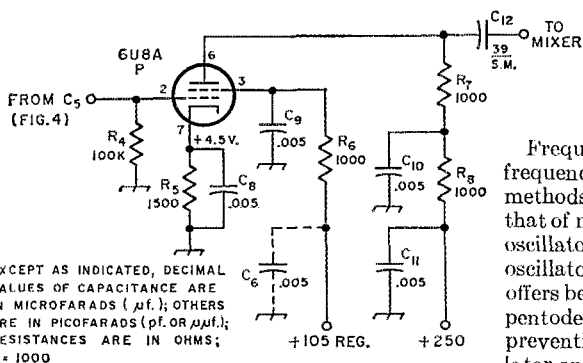


Fig. 11—Buffer circuit following tunable oscillator. Resistors are 1/2-watt composition; capacitors are disk ceramic, except C_{12} , which is silver mica. C_8 is the capacitor having the same designation shown in Fig. 4; it is unnecessary to use two separate capacitors across the same feed point. R_6 and R_8 are decoupling resistors backed up by C_8 and C_{11} ; these circuits are essential for preventing r.f. coupling through the power-supply leads.

The Frequency Converter

Frequency conversion in a v.f.o. is much like frequency conversion in a receiver, and the same methods can be used. The dominant factor is that of maintaining isolation between the tunable oscillator, the output circuit, and the conversion oscillator. A converter tube such as the 6BE6 offers better isolation than some of the triode and pentode circuits used in receivers, especially in preventing coupling between the tunable oscillator and the fixed conversion oscillator.

Whatever the method of conversion, the fixed-frequency oscillator — usually crystal controlled — should be entirely separate from the mixer. And even though a crystal is a pretty stable device, it is advisable to follow the oscillator with a buffer amplifier. If the mixer is a 6BE6 it is preferable to let the crystal oscillator drive

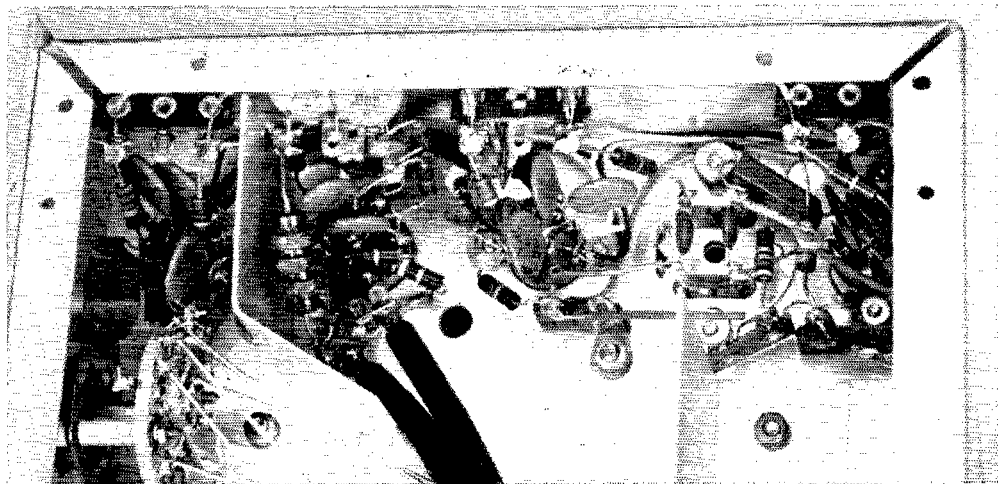


Fig. 12—A close-up of the wiring around the tunable-oscillator/buffer socket (to the right of bent shield plate) and the crystal-oscillator/buffer socket in the upper left corner. The metal center post of the socket is connected to the chassis through a soldering lug fastened under one of the socket mounting nuts; this is the single ground point for the stage. The same method of grounding is used in each stage. Disk capacitors are directly over the sockets to shield the oscillator and buffer sections from each other.

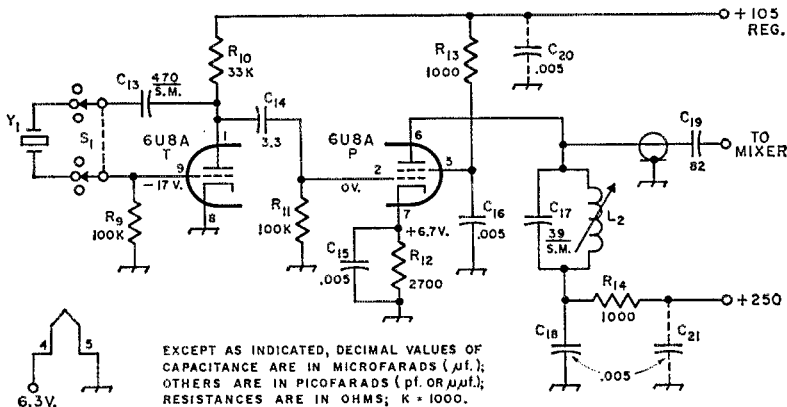


Fig. 13—Crystal-controlled conversion oscillator and buffer amplifier. Output tank capacitance includes the capacitance of the coax line between plate and C_{19} ; if this lead is more than two or three inches long the capacitance of C_{17} may have to be modified to compensate. C_{19} should be at the mixer end of the coax line. If this and the circuits of Figs. 4 and 11 use the same power supply, C_{20} is identical with C_6 in Fig. 4 and C_{21} is the same capacitor as C_{11} in Fig. 11.

C_{13}, C_{17} —Silver mica.
 $C_{14}, C_{15}, C_{16}, C_{18}, C_{19}, C_{20}, C_{21}$ —Disk ceramic.
 L_2 —Slug tuned, to resonate at crystal frequency with C_{17} and associated stray capacitances. For crystals in the 6- to 8.5-Mc. region a coil adjustable from 6.7 to 15 μ h. (Miller 4406 is suitable).

R_9 - R_{14} , inc.— $\frac{1}{2}$ -watt composition.
 S_1 —Ceramic wafer switch; sections and positions as required. A 2-section switch with 6 positions is used in the v.f.o. pictured.
 Y_1 —Conversion crystals, as required.

the injection grid, which requires some power, and to apply the tunable-oscillator/buffer output to the signal grid. Furthermore, to stay within the "linear" range of conversion the mixer tube should be operated with the same injection voltage that would be used in receiving — about 15 volts of rectified injection-grid voltage across a 22,000-ohm grid leak. The signal grid should be operated with Class-A bias and should not be driven into grid current.

The Conversion Oscillator

Fig. 13 is a practical circuit for the conversion oscillator and its buffer amplifier. The triode section of the 6U8A is used as a Pierce oscillator operating at low plate voltage, with light coupling to the pentode section used as a buffer amplifier. Since it is necessary to develop appreciable r.f. voltage for the 6BE6 injection grid, a tuned tank is used in the plate circuit of the pentode. If a wide range of crystal frequencies must be used for getting output in various bands, the crystals and buffer plate tanks can be simultaneously switched. The L/C ratio of the buffer tank is not too critical, but it should be low enough so that the Q will be reasonably high; the tank should contribute enough selectivity to minimize crystal-frequency harmonics.

The amplitude of the r.f. voltage supplied to the injection grid can be regulated by adjustment of the slug in L_2 . One setting will suffice for a group of crystals in a narrow frequency range such as is used in the experimental v.f.o. In the more usual arrangement where each amateur band has a single conversion crystal, individual coils will be needed for each band and may readily be adjusted for optimum output. Overall control of output lies in the choice of R_{12} , lower

values giving higher gain. With the circuit constants shown, the pentode is biased to about 7 volts and operates without grid current.

Stray Coupling

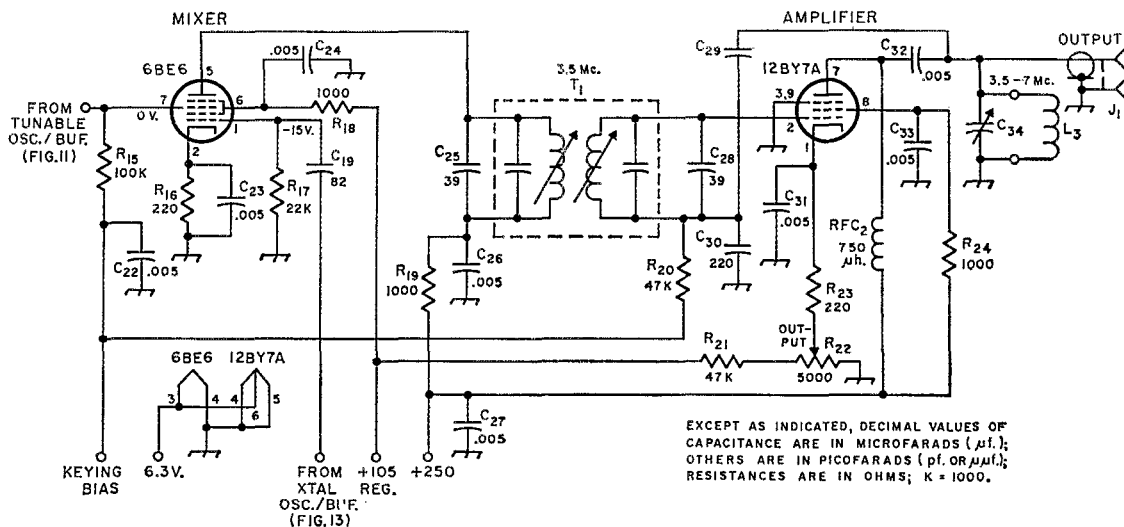
Oscillator-to-oscillator coupling may give rise to unanticipated effects. Note that in Fig. 12 there is a shield between the sockets for the tunable-oscillator and conversion-oscillator tubes. This shield was not used at first, and there was a small amount of coupling between the two circuits. The two oscillator frequencies combined in the crystal circuit, causing a difference-frequency signal to be applied to the 6BE6 injection grid. As this signal was at the converter output frequency it was amplified and fed to the following stage. Even when negative grid bias beyond the cutoff value was applied to the 6BE6 control grid there was a weak residual output that could not be eliminated. This made it impossible to use break-in keying with complete effectiveness. Installing the shield eliminated the coupling and made the mixer behave normally.

While coupling of this type might not occur in other layouts, the possibility of its existence should be kept in mind, especially if rated cutoff bias on the signal grid of the mixer does not completely cut off the output.

The Mixer Plate Circuit

One of the disadvantages of the conversion system is that it has innumerable by-product output frequencies, in addition to the desired frequency. If these are not suppressed they may go on through to the antenna to result in spurious radiations. The first real barrier to such frequencies is the mixer output circuit.

The mixer should not be asked to deliver power



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

Fig. 14—Mixer and output amplifier circuit. Except for C_{29} , all fixed capacitors are disk ceramic. Fixed resistors are $\frac{1}{2}$ -watt composition. C_{19} is the capacitor having the same designation in Fig. 13.

- C_{29} —"Gimmick" capacitor; twisted hookup wire adjusted to neutralize amplifier.
- J_1 —Coaxial connector, chassis mounting.
- C_{34} —140-pf. variable (Millen 22140).
- L_3 —For 3-foot length of RG-62/U (app. 40 pf.) cable in parallel with C_{34} ;
- 3.5 Mc.—33 turns No. 22 enam. close-wound on

- 1-inch diameter plug-in form (Millen 45005).
- 7 Mc.—14 turns No. 22, $\frac{3}{4}$ inch long, on same type form.
- R_{22} —5000-ohm control, linear taper.
- RFC_2 —750- μ h. r.f. choke (Millen 34300-750).
- T_1 —4.5-Mc. TV sound-i.f. transformer (Miller 6270) loaded to 3.5-3.6 Mc. by C_{25} and C_{28} .

to the following stage, but only to develop enough r.f. voltage for exciting a high-gain pentode as a Class A_1 or AB_1 amplifier. This takes only a few volts of r.f., so the mixer plate circuit should be designed primarily for attenuation of unwanted frequencies. A double-tuned transformer is highly desirable.

If the band of desired frequencies is narrow, in terms of percentage of the center frequency of the band, a slightly overcoupled tuned transformer will give sufficient band-pass effect to make more than initial adjustment unnecessary. A separate transformer for each band can readily be switched in as required. This method is usable for bandwidths up to 4 or 5 per cent of the center frequency. Wider bands may require a ganged variable capacitor to tune the transformer—which has the incidental advantage that, since looser coupling can be used between the transformer windings than in the bandpass case, the selectivity is increased.

Single-tuned circuits with capacitive coupling to the following stage, although less desirable, are simple to design and apply. They will usually give sufficient selectivity in transmitters where at least two tuned stages follow the mixer. It does not really matter how the selectivity necessary to prevent spurious radiation is obtained so long as it is obtained.

A single fixed-tune bandpass circuit, T_1 in Fig. 14, sufficed for this v.f.o. since mixer output was wanted only in the 3500-3650-ke. region. In the more usual conversion arrangement giving direct output on each band, a separate mixer

output circuit would have to be provided for each.

The Output Amplifier

Up to the mixer output the overriding objective should be to get a signal that will be clean and stable under any conditions of operation, including keying in the mixer signal-grid circuit. If the v.f.o. circuits are incorporated in a complete transmitter, the rest of the design can go on from there. For a separate v.f.o. unit it is better to include an amplifier, partly for additional selectivity to discriminate against spurious output frequencies, and partly to obtain enough power output so that coupling losses and driving requirements of the transmitter can be supplied.

For highest power sensitivity a video-amplifier pentode is the most suitable tube type, and of these the 12BY7A has the lowest grid-plate capacitance, a desirable characteristic in an r.f. amplifier. However, the capacitance is not low enough to prevent self-oscillation under all conditions, especially with Class AB_1 operation. The amplifier should therefore be neutralized.¹² This is easy to do when it is driven through a

¹² This rule should be applied to any high-gain pentode r.f. amplifier stage. We have yet to see one that would not go into oscillation when actually tested for it—including those that supposedly "required no neutralization." The unneutralized ones either are tested only when heavily loaded, or operate as locked oscillators (or are at least highly regenerative), the instability being concealed by various means, such as keying the stage. No amplifier will oscillate with its plate current cut off; it may stay in lock with the driving source, key closed, as long as the source is operating.

double-tuned transformer, as shown in Fig. 14.

Since the complete v.f.o. shown here was intended as a crystal replacement, the amplifier output circuit is a parallel-tuned tank having part of its tank capacitance in a 3-foot length of RG-62/U cable. The stage can be used either as a straight amplifier on 3.5 Mc. or as a doubler on 7 Mc. In either case there is ample output for driving the crystal-oscillator tube in practically any transmitter, since none of these operate at a power level of more than a few watts. Other types of output circuits for these frequencies could be substituted, if necessary.

For regulating the drive to the transmitter's ex-crystal-oscillator tube the amplifier has a cathode-resistor gain control, R_{22} . The 12BY7A is grid-block keyed along with the 6BE6 mixer, to make doubly certain that there will be no "leak-through" in break-in work.

Observance of the principles discussed here has resulted in a v.f.o. in which keying has NO effect on the frequency. In fact, there is not even a phase shift in the output of either the tunable oscillator or crystal oscillator when the mixer grid is keyed, either with or without shaping.

Final Note

After measurements had been made on the tunable oscillator at approximately 5 Mc., curiosity prompted replacing the tank coil with one that would let the circuit be tuned to about 2500 kc. The capacitance of C_3 , originally 35 pf., was increased to 50 pf. and a new series of crystals in the 6-Mc. region was substituted in the conversion oscillator. Aside from the new coil and variable capacitor, no changes were made in the tunable-oscillator tank constants.

The solid curves in Fig. 15 show the maximum and minimum limits of drift measured in seven 5-hour runs. The dashed curve is a single run which approximates the median of the two limiting curves. For the 5-hour period the median drift was about 70 cycles.

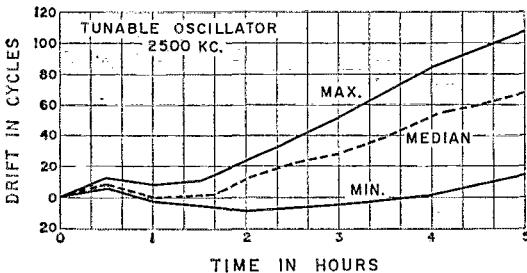


Fig. 15—Typical drift curves of tunable oscillator operating at approximately 2500 kc. These represent the extremes of performance in seven actual drift runs.

The crystals used in the conversion oscillator happened to have a positive frequency/temperature coefficient—i.e., the frequency increased with temperature. The opposite was true of the tunable oscillator. When the difference frequency is taken as output, as in this case, the two drifts add. Fig. 16 shows the results of 12-

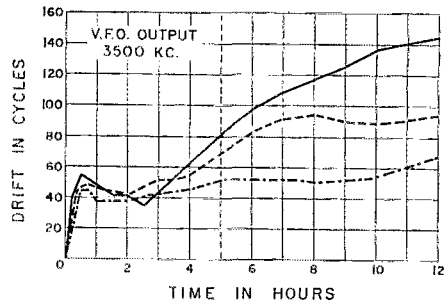


Fig. 16—Drift in output frequency over a 12-hour period. Comparison with Fig. 15 shows the effect of crystal-oscillator drift, which was predominant during the first half hour.

hour drift runs made on three occasions. The section to the left of the vertical dashed line covers the same length of time as Fig. 15. The effect of crystal drift is quite apparent when the two sets of curves are compared. The particular crystal used in making these runs had a total drift of 40 to 50 cycles. Most of it occurred in the first 30 minutes, after which the crystal settled down; the drift from then on was practically that of the tunable oscillator alone. The effect of crystal drift after the first half hour is to shift the tunable-oscillator drift curves upward by a fixed amount. If the crystal and tunable oscillators had both drifted in the same direction the total drift would have been their difference.

Using the 2.5 Mc. tunable oscillator and 6-Mc. crystals, the output, relative to fundamental output, on frequencies other than the desired one was measured with the amplifier tuned to both 3.5 and 7 Mc. (doubling in the latter case). The approximate limit of the measuring equipment was 80 db. The measurable outputs were as follows:

With output on 3.5 Mc.:

Freq., kc.	Db. down	Remarks
2550	65	Tunable oscillator
4450	75	Beat product
7000	19	2nd harmonic of output
10500	59	3rd harmonic of output
12100	72	2nd harmonic of crystal oscillator

With output on 7 Mc.:

Freq., kc.	Db. down	Remarks
3500	29	Fundamental
6050	59	Crystal oscillator
10500	42	3rd harmonic of 3500 kc.
12100	65	2nd harmonic of crystal oscillator
14000	65	2nd harmonic of output

The only ones of importance are those that would be expected from a "conventional" v.f.o.—i.e., harmonics of the desired signal. These are generated in the output amplifier/doubler. Other spurious responses are kept to negligible amplitude by careful adjustment of the buffer and mixer operating conditions and signal levels. The spurious output rises immediately when any of these stages shows grid current. **QST**

Fig. 1—All-metal arrays for 50 and 144 Mc. All parts of both beams can be assembled readily with ordinary hand tools. In this installation the two beams are fed from a single feed line, with a waterproofed coaxial switch at the top of the tower permitting selection of the desired array from the operating station.

THOUGH it is often said that "nobody builds ham gear anymore," there are still many of us, especially in the v.h.f. field, who like to make things. Trends in home construction change with the years, and we build our own gear today for quite different reasons from those that inspired amateurs of a generation ago.

Communications receivers were the first items in the ham station to "go commercial," and at one time it was common to buy a receiver and build one's transmitter. Commercially produced antennas were all but unknown. As transmitters became more complex, with the advent of multi-band designs and extensive TVI precautions, many companies went into the transmitter field, but antennas were still mainly homebuilt, even when everything else in the ham station was "store-bought." In recent years the antenna business has come on fast, removing the last absolute need for anyone to build a major component of his station by hand.

These developments did not remove the urge to build, nor the benefits to be derived from it. Constructional articles are still the mainstay of *QST*, and antenna information is very much in demand. This is as it should be, for no ham home-work is more rewarding than experimentation with antennas, particularly those for 50 Mc. and higher bands.

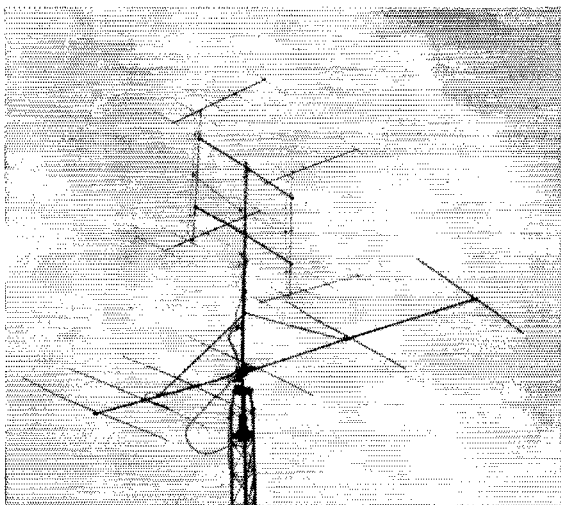
There are many good v.h.f. arrays on the market, but we still have to erect them — and this may be the hardest part of the job. Since we're going to be doing quite a bit of work on any antenna project, why not go the whole way and build the antenna, as well as erect it?

There are many different characteristics to be sought in v.h.f. antenna installations, and the chances are good that you can come up with something better suited to your particular needs if you design and build with your operating preferences and installation problems in mind. A full discussion of this philosophy is beyond the scope of a single article. Most of what we might say along these lines is already available in *The Radio Amateur's V.H.F. Manual*, which has two thick chapters on antenna principles and practice. We will be concerned here with practical means of doing the construction jobs. These can be adapted to arrays of your own design, or to antennas we have already described elsewhere.

Materials and Methods

Finding the right components bothers some would-be antenna builders, perhaps because they look no farther than their favorite radio store or mail-order catalog. Actually, antenna materials are everywhere, if we do a little improvising. Booms can be wood or metal, in v.h.f.

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



Building Your Own Arrays for 50 and 144 Mc.

*V.h.f. Beam Ideas
for the Home Constructor*

BY EDWARD P. TILTON, W1HDQ*

There are many good antennas for v.h.f. service on the market today, but there are advantages in building your own. The arrays described here follow standard practice as far as element lengths and spacings are concerned; the emphasis is on construction ideas, using materials that should be readily available almost anywhere. Only simple hand tools are needed.

arrays. Your local lumberyard is a good place to go for round or square boom stock. There are several examples of wood construction in the *V.H.F. Manual*, and a wood-frame 432-Mc. array is described in April *QST*.¹

Many hardware stores now carry stocks of "do-it-yourself" aluminum, in shapes and sizes commonly useful around the home. Most of the material for the 20-element 2-meter array shown herewith came from a small hardware store near ARRL Headquarters. This is not the cheapest way to do the job, but the materials are clean and easy to work with. Even using such high-cost sources, you'll probably come out saving money over what a comparable array would cost ready-made. More important, you may end up with a better antenna.

If you build mainly to save money, don't overlook junkyards, welding shops and the like. For many years the writer found almost everything needed for v.h.f. arrays at an aluminum smelting works. This outfit bought surplus aluminum that anyone wanted to unload, and they often had appreciable stocks of tubing, angle stock, sheet metal, rod and wire—all available to the bargain hunter who didn't mind getting his hands dirty digging it out. Prices ran less than half the new-stock figures, on the average. Aluminum wire and rod may be found in welding supply places. It is straight and much more rigid than the soft stuff many hams buy as "picket wire" in garden stores.

Wholesale distributors of aluminum usually have everything you'll ever need, but some insist on fairly large minimum purchases. Quantity prices may make it desirable to pool your needs with antenna-building friends. The classified section of your telephone directory will provide leads, if you live in or near any major city. One thing is sure: if you really want to build your own v.h.f. antennas, there are ways to get the materials.

Assembly methods vary with materials available. There are many ways to make antennas in addition to the common one of drilling the boom to mount the elements. Aluminum castings designed for element mounting are neat and easy to use, but they are getting harder to find all the time. Simple clamps cut from sheet metal are easy to make, and they permit adjustment of element spacing in experimental lashups. They're also fine for the fellow with limited machine shop facilities, eliminating the problem of lining up holes drilled in a boom.

Specific dimensions for use with popular tubing sizes are given under Fig. 4, but making clamps to fit available sizes is no problem. Our dimensions were arrived at by making paper mockups and then duplicating them in sheet aluminum. The basic idea is to make two U-shaped clamps that will hold two pieces of tubing together at right angles, as seen in Figs. 2 and 3. Dimensions are not at all fussy, since the clamps tend to be self-aligning. Just be sure

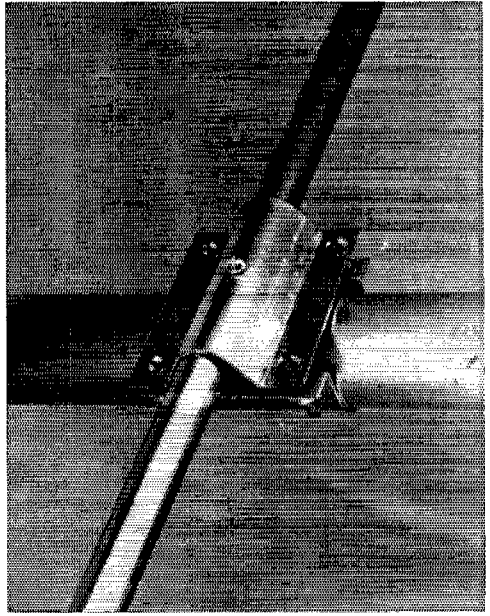


Fig. 2—Model showing the method of mounting elements on the boom without drilling holes through the latter. For strongest permanent assembly, self-tapping screws should fasten the sheet-metal clamps in position.

that the sides of the "U" are short of the actual diameter of the tubing to be used, so that when the clamps are bolted together at the corners they will hold the tubing members tightly. If both tubes are the same diameter, make two similar clamps. See A in Fig. 4. With differing diameters adjust the size of the clamps accordingly.

Once you have your frame or boom made up the way you want it, the assembly can be made permanent by "tacking" it together with self-tapping screws, as shown in the model, Fig. 2. This makes a very strong and rigid assembly, but we've had beam frames and boom-element combinations stand up for years without this final precaution. Clamp assembly is fine for arrays that must be dismantled and carried to the operating site. (Field Day committees take note.)

Large arrays used to be very heavy and cumbersome, but experience has shown that strength and durability are not necessarily synonymous with weight. One way to keep down weight and wind resistance is to use telescoping elements. Strength is needed only near the mounting point of a Yagi element, so the outer portions can be made of smaller and lighter materials. Steps taken in this direction are limited mainly by one's willingness to search out suitable materials and do the extra work involved in fitting them together. If making elements of graduated tubing sizes is too much bother for you, the sizes given for the center sections of our arrays for 50 and 144 Mc. will do a good job.

¹"Yagi Arrays for 432 Mc.," April, 1966, *QST*, page 19.

The 50-Mc. Yagi

The 6-element 50-Mc. Yagi in Fig. 1 can be built easily, with little scouting for hard-to-find components. In element lengths and spacings it duplicates an array of proven performance that has been a standard feature of several ARRL publications since its erection at WHDQ in 1957.² Our new version differs from its predecessor only in assembly method and in the design of its gamma-matching system.

The boom is just over 20 feet long, made of light-weight aluminum TV masting. This is available in several standard lengths, and has one end of each piece compressed to fit into the other end of the next. If the builder wishes to use two 10-foot lengths, the spacing of the two forward elements can be reduced slightly from that given in Fig. 5. Three shorter lengths may be cut to give the full spacing shown, with little waste. Steel TV masting is *not* recommended.

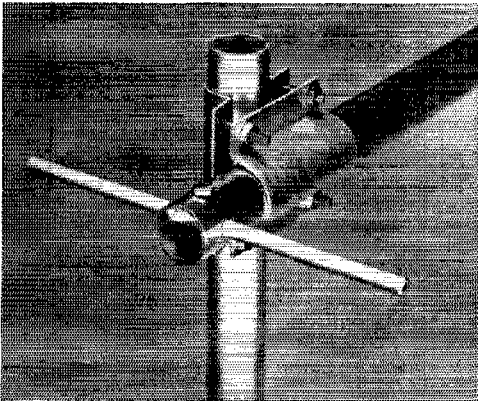


Fig. 3—Mockup showing clamps for assembling the framework of the 2-meter array. Mounting method for the elements is also illustrated.

The same general construction may be used with shorter arrays, merely by leaving off one or more elements starting at the forward director. Any number of elements up to five may be used without bracing of the boom, but with the length shown the suspension bracing is necessary with a light boom of this type. The exact dimensions of the braces are unimportant, and they may be fastened to the boom in several ways. About 2 inches at one end of the $\frac{3}{4}$ -inch-diameter braces was hammered flat, and then fastened to the boom with U bolts. Holes were drilled in the upper ends of the braces, and these slip over the ends of another U clamp on the vertical support. Fasten this clamp in place with its regular nuts and then use an extra pair of nuts to hold the ends of the braces.

Elements can be half-inch tubing throughout, though in this model only the center sections, about 3 feet long, are this size. The end sections are very light thin-wall tubing of a kind commonly used for fuel lines. Ours is $\frac{7}{16}$ -inch

² "Six Elements on 6," October, 1957, *QST*, page 18.

o.d., though $\frac{3}{8}$ -inch would be preferable. The ends of the half-inch center sections are slotted with a hacksaw to a depth of about 3 inches. The smaller tubing is then forced inside to a depth of 2 inches, and clamped in place with a wrap-around strip of aluminum about $\frac{3}{8}$ inch wide.

In the past we've used cast-aluminum clamps for mounting elements on the boom. If you can find these, there is nothing better, but we've had reports that they're getting scarce. If you have a procurement problem, the sheet metal clamps shown in the mockups, Figs. 2 and 3, will do the job nicely. Dimensions are given in Fig. 4 for all the clamps used in the arrays illustrated. These were made of $\frac{3}{64}$ -inch sheet aluminum, which can be bent easily by hand. Any heavier stock is good, if you have suitable bending facilities. Use of self-tapping screws to hold components in alignment, as shown in Fig. 2, is recommended with thin clamp stock.

The lips of the clamps should be bent upward at right angles first. Forming the "U" is started by placing the tubing in a vise in a vertical position, and bending the clamp around it. The actual U shape is achieved by opening the vise to slightly more than the width of tubing-plus-clamp, placing the clamp U-down loosely in the vise with the tubing lying in it, and then tapping the tubing lightly with a hammer. Alignment of the holes in the clamps is not fussy, and if they are drilled slightly larger than needed to pass the screws there will be no assembly problem. We used a No. $\#22$ drill and 6-32 screws. The nuts should be pulled up only tightly enough to hold the assembly firmly together.

Feed Method

The first model of our 6-element array was fed with a coaxial gamma match, as described

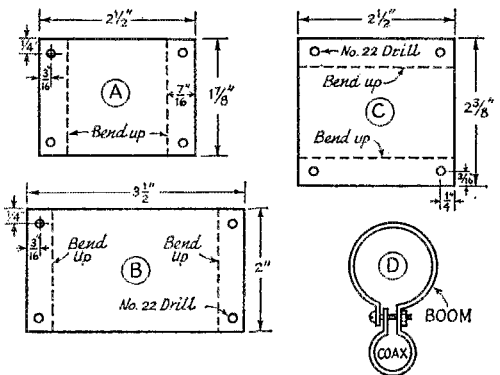


Fig. 4—Dimensions of aluminum plates used to make the assembly clamps in the v.h.f. arrays. Sheet metal should be $\frac{3}{64}$ inch or thicker. Two A-type clamps are needed for joining $\frac{3}{4}$ -inch tubes at right angles. One B and one C are needed to mount a $\frac{1}{2}$ -inch element on a $\frac{1}{4}$ -inch boom. The "figure 8" clamp, D, made from a $\frac{1}{2}$ -inch wide strip approximately 6 inches long, is used to ground the coax to the boom, and keep it in a fixed position with respect to the driven element.

in all ARRL publications dealing with antennas. We can recommend it highly in retrospect, since it was still working well when the array was dismantled after more than 8 years' service. It took some mechanical work to produce, however, so we looked for something simpler. The new gamma method is about as simple as you can get: the coax is merely brought along the boom to the driven element, bent at right angles, and run out far enough to match the antenna impedance when fed through a 100-pf. fixed capacitor. The point of connection was found experimentally, as was the value of series capacitance required. You may want to do the same with your array, though 20 inches and 100 pf. should come close, if the rest of the design is followed.

If you decide to do some adjusting, put an s.w.r. bridge in the line near the antenna. An electrical half-wavelength away from the feed point is good. Move the point of connection along the driven element until minimum reflected power is found. The coaxial line should be grounded to the boom near the point where the bend out to the driven element is made. This can be done by stripping a narrow band of the outer covering from the coax, and then fastening it to the boom with a "figure 8" bracket of aluminum strip. The area of the coax thus exposed should be waterproofed by wrapping with plastic tape after the connection is made, and then coating the whole with Krylon spray. The series capacitor should be treated in the same manner. This is a low-impedance point, so don't worry about insulation losses here.

The capacitor must be a type that will stand high r.f. currents. The centralab 8505-100N was designed specifically for transmitting applications and has more than adequate power-handling capabilities. A variable capacitor may be used if some provision is made for mounting it in a weatherproof container. Inexpensive plastic boxes intended for refrigerator use are good for this purpose. The voltage rating of the capacitor need not be high, so types with receiver spacing are suitable, if protected from moisture.

The array is supported on the vertical member by means of a square gusset plate of aluminum, backed up by a plate of similar size cut from tempered Masonite or outdoor plywood.

These plates are about 6 inches square. Four U bolts hold the assembly together, in the manner of several v.h.f. arrays shown in all recent editions of the *ARRL Handbook*, *Antenna Book* or *V.H.F. Manual*. This plate and all hardware in the array should be given a coating of Krylon spray when assembly work is completed. This will greatly prolong the life of metal parts, particularly steel items such as the U bolts and other handy TV antenna hardware.

The Stacked-Yagi Array for 144-Mc.

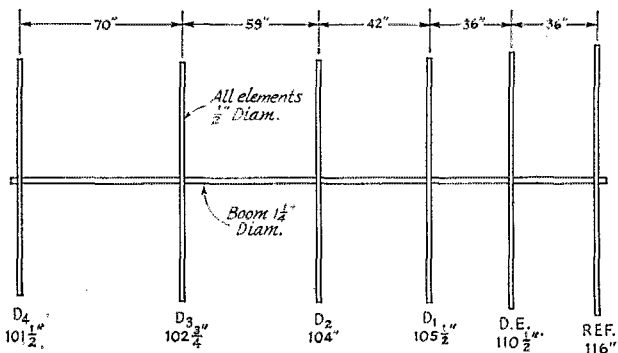
The all-metal array for the 2-meter band has four Yagi bays of 5 elements each, but the same general layout could be used with shorter bays, or longer ones up to about 7 elements. The spacing is one wavelength in the horizontal and vertical planes, which is optimum for bays of this approximate size.

The booms and frame are all $\frac{3}{4}$ -inch aluminum tubing, hardware-store stock, available in 6- and 8-foot lengths. Four 6-foot pieces (\$1.79 each) took care of the booms, and four 8-foot ones (\$2.39 each) were used for the horizontal and vertical frame members. You can beat these prices by methods already outlined, but the availability of the do-it-yourself hardware stocks is universal.

The clamps made as already described are shown in model and drawing form. Eight are needed. Elements can be anything from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter. Ours have $\frac{1}{2}$ -inch center sections of tubing, with inserts of $\frac{5}{32}$ -inch aluminum wire or welding rod. Any stiff wire, tubing or rod stock could be used for the entire element. We used this combination for several reasons: it makes for exceptional strength, we had some of both but not enough of either for the entire array, and the inserts provided a convenient means of adjusting the element lengths. We will not bother with the various dimensions involved, other than the overall element lengths finally arrived at by experiment. See Fig. 6. The elements are run through the boom, and held in place by self-tapping screws, as seen in the mockup, Fig. 3. Aluminum screws for this purpose can be bought at the hardware store, and we recommend them over steel. They stay in place, and they won't rust.

The phasing system is shown at the right of Fig. 6. A universal stub at the central feedpoint

Fig. 5—Element lengths and spacings in the 50-Mc. Yagi array. For a 20-foot boom, shorten spacings between D_2 and D_3 and D_3 and D_4 by 3 and 4 inches, respectively. Lengths given are for optimum performance between 50 and 51 Mc.



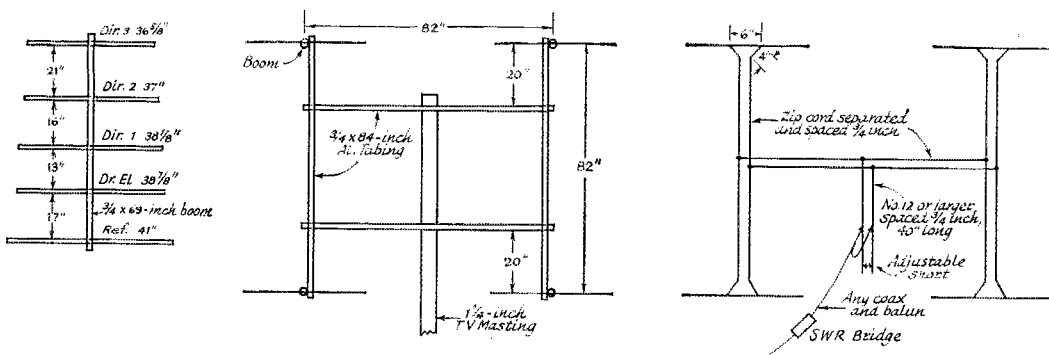


Fig. 6—Principal dimensions of the 144-Mc. array. Element lengths and spacings are given at the left. The supporting structure is sketched in the center. Details of the phasing harness and matching section are shown at the right. Impedances need not be known, since it is necessary only to adjust the position of the short and the point of connection of the balun for the frequency range most commonly worked. Dimensions of the fanned-out sections at the ends of the phasing harness are not critical, so long as all are the same size.

provides a simple means of matching without having to know the impedances involved. The phasing sections are fanned out near the point where they connect to each driven element. Here again, there is no precise dimension; just make the spacings and the triangular matching sections all the same. Be certain that a clean and permanently-tight connection is made to the driven element.

Phasing lines can be any balanced line, and most builders may prefer common TV open-wire line, either half-inch or one-inch spaced. We tried a different idea, and used ordinary zip-cord from the electrical counter of the hardware store. We strung this on homemade spreaders cut from $\frac{3}{4}$ -inch wooden dowel, drilled to give about $\frac{3}{4}$ inch spacing. The insulation on the zip-cord lasts well out of doors, and the wire is strong, yet flexible. Time will tell how it stands up, but it can be replaced easily if it doesn't. We have an idea that it will do all right.

Star lugs were soldered to the ends of the phasing lines to bolt to clips that wrap around the driven elements. The junction of the zip-cord and the lug was wrapped with plastic tape, and sprayed with Krylon. The wood-dowel spreaders were also sprayed. The line is supported at several points, using TV-type insulated standoffs which wrap around the appropriate dowel spreaders in the line. At this writing the antenna has been up in the wind at W1HDQ for about four months, and nothing has shown any sign of coming loose yet. The antenna has been used in heavy rain, with little apparent change in operating characteristics. Insensitivity to bad weather was a quality we hoped for with this unusual phasing system.

The element lengths given are for maximum performance in the bottom megacycle of the band. If you want the beam to be most effective above 145 Mc. it would be desirable to shorten all elements by $\frac{1}{4}$ inch for each megacycle higher. Element lengths are not as critical as most people think, provided that the short and points of balun connection on the matching stub are adjusted for zero reflected power at the

center frequency you select. We made a single 5-element Yagi as a preliminary to the 4-bay system, and adjusted it carefully for optimum performance between 144.5 and 145 Mc. We found only a discernible difference in forward gain from 144.0 to nearly 147 Mc., when we re-adjusted the matching stub for each frequency change. Both gain and front-to-back ratio dropped off markedly above 147.

It was interesting to note that the frequencies of optimum gain and front-to-back (they're not the same) moved down about 500 kc. with the stacked system, compared with the single Yagi. Presumably this was the result of coupling between bays, and the introduction of more metal in the field of the array. The element lengths given are corrected for the 4-bay system. The single 5-element would have $\frac{1}{8}$ inch more per element for peak performance over the same frequency range.

We put up this 4-bay array at W1HDQ after several years of working with a single 24-foot Yagi cut for the first megacycle of the band. Results with the new beam are at least as good on the peak frequency, and very much better at any spot above 145, than with the sharply-tuned single bay. This is not surprising; a long Yagi is fine where you don't worry about sharp frequency response, and particularly if you have limited ability to support an array that runs much above the top of your tower, but something with more driven elements and an appreciable frontal area is a better all-around antenna.

How much gain? We'd prefer not to say, for we know our limitations in gain measurement. We can make reasonable comparisons, however, and the 4-bay system was very close to 6 db. better than the single 5-element. A gain of 9 db. is a reasonable assumption for a 5-element Yagi, so 14 to 15 db. is a good honest figure for the 20-element. More important than tossing decibels around is the observation that this array is giving us consistent results in scatter work out to 450 miles or so. WSKAY, Akron, Ohio, is heard regularly on his skeds with New

(Continued on page 170)

• *Beginner and Novice*

A Transmatch For Balanced and Unbalanced Lines

Getting Rid of Your Harmonic Problem

BY LEWIS G. McCOY,* WIICP

DURING 1965, over 7000 Novices received notices from ARRL Official Observers who had noted defects in the Novices' signals. Most of these notices cautioned the Novices that they were radiating a second harmonic of their 80-meter signal. A large number of these Novices were also cited by the FCC for harmonic radiation.

Certainly every Novice wants to have a clean signal, one with no spurious radiations. A newcomer, starting out in amateur radio, has to acquire considerable "know how" to put a clean signal on the air and this includes getting rid of harmonics. In this article, we'll tell you the "why" and "how".

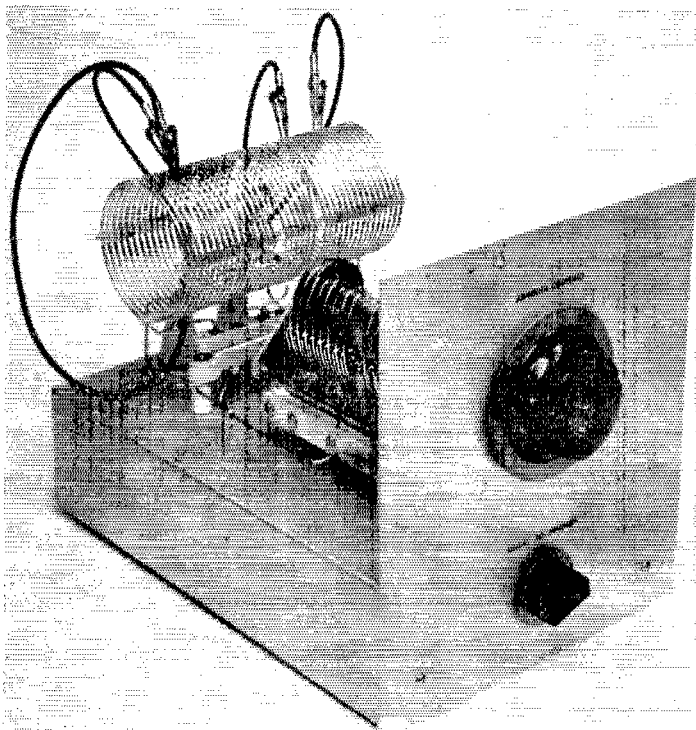
Many amateurs are inclined to blame the manufacturer if his transmitter radiates a har-

* Beginner and Novice Editor

monic. This is unfair because a manufacturer has no way of knowing how the amateur is going to use the equipment after he purchases the rig. It is quite possible that the same transmitter could be used on two different types of antenna systems and radiate a harmonic on one system and not on the other. The best approach to the problem is to assume that a harmonic or harmonics will be radiated by *your* transmitter and that something must be done to prevent this from happening.

Usually the reason we have harmonic radiation from a transmitter is because of insufficient selectivity between the final amplifier stage and the antenna. Installing additional circuits will attenuate any harmonics to the point where they would be no problem. In our opinion, the best approach for cleaning up this problem is to in-

This view shows the 80/40-meter coil with the shorting clips in place for 40-meter operation. The exact amount of coil to be shorted for 40 will have to be found by experiment but it will be approximately 8 turns on each side. Try for a condition that produces a match with C_2 near maximum capacitance and the antenna clips A and B, as far out on the coil from the link as possible.



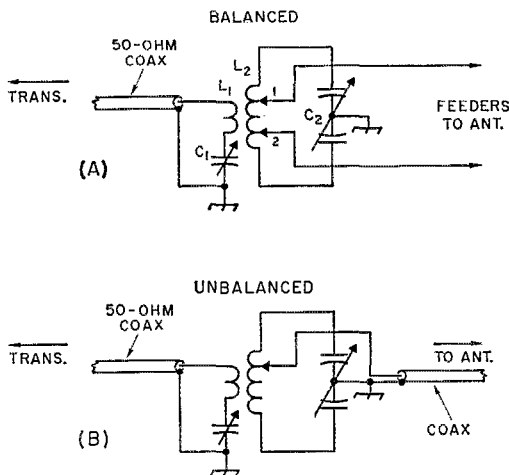


Fig. 1—At A is the transmatch circuit for balanced feed lines and at B, for coaxial lines.

stall a transmatch between the transmitter and antenna. A transmatch, in addition to providing the required selectivity for harmonic attenuation, has other important features.

Nearly all transmitters are designed to work into 50- to 70-ohm loads. On the other hand, very few antenna systems will present such a load across an amateur band and, what complicates the problem, many transmitters have no adjustments in the amplifier to cope with loads other than 50 ohms. For such a transmitter to work at full efficiency the load must be 50-ohms. A transmatch takes care of this problem because it can be considered a "matching" circuit in that it takes the unknown load on its output side and makes it a 50-ohm load on the input side.

Another important advantage in using a transmatch is to provide additional selectivity for your receiver. In many instances, a nearby broadcast station will cause severe cross-modulation in a communications receiver, particularly to 80-meter reception. If you don't know what cross-modulation is it can best be described as a mess of confusing "garbage" across the band. The signal you want to copy, instead of being clean, is hashed up by the strong nearby broadcast signal (or any strong local signal for that matter). The transmatch usually will provide enough selectivity to keep the strong signal from cross-modulating. Don't misunderstand, this won't get rid of another local ham signal in the same band but it will help on strong local signals that are outside the band you are listening to.

Still another feature of a transmatch is that it provides harmonic attenuation in the TV range in addition to taking care of the lower-frequency harmonics. Also, if you must use a low-pass filter for *maximum* TVI harmonic attenuation, such a filter should be installed in coax line that has a very low standing-wave ratio so that the low-pass filter components won't be damaged by

excessive voltages. The transmatch will provide a section of coax line with a low s.w.r., that portion between the transmitter and transmatch. All in all, one should see the desirability of using a transmatch. The transmatch described in this article can be used for unbalanced lines (coaxial) or for balanced lines (open-wire or TWIN-LEAD).

Transmatch and Unbalanced Lines

Fig. 1A is the basic circuit for a transmatch used with balanced lines, and Fig. 1B is for unbalanced or coaxial lines. Fig. 2 is the circuit diagram of the working unit.

Until recently, and by recently we mean the last few years, transmatches were not used with coaxial antenna-feed lines. The main reason for *not* using a transmatch was simply that coax is a line that should be matched in its characteristic impedance — or at least if it is not matched, the standing wave ratio should be kept as low as possible. Operating coax line with a high s.w.r. causes excessive losses in the line. However, transmitters and transceivers in recent years have come on the market without any provisions in their tank circuits to handle loads other than 50 ohms. When the s.w.r. is greater than 1 to 1, the load on the transmitter is something other than 50 ohms, and in many instances it becomes impossible to load the final amplifier. A transmatch makes it possible and, in addition,

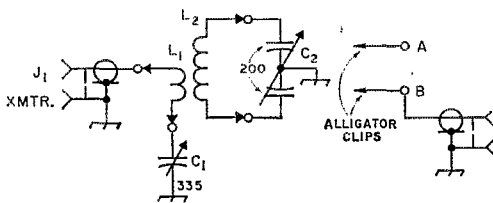


Fig. 2—Circuit diagram of the transmatch. Balanced feeders should be attached to A and B.

C₁—335 pf. variable (Millen 19335 or equivalent).
C₂—200 pf. dual variable, 0.077-inch air gap for 1 kw. (Millen 16200), 0.022-inch air gap for 150 watts and less (Millen 28200).

J₁, J₂—Coax chassis fitting, SO-239.
L₁, L₂—See Fig. 3 and text.

even though a multiband coaxial-fed antenna is used, the transmatch will take care of the ever-present harmonic problem. These are the reasons for using a transmatch in a coaxial-fed antenna system.

On the other hand, balanced lines such as open-wire or a good grade of 300-ohm twin lead are not lossy lines and they can be operated with a relatively high s.w.r. without any appreciable loss in efficiency. In the case of a high s.w.r. we are faced with the problem of matching a load that is quite far removed from 50 ohms. The transmatch will do just that because it is an adjustable matching device.

Getting the Parts

It is becoming more and more difficult to find dealers who handle a wide range of useful ama-

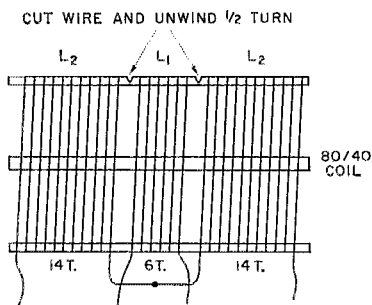


Fig. 3—Details for making the 80/40-meter coil. The 20-meter coil consists of 2 turns for L_1 and 6 turns for L_2 (3 turns on either side of L_1). Details for the 15/10-meter coil are given in the text. The coils are mounted on Millen type 40305 plugs and the socket is Millen type 41305. Coil stock is Polyphase PIC type 1778, 3-inch diameter, 6 turns per inch, No. 12 solid wire.

four components, even among the larger mail-order houses. With the exception of the coil stock, all the components used in this transmatch are made by the Millen Co.¹ The coil stock is manufactured by Polyphase Instrument Co., and if your local distributor doesn't stock the coil material you can write the company² and they'll tell you where you can buy it.

¹ If you cannot obtain the parts from your distributor they can be purchased direct from Millen Co. Write to James Millen Manufacturing Co., Attn. Wade Caywood, WIKRD, Malden 48, Mass.

² Polyphase Instrument Co., Attn. Tom Consalvi, East Fourth St., Bridgeport, Pa. 19405.

This shows the placement of C_1 and also the three coils. Although the center pin of the coil sockets is not used for a connection, the "joined" portion on each side of the link (the two L_2 sections) are soldered together and then connected to the center pin. This provides additional support to the coil assembly.

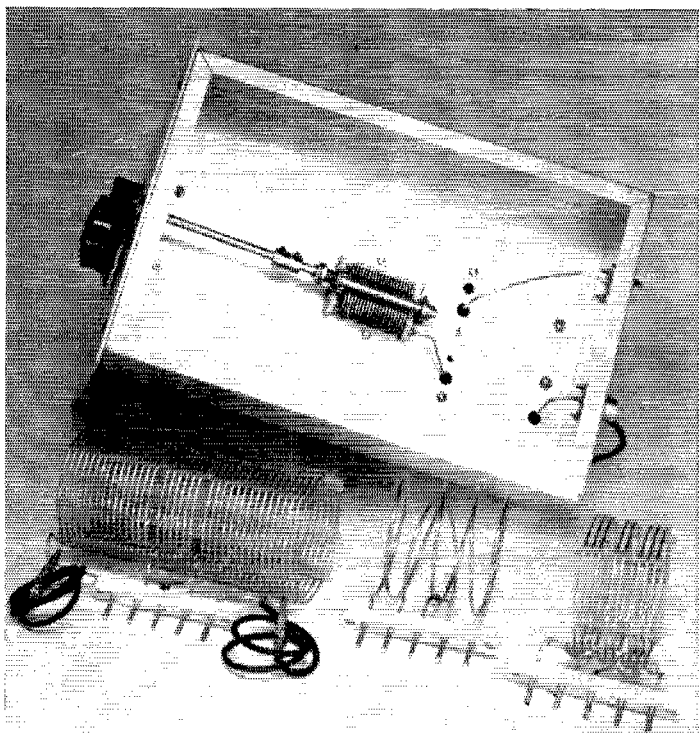
We've specified two types of capacitors for C_2 . The larger spacing will handle one kilowatt with most loads that will be encountered, while the smaller-spaced unit will handle up to 150 watts. There isn't enough difference in price between large and small coil stock, except size, so the builder is just as well off using the larger-size coil material for all power levels.

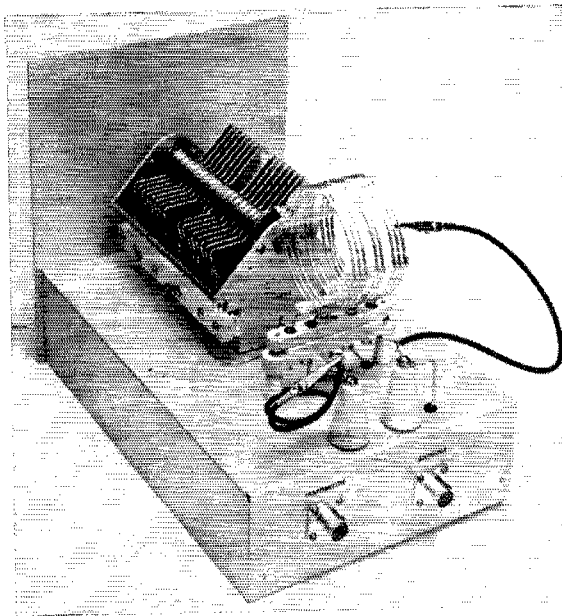
Construction

The transmatch is built on an aluminum chassis $3 \times 8 \times 12$ inches, although any size chassis that will hold the components can be used. The dual variable, C_2 , is mounted on top of the chassis and C_1 , the link capacitor, below deck. Mount the coil socket at least $2\frac{1}{2}$ inches behind C_2 so that the coil stock doesn't short to the metal frame at the rear of the capacitor. The coil socket is mounted on $\frac{3}{4}$ -inch-high isolantite stand-offs, and $1\frac{1}{2}$ -inch-high standoffs are used for the feeder tap leads. A permanent connection is made from one of these standoffs to J_2 , the coax connector mounted on the rear of the chassis.

Three plug-in coils are required to cover the 3.5- through 28-Mc. bands, one serves for 80 and 40, another for 20, and a third takes care of 15 and 10 meters. A single length of the coil stock listed in Fig. 3 is all that is needed for the 80/40 and 20-meter coils. Coil stock is not used for the 15/10 coil.

Refer to Fig. 3 for details of the coil construction. This drawing shows how to make the two coils, L_1 and L_2 , from a section of the coil stock.





This shows the set up for use with a coax-fed antenna. The clip on the standoff on the right is tapped onto L_2 . The other clip is clipped back on itself.

The coil shown is the 80/40 combination and construction of the 20-meter unit is similar.

No. 12 solid wire is used to make the 15/10-meter coil. L_2 consists of 4 turns, 3 inches in diameter, with the 4 turns spaced over $3\frac{1}{2}$ inches. L_1 is a single turn of No. 12, 2 inches in diameter, mounted in the center of L_2 .

The 5-prong coil plugs have a nickel coating which should be filed off the ends of the prongs in order to get a good solder connection.

Tune-Up and Adjustments

In order to properly adjust a transmatch an s.w.r. indicator is a big help. Just recently in *QST*⁸ a combination wavemeter and s.w.r. indicator was described. This is a very simple unit to make, and in addition to helping you adjust your transmatch, it will show you if you are on the correct band or not. Many newcomers make the mistake of tuning up their rigs on what they think is the correct band but actually end up outside the band. The unit mentioned, the Wavebridge, will help prevent this.

Fig. 4 shows a typical station arrangement for connecting the different units together. If a low-pass filter is required it can be installed immediately after the transmitter if an antenna change-over relay is used. If a diode or tube-type t.r. switch is used, the low-pass filter should be installed after the t.r. switch as these devices are known to cause harmonic TVI and you would want to prevent harmonics from such a device

⁸ McCoy, "The Wavebridge," *QST*, July, 1966. This issue of *QST* is available at ARRL Headquarters for 60 cents.

from reaching the antenna. Also, if at all possible, connect a good earth ground to the transmatch. It will work without one but, if you can, put in a ground connection.

Let's take the case of coax-to-coax, a coax-fed antenna. Connect the feeder to J_2 , tune up the rig on the desired band, and feed enough power through the s.w.r. bridge to get a full-scale reading with the s.w.r. meter switched to read forward power. Next, take the tap lead connected to the J_2 inner conductor and tap onto L_2 on either side of the link. It doesn't make any difference which side you tap on, but for a start put it on close to the link. Switch the s.w.r. bridge to read reflected power and then adjust C_1 and C_2 for a minimum reading of the s.w.r. meter. What you are shooting for is a reading of zero for reflected versus full-scale forward. This would indicate a 1 to 1 match and the transmitter would "see" a 50-ohm load. Also, you'll find several tap points with the tap lead that will give a match, but the one you want is with the tap as far out from the link, towards the outside end of L_2 , as possible.

For balanced feeders, connect the feeders to the two stand-off insulators and the tap leads to L_2 on either side of the link. Also, if you happen to have two antennas, one with coax feed, don't leave the coax line connected to J_2 when using the balanced feeders.

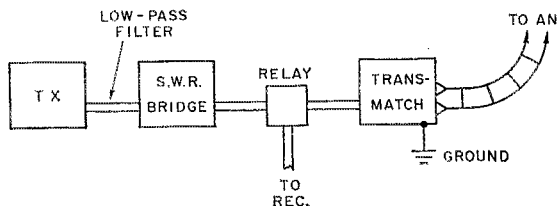
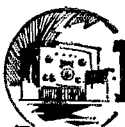


Fig. 4—This is a typical arrangement of units for a station installation. Coax line connecting the units together can be 50- or 70-ohm, depending on the s.w.r. bridge impedance.

Using the s.w.r. bridge the same way as with coax feeders, shoot for zero reading on reflected versus full-scale forward. Also, as with the coax tap, keep the taps as far out from the link as possible. The taps should be equally spaced from the link; in other words if one tap is $5\frac{1}{2}$ turns from the link, the other one also should be $5\frac{1}{2}$ turns. If it is impossible to get a match it means that the load presented by the feeders is so reactive the transmatch cannot handle it. You can try adding some feeder length (or shortening the feeders) as this will present a different load and may well bring it within the range. However, this will only happen in extreme cases as the transmatch will handle a wide range of loads.

As we said at the beginning, a transmatch will keep you out of trouble and improve the operation of your station. Build one and learn how to use it.

QST

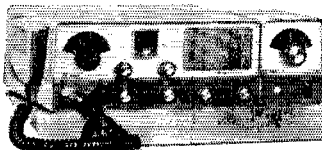


Recent Equipment



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

The Knight-Kit TR-106 Transceiver

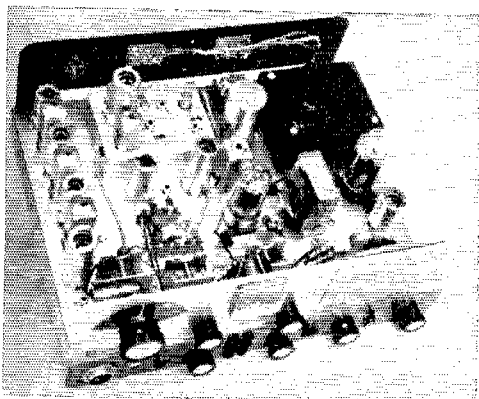


THE TR-106 is a 6-meter transceiver kit covering 50 to 52 Mc. The transmitter portion uses the familiar 2E26 at an input power of 15 watts. The receiver portion is dual conversion, with a crystal-controlled converter featuring a nuvistor r.f. amplifier in the front end. The transceiver contains a built-in spot switch, push-to-talk control, a.c. and d.c. power supplies, multiple-position crystal switch, internal speaker, and provisions for a matching v.f.o.

lost. The output circuit is a pi network designed to work into an impedance of 30 to 90 ohms. Transmitter tune-up is merely a matter of tuning all stages for maximum output. A combination S meter and peak-reading r.f. voltmeter is provided for this purpose. Transmitter alignment requires (not furnished) a dummy load and 3 crystals.

Receiver

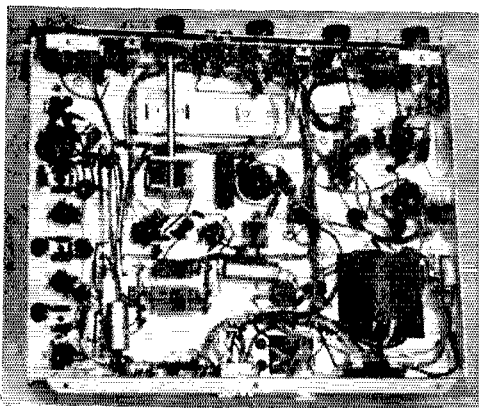
The receiver uses a crystal-controlled converter which is factory wired and aligned. Installation of the converter requires two bolts and soldering of four wires. A six-meter signal at the converter input is mixed with the signal from the crystal oscillator to obtain an output of 15.6 to 17.6 Mc. which is fed to the second mixer, V_{1A} . The local oscillator, V_{1B} , is coupled to the mixer by interelectrode capacitance, producing a signal at 1650 kc. This signal is fed to a two-stage i.f. amplifier, V_2 and V_3 , which uses three double-tuned circuits. The amplified signal is then detected by V_4 , and at this point the a.g.c. bias is obtained and applied to the i.f. amplifiers. Also combined in V_4 is a series-gate noise limiter activated by a switch on the rear panel. The detected output is fed to the a.f.



Top-chassis view of the TR-106. The converter chassis is the small box at the rear of the main chassis. The transistors for the inverter are mounted on the back panel.

Transmitter

Fig. 1 shows a block diagram of the transmitter with the receiver components at the top and the transmitter components at the bottom. The Colpitts oscillator, V_9 , uses 8-Mc. crystals in the grid circuit. The plate circuit is tuned to the third harmonic. The resonant frequency of this circuit is controlled by the MULT control on the front panel. In the next stage, V_8 , the 24-Mc. signal is doubled to the output frequency. The plate circuit of the doubler uses an inductively-coupled double-tuned circuit. This stage is stagger tuned to obtain a 2-megacycle bandwidth. The final, V_7 , operates straight through at 50 Mc. using a combination of grid-leak and cathode bias. The latter protects the tube if grid drive is



The bottom view of the TR-106 showing the wiring harness. The transmitter is in the center, the receiver on the left, the audio on the right.

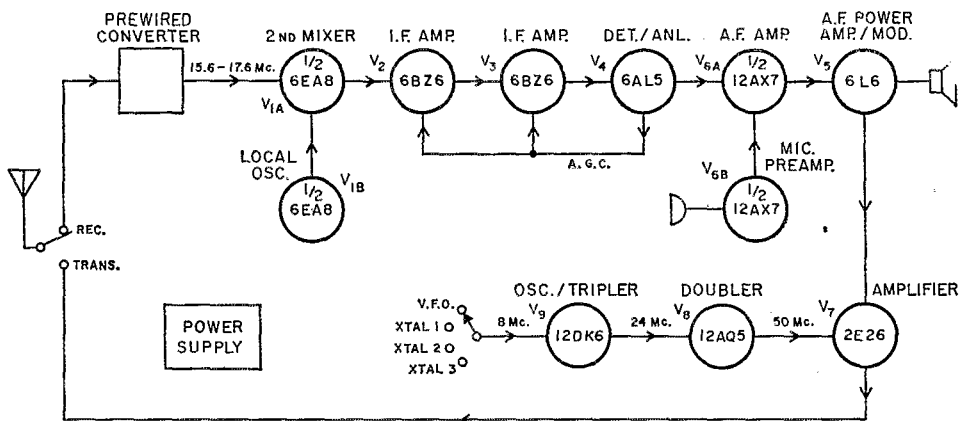


Fig. 1 — Block diagram of the TR-106

amplifier, V_{6A} , the a.f. power amplifier, V_5 , and finally to the speaker. Low-impedance ear-phones may be used at the front-panel jack, thus muting the speaker. The remaining half of V_6 serves as a microphone preamplifier which feeds V_{6A} . The modulator is designed for 300 to 3000 c.p.s. frequency response.

A note of interest for the home constructor concerns the mounting of the a.f. power amplifier. To lower overall cabinet height the socket for this tube is mounted below the chassis level using metal spacers. This also gives added ventilation to the amplifier circuit components as well as the tube.

Three complete turns of the receiver tuning knob are required to cover 50 to 52 Mc. Dial markings are every 100 kc., with special marks for the 49.980-Mc. MARS frequency and 50.0 to 50.1 Mc. for the c.w. portion of the band. To align the receiver two v.t.v.m.s and a 1650-kc. r.f. source are needed for the i.f. section. One v.t.v.m. is used to monitor the a.g.c. bias, and the other is used across the speaker for a more accurate output indication than using your ear. Eight-megacycle crystals can be used to align the r.f. section. No adjustment of the converter should be needed or attempted.

This and That

A spotting switch is located on the front panel; this switch removes the B plus from the doubler and final tubes. The signal from the remaining stage is sufficient for spotting the crystal or v.f.o. frequency.

Power for the transceiver is supplied by a voltage-doubler circuit using a special transformer. For a.c. the transformer functions as a normal step-up. For 12-volt d.c. operation the transformer and two transistors function as an inverter. Two power cords are supplied, one the standard a.c. type, and the d.c. cord which is supplied with a cigar-lighter plug. Changing power cords automatically switches the correct fuse into the circuit.

Transmit-receive switching can be controlled from the front panel or by a p.t.t. switch on the noise-canceling microphone supplied.

The circuits used are standard types with most of the wiring accomplished through a harness. The use of the harness cuts wiring time in half. The kit is packaged so that all parts are right at hand.

— WIDEJ

Knight-Kit TR-106 Transceiver

Height: 5½ inches.

Width: 13¼ inches.

Depth: 11 inches.

Power Requirements:

110-130 volts a.c., 90 watts receive, 105 watts transmit.

12-15 volts d.c., 6.8 amp. receive, 3.1 amp. transmit.

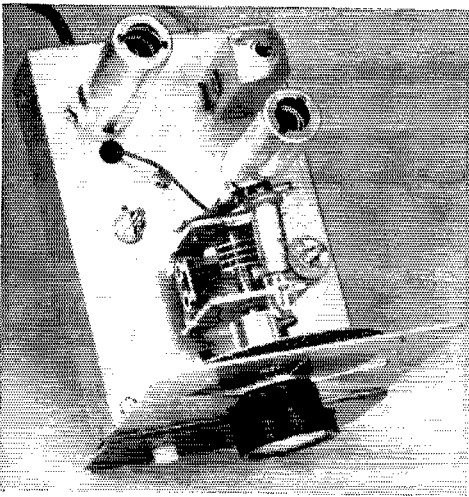
Price Class: \$140.

Manufacturer: Allied Radio, Chicago, Illinois.

The Knight-Kit V-107 V.F.O.

The Knight-Kit V-107 is a v.f.o. with 8-Mc. output for transmitters in the 6- and 2-meter bands. The actual output is from 8 to 8.22 Mc. (144-148 Mc.) for 2 meters or 8.333 to 8.666 Mc. (50-52 Mc.) for 6 meters. The v.f.o. must be recalibrated each time the band is changed. To

do this, the set screw holding the dial in place must be loosened and the dial rotated 180 degrees and the set screw tightened. The coil and capacitor used to determine the high and low ends of the band, respectively, are then adjusted for correct dial calibration.



Top view of the V-107 v.f.o.

The circuit is a standard Clapp oscillator using a variable capacitor in the grid circuit of a 12DK6. The plate coil is slug tuned to obtain

maximum drive to the transmitter. No multiplying is done in the v.f.o. The usual precautions are taken to obtain good stability. No power supply is included since the matching transceivers have sockets for the v.f.o. power plug.

A neon indicator is used in the B plus line to show when power is on. Power is controlled by the OPERATE/STANDBY switch on the front panel.

The circuit is designed to operate at low power to keep heating effects to a minimum. A voltage regulator tube is used in the screen circuit.

The cabinet matches the TR-106 and TR-108 transceivers.

— WIDEJ

Knight-Kit V-107 V.F.O.

Height: 5½ inches.

Width: 1¾ inches.

Depth: 6½ inches.

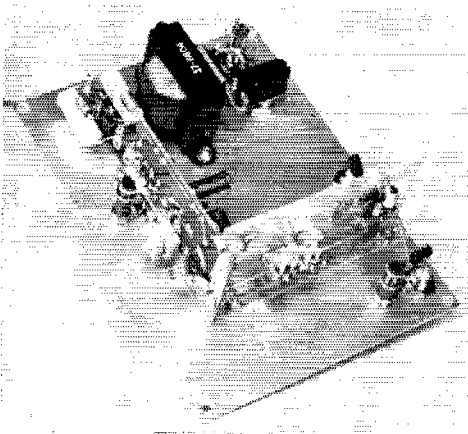
Power Requirements: 200 volt d.c. at 30 ma. and 12.6 volts at 0.15 amp.

Price Class: \$20.

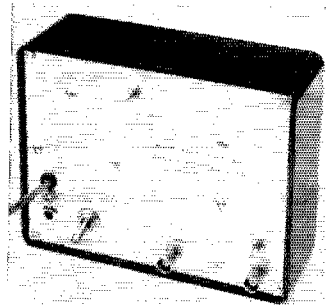
Manufacturer: Allied Radio, Chicago, Illinois.

The Parks 432-3 Converter

BIG news in 432-Mc. circles in recent months has been the development of inexpensive transistors that are capable of beating anything but a parametric amplifier when it comes to weak-signal u.h.f. reception. Here is a crystal-



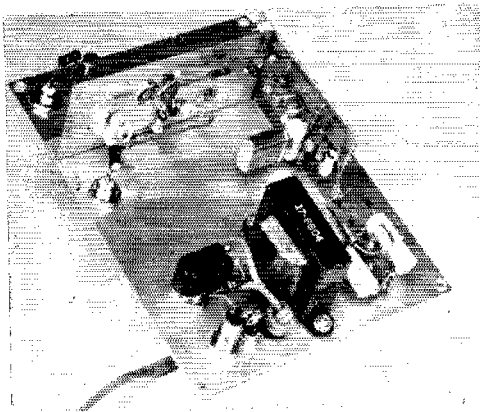
The oscillator-multiplier stages are on the circuit board at the left. R.f. and mixer circuits are on a silver-plated brass plate, lower right, with the mixer side showing.



controlled 432-Mc. converter that uses some of them to provide outstanding performance.

At first glance the Parks 432-3 Converter seems to have very little inside its shiny black and silver box, but closer examination shows that there is plenty for the job at hand. Transistors and diodes throughout, and neatly-designed line circuits for the u.h.f. stages, result in this air of seeming simplicity. To eyes accustomed to vacuum-tube devices for this frequency range the layout is almost devoid of parts and wiring, but the performance exceeds the best obtainable with tubes.

The r.f. amplifier and mixer transistors are TIXMO5s or 6s, or possibly others of the TI u.h.f. series, so long as they meet the manufacturer's specifications for noise figure: 4 db. or better. The oscillator and first multiplier stages also use transistors, and two crystal diodes in parallel multiply to the injection frequency. The converter tested has a 67.333-Mc. crystal multiplying to 404 Mc., for an i.f. output frequency of 28.0 Mc. and for a signal frequency of



Looking at the opposite side of the converter shows the r.f. amplifier components at the upper left, and the power supply in the foreground.

432.0 Mc. Other intermediate frequencies from 26 to 52 Mc. are available on order.

The r.f. and mixer stages are mounted on opposite sides of a silver-plated brass plate. The injection stages are on a laminated circuit board, the smaller of the two assemblies, running the long way of the converter. A small solid-state zener-regulated power supply occupies one end of the base plate. All r.f. circuits are silver-plated, and tuned with miniature air trimmers, accessible only from inside the box. The only controls brought out of the converter are the tuning screws for the slugs in the crystal oscillator and i.f. output coils.

The box is the shiny black insulating material which is familiar to all users of Parks v.h.f. and u.h.f. gear. It contrasts nicely with the grey-white of the aluminum base plate. Input and output connectors are BNC fittings.

Performance

Everyone wants a number that he can quote for receiver noise figure, preferably stated in tenths of a decibel. We do not go for such figures, for like most amateurs, we do not have the equipment necessary for accurate noise figure measurement. We are able, however, to make quite accurate comparisons, and on this basis the 432-3 Converter shows up very well indeed. In ability to detect very weak signals it was at least equal to the best we've yet seen, including average ham-type parametric amplifiers, adjusted to their peak performance.

Noise figure remains substantially constant over a range of 430 to 436 Mc., without repeaking of the front-end circuitry. The i.f. output circuit is fairly selective, however, with the result that the gain drops off markedly in covering more than about 500 kc. This is of no concern to most operators as nearly all weak-signal work is done in a narrow segment of the band, starting at 432 Mc. The mixer output circuit peaking affects only gain, and it can be repeaked casually for maximum response anywhere in

the band. The r.f. circuits may also be repeaked for parts of the band other than that near 432 Mc., but this should not be necessary in the 430-to-436 region.

Use of a high starting frequency (67.333 Mc. for 28-Mc. i.f.) results in less in the way of spurious response trouble than would be encountered with a lower crystal frequency and more multiplier stages. In a test at W1HDQ, where three u.h.f. TV stations and several v.h.f. TV and f.m. stations are within a few miles, the Parks 432-3 Converter showed far less trouble with TV birdies than does the converter regularly used. The latter has an injection string starting at 21.222 Mc., and a high-Q tank circuit is used in the antenna line to keep TV blips down to level where weak 432-Mc. signals can be copied. This should not be taken to mean that the Parks Converter is free of such troubles. It may need coaxial-tank help in congested areas, depending on frequencies used by nearby stations in the v.h.f. or u.h.f. ranges. The tuned circuits in the converter will not provide a high degree of rejection of unwanted frequencies.

—W1HDQ

Parks 432-3 U.h.f. Converter

Height: 2¾ inches, including connectors.

Width: 7 inches.

Depth: 5¼ inches.

Weight: 2 pounds.

Power Requirement: 115 volts a.c.

Price Class: \$55.

Manufacturer: Parks Electronics Lab,
Route 2, Box 35, Beaverton, Oregon.

Next Month



W.R.L. Duo-Bander 84

IMPORTANT NOTICE

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code*. Your promptness will help you, the postal service and us. Thanks.

Technical Correspondence

NARROW-BAND TV USING PSEUDO-RANDOM DOT SCAN

Technical Editor, *QST*:

Various experiments in narrow-band television performed recently at the Polytechnic Institute of Brooklyn indicate that a more efficient narrow-band TV system is possible than the systems which have appeared in *QST* to date.¹ Of particular interest are experiments with 2-kc. and 8-kc. bandwidth systems, including on-the-air testing of the 8-kc. system.

There are three main considerations in a narrow-band TV system: bandwidth, resolution and flicker. The bandwidth of a television system is given by the formula

$$B = FN/2$$

where B = bandwidth, F = frame rate and N = the number of elements per frame. This indicates that to decrease the bandwidth without losing resolution (i.e., without reducing N), we must reduce the frame rate. Unfortunately, reducing the frame rate increases the flicker. Even with a long-persistence phosphor, the flicker associated with a linear scan is disturbing at frame rates below 15 c.p.s.

However, we can use a frame rate of less than 2 c.p.s. and still avoid flicker by using a *pseudo-random dot scan*. Instead of scanning linearly, we break up the field into dots and scan them in a manner which appears random to the eye. Fortunately, we can produce a scan pattern which appears random with a few bistable multivibrators.

In the 2-kc. system constructed at Polytech, the scan is produced completely by square waves that are generated by bistables (11 are used). This produces a picture 32 elements wide and 64 elements high, a total of 2048 elements. The frame rate is 1.875 c.p.s. (60 c.p.s. divided by 32). The picture has the same number of elements as a 0.6 × 0.8-inch section of a New York Times photograph. The scan characteristics are shown in the table below.

Frequency of Square Wave c.p.s.	Direction	Amplitude, Elements Peak-to-Peak
1920	Vertical	32
960	Horizontal	16
480	Vertical	16
240	Horizontal	8
120	Vertical	8
60	Horizontal	4
30	Vertical	4
15	Horizontal	2
7.5	Vertical	2
3.75	Horizontal	1
1.875	Vertical	1

This system is even easier to synchronize than a linear scan. The upper-left-corner element is sent as a large negative (black) pulse. This is detected at the receiver and used to reset the receiver bistables to the transmitter bistables. A weak (30 db. down) sine wave at 1920 c.p.s. is added to the video signal. In the receiver, a 3840-c.p.s. clock is driven by a high- Q

¹ Macdonald, "A Slow-Scan Vidicon Camera," *QST* June, July, August, 1965.

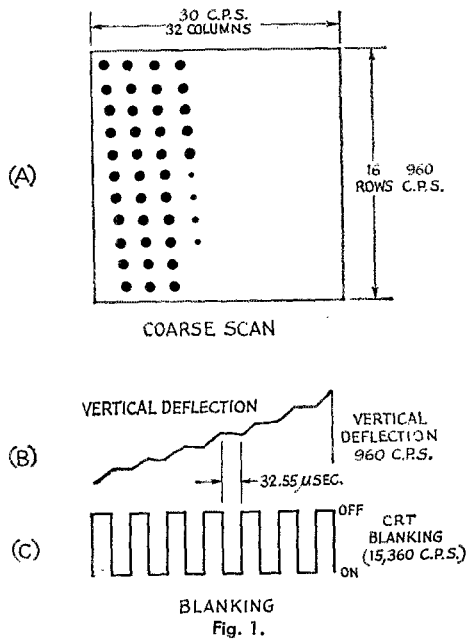
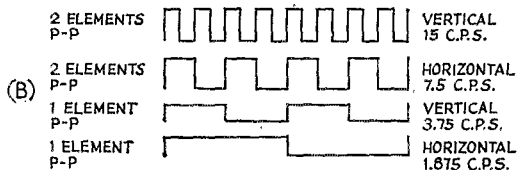


Fig. 1.

tank tuned to the 1920-c.p.s. component of the video signal. The 3840-c.p.s. signal is divided by the chain of bistables to produce the square waves for scanning.

In the 8-kc. system a linear coarse scan and a pseudo-random fine scan are used. This done by using 1.875 frames per second and 16 fields per frame. Each field contains 512 dots. Each field is displaced slightly from the preceding one, so that it appears as if we have 512 dots moving in a pseudo-random scan. The total number of picture elements is $512 \times 16 = 8192$. This provides plenty of detail to recognize a face, and will also reproduce motion if it is not too fast. The dots are formed by using a 960-c.p.s. staircase waveform (see Fig. 1) for the vertical sweep. The staircase waveform has 16 steps. A 15,360-c.p.s. square wave is used to blank the beam as it moves between the dots. A 30-c.p.s. sawtooth is used for the horizontal deflection. To produce the pseudo-random scan (see Fig. 2) square waves of 15 c.p.s. and 3.75 c.p.s. are added to the vertical deflection voltage, while 7.5-c.p.s. and 1.875-c.p.s.

PSEUDO-RANDOM SCAN PATTERN



PSEUDO-RANDOM SCAN VOLTAGE Fig. 2.

square waves are added to the horizontal deflection. Four synchronizing signals are needed in this system, two to synchronize the coarse scan sweep, one to synchronize the pseudo-random scan and one to synchronize the blanking.

On-the-air tests of this system indicate it would be a good system for amateur television. The use of the long-persistence phosphor and pseudo-random scan integrates out noise.

If we cut all sweep and blanking frequencies in half we get a system with a bandwidth of only 4 kc. Such a signal could be transmitted by a single-sideband partly-suppressed-carrier system and would take up no more room than a conventional a.m. phone signal.

Circuit details of systems used at Polytech can be obtained from Professor S. Deutsch, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn, New York, N. Y. 11201. — *Raymond Simpson, WA2PYX, 22 Carlisle Place, Merrick, New York 11566.*

LOW-PRICED PREMIUM TRANSISTORS FOR AMATEUR APPLICATIONS

Technical Editor, *QST*:

Selecting the best transistor for an amateur project was once a simple matter; only a few types were within the ham's budget. Today 2N numbers have progressed well beyond 3000 and the builder faces an almost bewildering selection. This problem is further complicated because manufacturers are slow to discontinue outmoded types; these are often sold in kits of transistors for experimenters or as "all-purpose" replacements, and frequently appear in circuits published for amateur construction.

The accompanying list of transistors represents some of the best buys currently available. Many

amateurs are already familiar with the 2N404 and 2N706. Several u.h.f. designs in *QST* have suggested the 2N3478 as a possible substitute for the high-priced 2N2857. Many of these transistors would have been considered "exotic" as recently as two years ago. The 2N2102, for example, is one of the most versatile transistors available.

Voltage, current, and power dissipation are maximum ratings. Gain-bandwidth (g.b.w.) is the frequency at which a video amplifier would have unity gain. However, in a tuned circuit considerable gain may still be obtained at this frequency. Note in particular that the high-voltage ratings of some of these transistors do not imply that they cannot be used in low-voltage circuits; the 2N2102 would behave (except for polarity) just like the 2N404 as a low-voltage audio amplifier. This is quite unlike the vacuum-tube case, where full gain depends strongly on plate voltage.

The Texas Instruments 2N3819 is the first low-priced field-effect transistor; its low noise and low intermodulation characteristics make it ideal for receiver front ends.

The 2N404 and 2N1970 are germanium transistors; all the rest are silicon types. Silicon transistors, by virtue of their low reverse saturation currents, are much more stable against thermal runaway. This is important, for example, in mobile equipment subject to temperature extremes, and in hi-fi output stages where germanium transistor designs often had to resort to protective diodes and even thermal circuit breakers. Moreover, germanium power transistors have high-frequency limitations, and considerable feedback is necessary to get full audio-frequency response in hi-fi applications. — *Jon B. Hagen, W7URZ/6, Route 1, Box 93-G, Del Mar, California.*

Transistor Table

Type	Manufacturer	Use and Ratings	Price
2N404	GE, RCA, TI	audio, digital, general-purpose, low-level use, 150 mw., 25 v.	\$.47
2N706	GE, RCA, SYL, TI	r.f. osc., am., switching, 300 mw., 25 v., 200 Mc. g.b.w.	\$.99
2N3640	Fairchild	r.f. osc., amp., video amp., ½ watt, 12 v., 600 Mc. g.b.w.	\$.75
2N3646	Fairchild	r.f. osc., amp., video amp., ½ watt, 40 v., 400 Mc. g.b.w.	\$.70
2N2102	RCA	r.f. osc., amp., video amp., (low noise) 5 watts, 120 v., 60 Mc.	\$ 1.41
2N3053	RCA	similar to 2N2102. 5 watts, 60 v., 100 Mc. g.b.w.	\$.99
2N3478	RCA	r.f. osc., amp., video amp., (low noise) 30 v., 900 Mc. g.b.w., noise fig., 5 db. at 470 Mc.	\$ 2.06
2N3819	TI	field-effect transistor, 200 mw., 25 v., $g_m = 5000$ micromhos, noise fig., 2.5 dbm. at 100 Mc.	about \$3.00
40264	RCA	power transistor, r.f. amp., 4 watts, 300 v., 50 ma., 25 Mc. g.b.w.	\$ 1.21
40313	RCA	power transistor, 35 watts, 300 v., 2 amp.	\$ 2.23
40251	RCA	power transistor, 29 watts, 40 v., 15 amp.	\$ 2.89
40250	RCA	power transistor, 29 watts, 40 v., 4 amp.	\$ 1.57
2N1970	Motorola	power transistor, 150 watts, 100 v., 15 amp.	\$ 2.35

STATION DESIGN FOR DX

Part II—Economics of Station Design and Construction

BY PAUL D. ROCKWELL,* W3AFM

IN the pursuit of amateur radio, dollar limitations are always present. What is the most practical allocation of available funds? Let us first illustrate an analytical approach to this question from the standpoint of effective DX-radiated power (DX e.r.p.). Assume 20-meter operation, flat terrain, no voice modulator, and optimum radiation angle of 1° . As a frame of reference, 0-db. will be taken for 100 watts c.w. input, 30-foot tower height, and 10-foot Yagi boom-length.

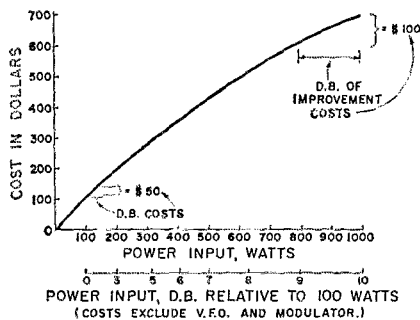


Fig. 3 — Transmitter power costs.

Transmitter power costs run about as shown on Fig. 3. The costs include driver, but exclude v.f.o. The curve would have to be shaded upward for first-class features, and downward for some home constructors. Make your own curve, if you prefer. What is being shown on this and the following curves is a design technique — not a universally applicable set of data. What is important to note, in this example, is that the last db. (from 780 to 1000 watts) costs \$100.

Now consider antenna costs. Fig. 4 presents these for Yagis. The db. gain values are relative to a half-wave dipole, same height and foreground. The next db. beyond 30-foot boom length costs \$200. Stacking two beams, which gives 3-db. gain at the expense of 40-foot additional tower height is attractive beyond about 30-foot boom length. However, this introduces the problem of rotating both beams without interfering with guys. The Telrex Big Bertha solves this by rotating a self-supporting tower. Such a tower, 112 feet high, equipped with antennas and accessories, costs over \$15,000 in place.

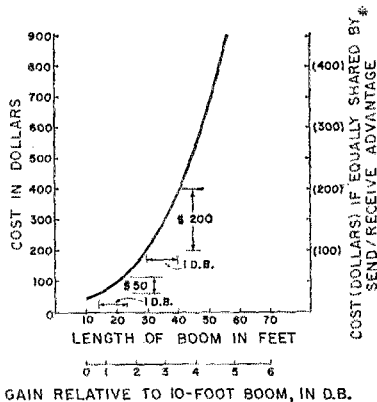
Now tower height. Fig. 5 presents costs, based on \$10 per foot for ordinary lattice tower, guys, anchors and foundations. Erection costs are

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added, beyond 40-foot height, up to \$400 for the 150-foot height. No allowance is included for rotator, indicator, insurance, etc. Gains are related to the assumed ideal of 1° takeoff angle by use of the image-antenna geometric construction. Analysis by the indicated technique shows that, to a close approximation, DX e.r.p. at 1° increases as the square of tower height. That is, each time the tower height is doubled, 6-db. improvement is appreciated. Because DX signals often arrive (and should be transmitted) at angles considerably above 1° , this figure must be weighted downward. Fig. 5 has been constructed on the basis of linear relation between e.r.p. and tower height — 3-db. improvement for each doubling of height. This agrees fairly well with Utlaut's results for very high effective heights.

The concept being developed is: Cost per db. for the last db. of improvement which can be handled economically. Suppose we can afford \$200 for the last db. By examination of the curves, we see immediately we should run 1-kw. input, for in this department the last db. costs only \$100. We choose from Figure 4 a boom length of 40 feet. Tower height per Figure 5 is 75 feet. Total cost, adding the corresponding ordinates of Figures 3, 4, and 5 is \$1980.00.

Perhaps this cost exceeds our means. Maybe we can afford only \$50 for the last db. in each of the three departments principally affecting DX effective radiated power (DX e.r.p.). On this



* COSTS IN PARENTHESES ARE USED FOR APPORTIONMENT PURPOSES IN CONSTRUCTION OF FIG. 6. TOTAL COSTS IN ALL CASES ARE TAKEN FROM THE LEFT ORDINATE.

Fig. 4 — Antenna costs.

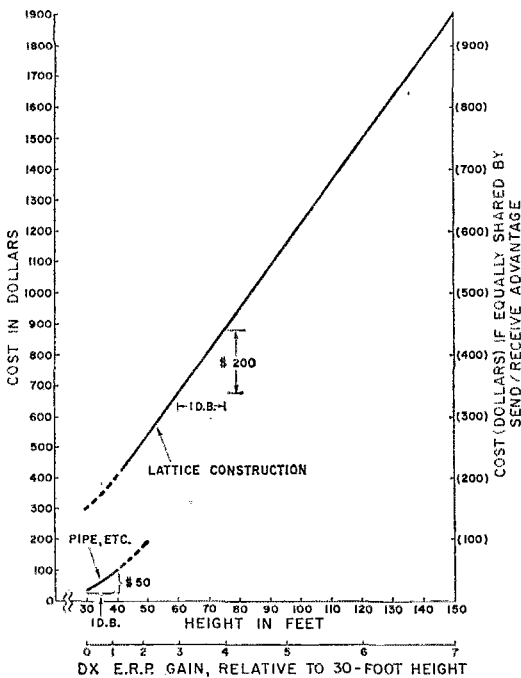


Fig. 5 — Tower Costs.

basis, we choose 150 watts, 23-foot boom, and 40-foot tower height. Total cost is \$350.00.

Once the concept is understood, curves may be developed to fit the individual situation, and to take into account all sorts of other variables: cable losses, fixed costs for auxiliaries, commercial increments of sizes, nested-rhombics-plus-real-estate versus Yagis, etc.

An important consideration, so far excluded in order to simplify the discussion, is the fact that antenna db. work both ways: send and receive. Appraisal of antenna and tower costs for DX e.r.p. should therefore be weighted, so as to allocate a share of these costs to the receiving advantage. A reasonable factor is one-half. That is, the dollar values of ordinates of Figs. 4 and 5 can be cut in half, for economic optimization of design with respect to DX e.r.p. only. On this basis, Fig. 6 shows optimum combinations as a function of funds available. The figure is constructed by assuming various dollars-per-last-db. values, and connecting the resultant values by curves. Of course the optimization differs somewhat from the \$50/db. and \$200/db. examples above, because the receiving components of costs have been broken out separately.

For example, suppose \$500 are available for the relevant parts of the station. Refer to "Total Cost" on Fig. 6 at \$500. Draw a line straight up. Parameters are: Power, 150 watts; Boom, 27 feet; Tower, 50 feet. Gain relative to the reference installation is 5.3 db.

If \$2000 are available, parameters are: Power, 1 kw.; Boom, 40 feet; Tower, 75 feet. Gain relative to the reference installation is 17.2 db.

Fig. 7 presents compatible equipment complements with regard only for DX e.r.p. — no allowance for concurrent receiving advantages. This represents a more conventionally accepted approach. In effect, transmitter power is given greater initial emphasis. These db. are cheap and more convenient than antenna/tower db., but do not bring corresponding receiving advantages. After the legal power limit is reached, optimization proceeds much as on Figure 6. For \$500, read off: Power, 275 watts; Boom, 26 feet; Tower, 44 feet; Relative gain, 7.3 db. For \$2000: Power, 1 kw.; Boom, 40 feet; Tower, 75 feet; Relative gain, 17.2 db.

Economically, c.w. telegraphy gives by far the most DX per dollar. Not only is this true because more DX stations are available by c.w., but also because of greater efficiency, expressed in db. as follows¹⁷:

- C.w. 0 db.
- D.s.b. a.m., order-wire quality. . . . +17 db. required
- S.s.b. order-wire quality. +14 db. required

S.s.b. DXers will nearly all aver that the table above should be corrected to read "11 db." instead of "14 db" for s.s.b.

After reading this, it is fair to ask: "What does a db. in DX e.r.p. really buy, after all, in terms of DX capability?" The answer is that, *other things being equal*, it buys a lot. Six db. buy, competitively, a decisive advantage.

So far, system-design trade-offs have been discussed. The matter of constructional alternatives is also important in station economics. The remainder of this month's text is on miscellaneous antenna-construction comments. An-

¹⁷ "Median Signal Power Required for Reception of Radio Transmissions in the Presence of Noise," Technical Report 5, U.S. Army Radio Propagation Agency, June, 1961.

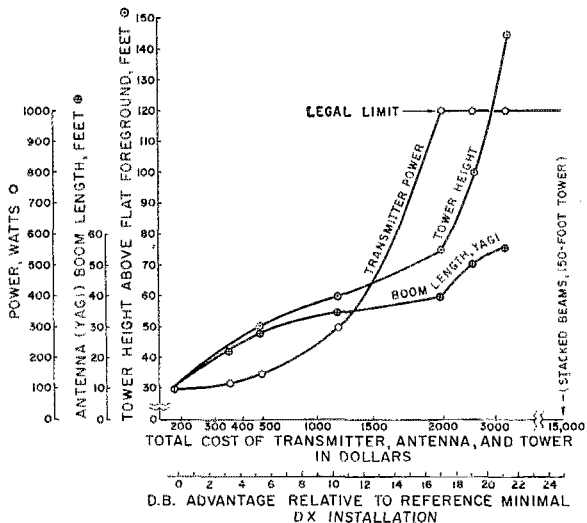


Fig. 6 — Compatible equipment complements (with allowance for receiver advantage).

tenna mounts are frequently the major item of home built equipment.

First, re antenna towers. There are fine products on the market. These firms also sell the numerous necessary and desirable accessories: brackets, clamps, clips, anchors, winches, guys, and even gin poles. Only a small percentage of DXers use these products, because the majority (a) can't afford them, and/or (b) home and neighborhood considerations won't permit them. Speaking in generalized terms, short of all-out optimum performance, a practical and almost universally applicable construction is to use telescoping pipe sizes, side-supported to the house, with a hand-winch for running the antenna up and down. This is what is done at W3AFM. Some particulars follow.

The cheapest and most universally available mast structural element is water pipe. It comes in 21-foot lengths. It should be ordered black, unthreaded. Local suppliers usually deliver. Prices run about \$10.00 a length, depending on weight. Figure 12¢ to 20¢ a pound, depending on discounts, location etc. Sizes are confusing, because they are based on nominal i.d. of the standard weight. "Extra strong" and "double extra strong" are of the same material, but smaller i.d. (same o.d., to match fittings) for greater wall thickness. Some examples are given in the table below, in which "XXH" means "double extra heavy":

Size (in.)	Type	o.d. (in.)	i.d. (in.)	Wall Thickness (in.)	Weight (lbs./ft.)
1½	Std	1.900	1.610	0.145	2.72
	XH	1.900	1.500	0.200	3.63
	XXH	1.900	1.400	0.400	6.41
2	Std	2.375	2.067	0.154	3.65
	XH	2.375	1.939	0.218	5.04
	XXH	2.375	1.503	0.436	9.03
2½	Std	2.875	2.469	0.203	5.79
	XH	2.875	2.323	0.276	7.66
3	Std	3.500	3.068	0.216	7.58
3½	Std	4.000	3.548	0.226	9.11

Many Yagis are made to mount on 1½-inch pipe. Speaking in generalities, and depending on prevalent winds, antenna, etc., 16 feet of unsupported height (i.e., 16 feet above guy attachment or last bracket) can be good design, whereas 20 feet can be risky. It is wise, if using water pipe, to telescope sections, in such a way that the top 10 feet are single-wall, next 10 feet double-wall, next 1 foot triple-wall, etc.

Steel much better than water-pipe iron exists. Chrome-molybdenum electroweld or seamless AISI 4142, heat-treated to 180 k.p.s.i. looks great — but costs ten times as much per pound and seems almost impossible to get in less than mill lots.

A popular mast in the Northeast is Diamond "E" (1020 cold-drawn steel) 2 inches o.d. by 0.25-inch wall × 20 feet long, selling for about \$60.00. So far as known, one of these has never folded.

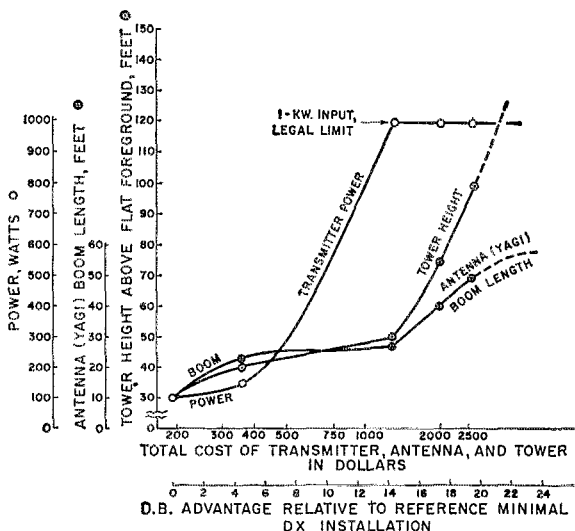


Fig. 7—Compatible equipment complements (DX e.r.p. optimization).

Aluminum alloys have a modulus one-third that of steel. This can make them very willowy, unless kept short, and thick-walled.

In the best installations, the mast or top tubular-section of the antenna-mount, projects only a few feet above the main steel-lattice tower. The rotator is then a few feet below the top of this tower. Sometimes, for reasons previously mentioned, a lattice tower is not practical. In such cases, the pipe mast is extended down to the ground, and the rotator mounted near the ground. Such an antenna support is commonly clamped, loosely so the antenna can be turned, to the side of a house. When this is done, it is important to spread the stress on the house structure. This is done by angle-iron, channels, or wooden members, coupled typically by ½ inch threaded bolts all the way through, for example, the attic walls. At W3AFM, a vertical 2 inch × 6 inch × 12 foot plank is bolted to the side of the house, with 2 inch × 4 inch × 6 foot lateral stress-spreaders horizontally inside the attic wall. The strongest wood commonly stocked is oak. Clear white oak, unfinished, and suitably stained, is used. The vertical plank is attached by four ½ inch bolts, and projects 4 feet above the peak of the roof. Three husky electrical clamps attach the mast to this plank. The second 21 foot pipe section up from the ground is slotted to fit over a ½ inch dowel in the lowermost 21 foot pipe section: so the antenna may be lowered to a height reachable from the roof by first raising it a few inches, then lowering the disengaged part to the ground.

Such a load requires work advantage. Boat winches, available from Sears or Ward's at about \$25.00, are well suited to this purpose. Half-inch polyethylene boat rope is a good value.

It can be dangerous and expensive to economize on small hardware fittings: eyebolts, U-bolts, clamps and the like. Items stocked at Sears,

(Continued on page 156)

"QSL . . . Solid Copy"

BY JOHN G. TROSTER,* W6ISQ

"WB6BBO de KH6FHA. Hr SET msg . . .
NR 1 TEST EMERGENCY KH6FHA CK 14 KAILUA
HAWAII 1700Z OCT 1 F.E. HANDY ARRL NEW
INGTON CONN THIS IS TEST MESSAGE STOP
ADVISE ARRIVAL TIME RED CROSS REPRE
SENTATIVE STOP ARL SEVEN R. O. DAME
KH6FHA

"KH6FHA de WB6BBO . . . QSL . . .
solid copy . . . get it right out . . . '73.' Cheesh,
for a emergency message, that fella sure sent a
awful lot of mistakes and extrastraneous stuff.
A course, he was going about 45 w.p.m. so I
might of missed a letter now and again. But in a
emergency, there ain't time to slow down and
worry about all them dits . . . I always say . . .
yeah. Boy, if Mr. Handy ever saw how this
thing arrived . . . Whhheew! Guess I'd better
fix it up a bit! Everybody *knows* it's only a
test, soooo don't need that part. And who needs
the 'ck' and 'QTH'? . . . change the time to
local . . . and *everybody* knows Handy, sooo
. . . and tighten up the text a bit . . ."

"W9BRD de WB6BBO. QTC 1 Conn."

"WB6BBO de W9BRD. Just leaving for a
football game, but can shoot it through to-
night . . . QRV."

"Good enough . . . (yeah, anything's okay
just so's I can get it off *my* Back!) Guess I'd
better crank up the keyer wide open. If it's a
emergency message, ya gotta send it fast . . .
dit.ditditititititit

KH6FHA 7 AM OCT 1 HANDY TEST XRAY
PLEASE ADVISE ARRIVAL RED CROSS REPRE
SENTATIVE XRAY ARRL 7 DAME KH6FHA

"WB6BBO de W9BRD . . . QSL . . . solid
copy. (Get it out tonight after the victory cele-
bration . . . rah rah rah . . ." * * * . . .

"Oooops, forgot that one for Handy. That
victory celebration last night . . . too sweet
and too late . . .ooooo. Hmmmmmm, must
be a 'SET' message. Guess it's that time of year.
Oughta make up a 'number' and 'QTH.' And
I'd better fix that 'date' . . . somebody'd get
mad if they knew I kept it a day! And what's
Handy's first name? . . . and the state. Ooooh,
this text needs work . . . much too sloppy. And
who needs a 'signature' in a emergency? Okay!
W2ISQ de W9BRD. One for Conn."

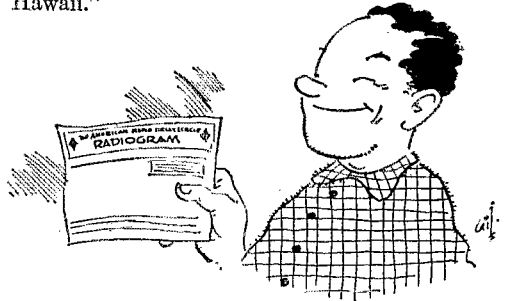
NR 1 KH6FHA HAWAII 7 AM OCT 2 FRANKLIN
HANDY CONNECTICUT TEST MSG X ADVISE
ARR RC REP AT ARRL X 73

"W9BRD de W2ISQ.' QSL . . . solid copy!
. . . Boy, Mr Handy would really go into oscil-
lation if he saw what came through! Wow! If
I sent this to WIAW like this . . . why, why
they'd tear up my ORS! Better fix it. Lessee, it
needs a 'precedance' . . . look up KH6FHA's
QTH in the book . . . make the time 'zulu' . . .

and date! . . . eeeee . . . *can't* be Oct 2 in
Hywiiee yet . . . or maybe it's Oct 3? . . . oh
well, back up one just in case . . . it shouldn't
arrive before it's sent. Aaaand, Mr. Handy's
kinda sticky about using a complete address . . .
and his name ain't what it says here . . . it's
ahhhhhh . . . oh well, use initials. Annnnd . . .
this text . . . wow. Really gotta work this over.
This is a test message . . . use 'stops' . . . spell
out words . . . and that RC fella just *can't* be
arriving at ARRL . . . must be arrival in KH6.
Sure. And that 'ARRLx73' . . . hmmm
. . . don't make sense. No time for pleasantries
in emergencies. Maybe it's a numbered message
. . . like 'ARL 73' . . . but there's no message
number '73.' Ahhhhhh, yes . . . gotta be 'ARL 7.'
Aaaand, 'signature' ? ? ? Hmmm . . . must
be KH6FHA. Get his name in the book. And
now the 'ck' . . . much better now.
'WIAW de W2ISQ . . . SET tfc for u.'"

"W2ISQ de WIAW QRV . . . * * * . . .
QSL . . . wl fone FEH immediately."

"Mr. Handy, this is the operator at WIAW.
Just received a SET message for you from
Hawaii."



QSL . . . solid copy . . .

"Good. Read it to me please and I'll check
it against the original we sent to KH6FHA to
use in the test."

"Here it is . . .

NR 1 TEST EMERGENCY KH6FHA CK 14 KAILUA
HAWAII 1700Z OCT 1 F. E. HANDY ARRL NEW
INGTON CONN THIS IS TEST MESSAGE STOP
ADVISE ARRIVAL TIME RED CROSS REPRE
SENTATIVE STOP ARL SEVEN R. O. DAME
KH6FHA

"Astounding . . . perfect . . . absolutely
letter perfect. A little late but absolutely remark-
able. We can't do this well around here with
our office memos! Must be extraordinary opera-
tors who handled this. Would you please send
a tracer. Get the calls of all stations who handled
that message. We must commend each of them
publicly in "Operating News." After all, this is
the solid copy accuracy and attention to duty
and detail we've been striving for all these years."

* 45 Laurel Ave. Atherton, Calif.

QST

97.73 — or Bust!

In Two Parts — Part I

BY DAVID A. LIEN,* WA6YMY, ex W4PAI, W0ZSR

SAY, OM, I got an "Official Observers Cooperative Report" in the mail today, and he sez my signal is f.m.ing. How does the signal sound to you?"

"Looks O.K. on my scope here. I don't see any f.m."

"Well, . . . guess the OO must have copied the wrong call or something. I've never had f.m. problems here before — that I know of anyway. Thanx for the check, OM."

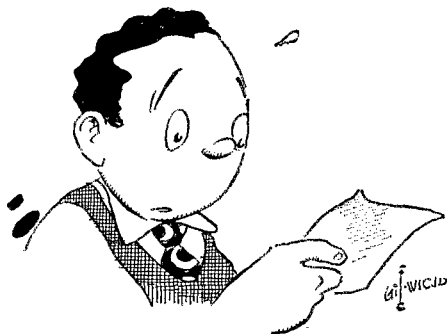
Sounds familiar doesn't it? Just another on-the-air signal check. But did you catch the probable error in the conclusion drawn as a result of this "check"? Unwanted frequency modulation of a signal is easily detected by simply turning on the receiver b.f.o. and noting if the beat note between the incoming carrier and the b.f.o. varies with modulation. F.m. however is NOT readily seen on a scope of the quality usually found outside a laboratory, thus the merits of this test are in considerable doubt.

Step number one following receipt of an OO, Cooperative Report is: Confirm that the problem indicated does (or does not) exist, by monitoring your own signal. With only your station receiver as a testing device, and the knowledge of how to use it, you can discover all sorts of things about your own signal. Add an inexpensive scope (and the knowledge of how to use it correctly) and you're really in the amateur signal analyzing business. But . . . let's start at the beginning.

Who is an OO?

ARRL Official Observers are hams, just like those found in the rest of the fraternity, differing in only the following ways: They have a sincere desire to be of aid to the amateur service, and have so indicated. They have been as carefully screened as is possible in a strictly volunteer no-pay organization, with effort made to screen out the amateur vigilante, those with grudges to bear against certain segments of the fraternity, and those whose sincerity in wishing to aid is doubtful. And perhaps most important, the OO must be technically competent. Part of the screening (by local SCM, and Hq.) is a written paper covering theory as applicable to signal

* 7866 Airlane Ave., Los Angeles, Cal. 90045



I got an Official Observers Cooperative Report in the mail today!

monitoring, with emphasis on the pitfalls which may cause incorrect conclusions to be drawn about a signal under observation.

The average OO loves to ham, and the time he gives to observing is completely gratis. This time must be subtracted from the normal time he has available for ragchewing, DXing, construction, contests, or whatever he prefers. Likewise, the time he spends personally assisting notice recipients in finding their troubles, both on the telephone and in person, is time which he willingly gives additionally.

As an unpaid volunteer, he helps keep the hands clean by looking for signals which are deteriorating in quality. By catching these signals *before* they are caught by observant FCC monitors, fellow hams are spared FCC citations. FCC citations are not just figments of someone's imagination. They are really being issued, in quantity, but most recipients are too embarrassed to acknowledge a citation to fellow hams. I have one framed and hung on the wall as a reminder of my close scrape with the FCC a few years ago, during sweepstakes. No Official Observer got to me first to point out that my v.f.o. had decided to become a happy wanderer.

There are some gross misunderstandings afield. An Official Observer does not have the authority to "cite" anyone for anything. The "Official Observer Cooperative Reports" are just what

The purpose of this article is to assist hams who have received OO Cooperative Signal Discrepancy Notices in achieving compliance with the Technical Standards of the FCC Rules and Regulations. Particular attention is given to those technical violations covered by section 97.73. This is not a step by step "solder the 3 wires found on pin 7" article, but one that will help you (1) confirm that the trouble does (or does not) indeed exist, (2) locate the probable cause of the trouble, and (3) point out the right direction to follow in curing it. Armed with this knowledge, you should be able to take advantage of the OO's signal report, and return your signal to one in which you can take pride.

their title indicates, and are in the best Amateur tradition of self-policing and mutual assistance. The OO's obligations are of the same order of magnitude as his authority. He *owes* you only as much as the next ham, although he is probably willing to help you considerably more. Since his responsibility ends with the mailing of a discrepancy notice, the final responsibility for the quality of your signal rests with *you*.

The Hams Response

People in general are funny (guess the radio/TV program by the same name proved that), but when it comes to their favorite hobby it becomes especially evident. Hams are not at all unlike owners of TV sets who hit the ceiling when told that there may be something wrong with their expensive "pride and joy." Having sent out nearly a thousand OO Cooperative reports in the last several years, and having kept close track of the responses offered to these reports, here is how the reactions seem to fall:

Group A: This group, a large one, realizing that component deterioration is quite normal and is to be expected, will check out the report, perhaps contact the cognizant OO for assistance, find the trouble, repair it, and perhaps send a "TNX" letter or QSL to the assisting OO. (One drawer here is stuffed with them).

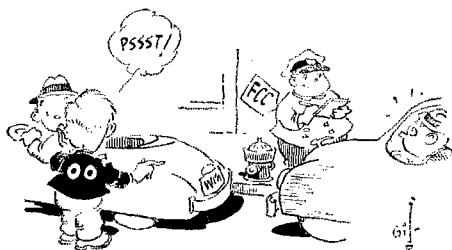
Group B: This group throws the card away, having made only a feeble attempt (or no attempt at all) to investigate the report.

Group C: This group, a small but vocal one, doubts or pretends to doubt the integrity, veracity or competence of the Observer, and calls or writes and wants to argue, or compare technical credentials. It often develops that good test equipment is on hand, but is either not being used correctly or not being used at all. The biggest problem this group seems afflicted with is a bruised ego.

Group D: This tiny group (0.3 of 1% of the attempts to be of help here), for reasons best known to psychiatry, fly into a rage with perhaps the reaction "... I ain't got no time for the ARRL or anyone associated with ... etc."

Looking at this breakdown, it would appear that amateurs react pretty much as one would expect the general populace to react under similar circumstances: *Group A:* The good guys, conscientious, aggressive, not content to have any-

thing but the best signal possible, quick to investigate any report (from any source) that their signal may be deteriorating, and determined to fix it. *Group B:* More good guys, but for reasons unknown, not motivated to carry a report through to its conclusion. Probable reasons include lack of self confidence to investigate the problem; or, having investigated it by inadequate on-the-air checks, decision that the signal can't be too bad; or forgetfulness; or laziness; or in some few cases, maybe just don't care. *Group C:* In many cases, here are victims of the great volume of electronic misinformation that permeates some of the bands. This group, having overcome a bruised ego, would doggedly pursue the trouble until found. *Group D:* As a certain percentage of the population is made up of "kooks," it's understandable that a few get ham licenses.



An OO does not have the authority to cite anyone for anything.

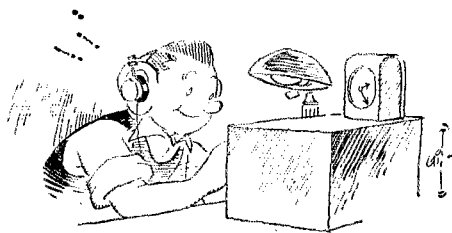
Brass Tacks

Enough background information. Let's get down to brass tacks and examine some common technical problems. Let's assume (for our first example) — you've received an OO "Cooperative Report" that indicates your signal was chirping. This is one of the many technical violations covered by section 97.73).

As stated at the beginning, the first step in bringing a report to a satisfactory conclusion is to confirm that the problem indicated does (or does not) exist, by *monitoring your own signal*. This may be done by listening to yourself on your own receiver, or by trading stations with a ham a few miles away and listening to your signal on his receiver. The "strictly amateur" way (and not in the sense in which we like to use the phrase) to check out your signal is to get on the air and get some "reports." This method is notoriously unreliable. Consider for a moment the value of S-meter reports. They are more of a joke than a tool, and the same holds true of most other on-the-air reports. Getting on the air to check your signal is the *last* step in a repair job, not the first. The "professional" way to go about analyzing your signal is to eliminate the vagaries of the atmosphere and the operator on the other end.

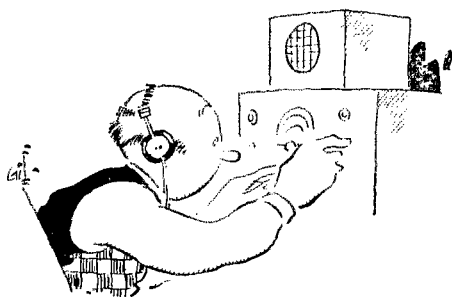
Listening to Yourself

One of the popular myths or half-truths that is heard on the bands is that "if the transmitter



OOs are hams just like those found in the rest of the fraternity.

and receiver are too close to each other, the receiver will give false readings." As stated, this is wrong. A normally well-shielded receiver, in the proximity of a normally well-shielded transmitter, will function normally. What is important is that the amount of r.f. from the transmitter which reaches the receiver's antenna terminals must be limited. If the r.f. at these terminals is such that the S meter reads less than S9 with the r.f. gain up full and the antenna trimmer or preselector peaked for maximum, the receiver will monitor your own signal as well as any other incoming signal. As an engineer I've operated 100-kw. transmitters into dummy loads and monitored the signal with receivers and spectrum analyzers in the same room, without overloading. This monitoring technique is standard operating practice.



Listen to yourself.

Listening to yourself requires a few simple accessories. To listen to a phone signal you will need headphones. A dummy load should be used on the transmitter for extensive testing, but you will want to make a brief test using the antenna, if for no other reason than to exclude it from consideration as a source of the trouble. (Remember what section 97.73 says about excessive on-the-air tuning and testing, though). It will be necessary to bypass the receiver mute terminals, in order that the receiver remain on during the transmissions. Last, but not least, you must control the amount of r.f. that reaches the receiver antenna terminals.

With low-power transmitters it is normally sufficient to disconnect the antenna from the receiver. At higher power levels it may be necessary to short the antenna terminals together with a short wire. If this does not reduce the signal level below S9, it will be necessary to improve the shielding of the transmitter. If you are using a legitimate resistive load (not light bulbs) you should have no trouble keeping the r.f. level below the point of receiver overload. If you find you are so well shielded that you don't get enough r.f. to the receiver for reliable monitoring (how sweet that is) connect enough wire to the antenna terminal to bring the signal level up to S6 or S7.

Having so equipped your receiver for the task, you are ready to monitor your own signal. If you have only a transceiver, borrow a receiver from the ham who keeps borrowing your multimeter.

Chirp

To quote from the keying chapter of the ARRL *Handbook*, "Chirp is an easy thing to detect if you know how to listen for it, although it is amazing how some operators will listen to a signal and say it has no chirp when it actually has." "The least satisfactory way (to determine whether or not it exists) is to ask another ham on the air how your keying sounds, although this seems to be a very popular method. . . . In many cases they don't actually know what to look for or how to describe any aberrations they may observe." Thus the importance of checking your own signal.

Load up the transmitter on the band which was noted on the OO signal report, and tune in the signal on your receiver. Adjust the b.f.o. so that a low-frequency beat note is heard (a few hundred cycles or less). Key the transmitter on and off *slowly*, listening for a change in pitch in beat note between the first and last part of the pulse. If the chirp is severe, it will be noted during the first few cycles of the c.w. pulse. If the chirp is less severe it may take several tenths of a second for an appreciable frequency shift to occur. In a properly-operating transmitter, there should be *no* shift in frequency between the first part of the pulse and the end of it.

Adjust the b.f.o. to the other side of your signal. If the chirp was down in frequency before, it will now be upward. Listen to your signal both ways, as some people can hear the chirp better one way than the other.

Having ascertained that the transmitter is chirping, how do we fix it? First, we have to recognize the cause of chirp. Chirp is caused by some electrical change in the oscillator circuit, be it a crystal oscillator or a v.f.o. The most common cause of a change in frequency is a change in oscillator tube screen or plate voltage. As the key is depressed, causing the final tube to draw large amounts of plate current, the power supply voltage drops, and if this drop in voltage is allowed to be reflected back to the oscillator tube, the oscillator frequency will change, or "chirp."

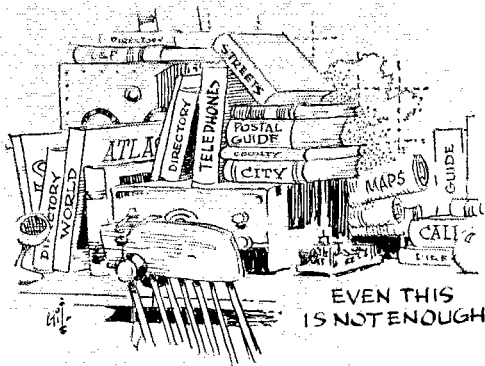
The first place to look for trouble in any piece of malfunctioning electronics gear is the tubes. If you understand how a tube tester works, and what it can and cannot do, it is a powerful trouble-shooting tool. Without taking space here to cover the details of operation of the several kinds of tube testers in use, and the virtues and demerits of each, let the following suffice: If a tube tester says a tube is bad, it probably is. If the tester says the tube is good, it *may* be.

If your transmitter is more than several years old, chances are good (or bad) that the electrolytic capacitors in the power-supply filter have started to deteriorate, and their filtering ability has decreased. This in turn affects the regulation of the power supply. If chirp is still noticeable after having provided the rig with good tubes, look to the filter capacitors.

Another source of potential trouble is the

(Continued on page 154)

GBA



Or, Why Not Address Them Right in the First Place?

BY LOUISE RAMSEY MOREAU,* WB6BBO

ONE of these years there is going to be a night when the entire Traffic Fraternity will rise in a moment of solemn, ceremonial silence at their stations, turn to the calendar, put a red circle around the date, and preserve it forever as the most amazing night in all traffic history — the night that every message had a complete address. This eventful night will be followed by a second, equally rare one, when no service message went through the nets with that 120-year-old letter group *GBA* in the text, meaning: "Give Better Address."

The average amateur is very careful to send "name & QTH" when requesting a QSL for his collection for a certain certificate. When he writes to the companies regarding equipment, he makes sure the address is complete. When he writes to his friends, he sees to it that the full name, house number, street, town and zip code are included. He wouldn't think of sending a letter addressed to The Meyers Family, Babcock Boulevard, Pittsburgh, Penna. Nor would he dream of wasting an airmail special-delivery stamp on a letter addressed: Carolyn, % Martha Nicholson, Columbus, Ohio. And, if it were even

* 1036 E. Boston St., Altadena, Calif. 91001

suggested that a letter be addressed to Thomas Martin, 2116 Evergreen Street, California, USA., he would write the idea off as coming from someone with an awful lot of stamps to waste because the Post Office has a nice rubber stamp in purple ink that reads "insufficient address" that they apply before they shoot it back to him.

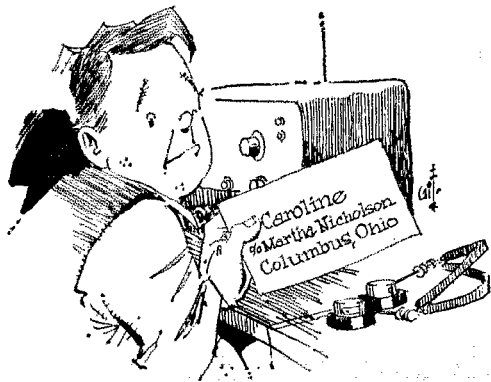
If a letter is worth sending at all, it is worth sending with an accurate address, or back it comes.

The same is true with radiograms that keep the traffic nets going. Yet night after night the messages come through the system, arrive at a terminal station for delivery, and, the following night, the traffic net version of that purple stamp, Please GBA, follows the reverse route of the message to the station of origin.

So often the zeal to demonstrate this facility of our public service causes us to sacrifice accuracy for show. A neighbor is about to visit a friend in another city and lists the arrival date and time, but can't remember the full address so the message starts on the section net to "The Meyers Family AA Babcock Blvd AA Pittsburgh Penna." A Priority message regarding a very important event ends up delayed because the address is to "Carolyn AA % Martha Nicholson AA Columbus Ohio." An Amateur friend decides to go on vacation, and off go messages addressed to "WA6XXX/3 AA Baltimore Md."

The experienced members of the traffic nets are amply supplied with all sorts of aids to route traffic. Their desks sag under post office directories, call books, telephone directories, maps, city directories, street guides, but it would take the combined services of a crystal ball, ouija board and a fortune teller to route these messages to their destination. The Meyers Family will never get the news of the impending arrival, Carolyn is unaware of her well wishers as she is crowned queen of the prom, and, unless

(Continued on page 164)





Hints and Kinks

For the Experimenter



NEON LAMPS

A LITTLE-known source of small neon bulbs for use as r.f. indicators and pilot lights can be found in defunct fluorescent-light starters. — *Kenneth G. Kopp, WA4HAA*

V.H.F.-U.H.F. SIGNAL SOURCE

WHILE checking a 432-Mc. converter, I discovered that the simple one-transistor crystal test oscillator described by W3GKP in the "Hints & Kinks" column of *QST* for February 1965 makes a very potent v.h.f.-u.h.f. signal generator if a reasonably good v.h.f. transistor is employed. Using a 2N706 and an 8-Mc. crystal, strong harmonics in the 420-Mc. band were obtained. (Since the 2N706 is an n-p-n transistor, the battery polarity of the original circuit must be reversed as the test oscillator was designed for p-n-p types.) Harmonics in the desired range may be enhanced by connecting the oscillator output to an antenna which is resonant at the desired frequency. With quarter-wave whips on both the oscillator and a 432-Mc. low-noise converter, the signal was easily detected when the antennas were twenty feet apart and was considerably over S9 with an antenna separation of a couple of feet. This simple oscillator compares favorably in signal strength and stability to a complicated signal generator using a 72-Mc. crystal, two good u.h.f. transistors and a diode multiplier. — *Gerald R. Lappin, W4WQZ*

ADAPTER FOR MIKES WITHOUT P.T.T. SWITCH

HAVING recently purchased a Heath HW-12, and not owning a microphone with push-to-talk control, I had to build an adapter for use

between my mike and the mike jack on the HW-12. The circuit shown in Fig. 1 enables the operator to use S_2 to control the transceiver in the same fashion as would result from a p.t.t. switch on the microphone. By placing S_2 in the "off" position and activating the circuit with S_1 , normal VOX operation results.

The adapter is built in a $1\frac{1}{2} \times 2\frac{1}{4} \times 3\frac{1}{4}$ -inch Minibox. Terminals 1, 2 and 3 are connected to a 12-inch length of 2-conductor shielded mike cable which is terminated with a microphone plug that mates with the mike jack on the equipment used. An Amphenol 80MC2M plug is used with the author's HW-12. J_1 can be selected to match the existing plug on the operator's mike. S_1 is a s.p.s.t. toggle switch; S_2 is a d.p.s.t. toggle. — *Norm Bradshaw, W1DJV/W8EEF*

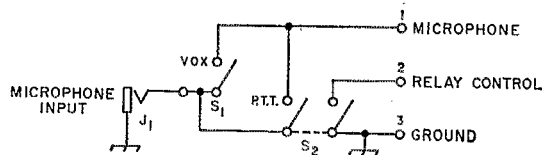


Fig. 1—W8EEF's microphone adapter.

QUICKIE ANTENNA FOR 2 METERS

A low-cost 2-meter mobile antenna can be made from a Millen 37001 high-voltage connector and a 19-inch length of small-diameter brass rod, such as brass welding rod, as shown in Fig. 2. Once the whip has been soldered to the male connector, epoxy cement can be used to fill the top of the cap, making the unit quite rugged. The antenna can be mounted any place on the car and will be weatherproof as long as a rubber gasket is placed between the Millen fitting and the car body. This scheme is particularly useful for center-roof installations. Brass screws are recommended for securing the mount so that rust will not form. When desired, the antenna can be unscrewed from its mount and stored inside the car. — *WICER*

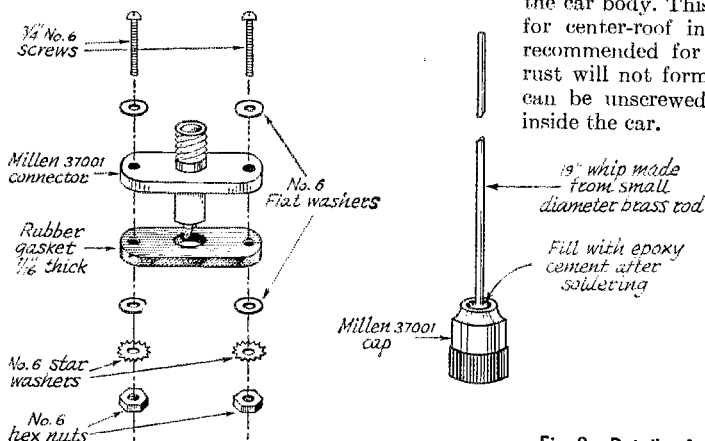


Fig. 2—Details of simple 2-meter mobile antenna.

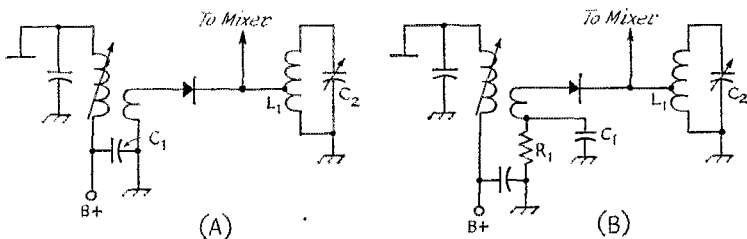


Fig. 3—(A) Typical diode multiplier circuit. (B) Modified multiplier circuit for increased harmonic output.

C_1 —Button mica, standoff or feedthrough ceramic.
 L_1 - C_2 —Tuned circuit, set to desired harmonic.

R_1 —Bias resistor, value determined experimentally.

IMPROVING OUTPUT FROM DIODE MULTIPLIERS

A diode multiplier can be made to produce considerably more harmonic output if it is biased, as shown in Fig. 3. This is particularly effective when the order of frequency multiplication required is high, as it frequently is in converters for 220 Mc. and higher bands. For example, the 220-Mc. converter in the *Handbook* requires quadrupling from 51.5 to 206 Mc.

Particular attention should be paid to the bypass capacitor C_1 ; preferably it should be a button mica, standoff or feedthrough ceramic type. The tuned circuit, $L_1 C_2$, should have high Q at the desired frequency to discriminate against unwanted multiples of the driving frequency as much as possible.

— Frank Greene, K5IQL

(Several factors determine whether biasing a multiplier diode will increase the level of a particular harmonic. Important considerations include the amount of drive available, the value of the bias resistor, the order of frequency multiplication, the type of mixer and the method of mixer injection. The usefulness of diode multiplier bias in any circuit is best determined empirically. — Editor.)

MINIATURE TOROID CORES

WITH the advent of r.f. transistor circuitry, the small toroid coil and transformer have come into great favor due to the toroid's high coefficient of coupling, low losses and high permeability. However, miniature toroid cores are sometimes difficult to find.

A good source of suitable cores, both ferrite and powdered iron, is the threaded slug with a hexagonal hole through it, intended for use in an inductively-tuned coil. As shown in Fig. 4, these $\frac{3}{8}$ inch long by $\frac{1}{4}$ inch diameter cores make excellent coil forms. The coils can be wound bifilar, and since only a few turns are needed, fine wire can be used without significantly reducing the Q .

Although permeabilities vary greatly with different materials, the threaded cores usually fall into two general categories: the ferrites, which are dark gray in color and are quite shiny, and the powdered irons, which are lighter in color and dull in texture. The ferrites are good to about 2 Mc., while some of the powdered

irons are usable to several hundred Mc. Formulas for approximate inductance using the $\frac{1}{4}$ -inch diameter by $\frac{3}{8}$ inch long forms are:

$$L = 0.65N^2 \text{ (for ferrite)}$$

$$L = 0.02N^2 \text{ (for powdered iron)}$$

where L = Inductance in microhenrys.

N = Number of turns.

— Dan Tomcik, K8ZQE

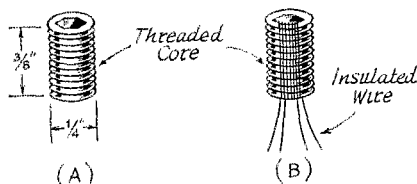


Fig. 4—(A) Threaded core as removed from slug-tuned coil. (B) Miniature core with bifilar-wound coils.

ANOTHER METHOD OF FORMING VINYL CABLE LACING

A HINT by KØPQW on fashioning cable lacing, described in the seventh edition of *Hints And Kinks*, although relatively simple to employ, has several disadvantages. The lacing can become undone easily by vibration and cannot be used readily for harnessed wires that bend at sharp angles. Furthermore, if the cable consists of parallel-oriented wires, which is the usual case, there will be a tendency for individual wires to pop out of the slit.

A method I have used for years overcomes these objections and also utilizes the vinyl jacket from coaxial cable. Instead of splitting the jacket longitudinally, I cut the vinyl covering with a knife placed at an angle to the length of the cable. The cable is simultaneously pulled and twisted with the left hand in such a way as to make a spiral cut in the jacket. The cable can be kept in the correct position by a simple jig consisting of a board and three nails while the knife is held by the right hand. Removing the vinyl spiral from the coax and wrapping it around the new cable completes the operation. For that "professional look," the ends of the spiral may be trimmed with a pair of scissors and secured with a couple of turns of $\frac{1}{2}$ -inch black vinyl electrical tape. — Erling R. Jacobsen, K4OJY/9

RESULTS

ARRL International DX Competition

28 MC.

COMPILED BY ELLEN WHITE,* W1YYM

RECAPPING the 1966 ARRL International DX Competition, of the second and fourth weekends of February and March, highlights the poor second weekend c.w. conditions and the tremendous 10-meter phone opening the March 12-13 weekend. Once again entries show the result of generally improved conditions, with 1811 logs received, both modes, from W/VE and DX stations in 121 countries, up 6.5% from 1965.

After compiling the myriad bits and pieces that make up this report there seems hardly anything else left to say! Comments and suggestions from hundreds of participants this year, however, paved the way for the changes that will take place in the 1967 Test. Let's get word of the following changes around, particularly to the DX stations you regularly work. For 1967: the first and third weekends of February and March will be the dates, KH6 and KL7 stations will count as DX, no quota for either phone or c.w. W/VE stations, multipliers for DX stations will change from "call areas" to the 48 continental United States plus VO and VE1-VES, and a handsome plaque will be presented to the highest single operator phone and c.w. DX station in each continent.

This year's certificate awards are scheduled for October 14 mailing.

* Asst. Communications Mgr., ARRL.

1967 ARRL DX COMPETITION

Phone: February 4-5, March 4-5

C.W.: February 18-19, March 18-19



The Clubs

It was another big year for the competitive-minded club group. The gavel-winning Frankford Radio Club wound up with an incredible 18,668,219 points, almost 9 million ahead of their 1965 mark. In addition to their savvy single operators, about 5.6 million points of their aggregate is due to some first-rate multioperator performances. Although the Potomac Valley Radio Club had six fewer entries than their previous DX Competition effort, they scored four and a half million more points, a rough 300-K/member! The Northern California DX Club turned to, taking third place well ahead of the balance of the pack reaching for that five-million mark. On c.w., K6ERV was keyed by W6BHY while K6ERV did the honors himself on phone. The Niagara Frontier DX Association did not compete as a group in the 1965 Test but did this year for two million points, c.w. award to K2GXI and phone to W2SSC. Other fine gains were registered by the Rochester DX Association almost doubling their previous effort and the Connecticut Wireless Association almost quadrupling last year's score.

Your club's score didn't appear? The basic requirements for appearing in this club tabulation are: your club must be an ARRL-affiliate, we must receive a "secretary's letter" itemizing your club activity in this competition, and we must receive the indicated logs as entries in the competition.

SOAPBOX

"I hereby retire my aspirin bottle, coffee cup and extra-large ashtray till the phone test next year." — *K3JCT*. "My first phone contest in 35 years of operating and an enjoyable experience." — *W3BIP*. "How the mighty have fallen." — *W3ECR*. "Lots of fun as usual but we have a lot to learn with more than one phone rig going." — *W3WJD*. "Conditions improving every year. The ten-meter phone opening sparked up the last day's activity." — *W3TLN*. "I learned that antenna height is a prerequisite in this MDC area." — *W3BWZ*. "Amazed to work so many stations using 100 watts on phone!" — *W3FVS*. "More pile-ups on 10 than on 20." — *W3CQE*. "Best phone contest in five years." — *K3CBW*. "On 21 Mc. on March 12, K3EST worked 54 JAs, a BV and an HL9 between 2218-

When it comes to operating, **VP5AR** (K5LMJ) has that contest "know-how." Tony's c.w. score of almost 400-K includes 1852 contacts in 30 hours while his phone 40-hour endeavor totalled close to 1700 two-ways for over 360-K.

QST for

2335Z. It was bedlam!" — *W3MSK*. "Worked a 9V1 for phone DXCC #305." — *W4R1ZS*. "My first DX test and I worked 43 new ones." — *WB2QYO*. "Nicest phone surprises were working the Falklands on 10; and on 40, after a long struggle attempting to read a weak one, found it to be EP3AM. Good to be back after a 3-year absence." — *K2GX1*. "Really tickled to make WAC on 15 phone. Next year we plan an all-out effort on 15 phone to make the box score or bust!" — *W2TAB*. "There is room here for improvement on a few small items such as transmitter, receiver, transceive capability, TVI reduction, antennas, kids (3), wanting to sit on my lap simultaneously while I'm operating, scheduling of out-of-town relatives on contest weekend, and XYL tolerance of ham radio in general and contesting in particular. It must be terrible to become so good, so well-organized, and equipped, that you become stagnant." — *K3KMO*.

"WOW!" — *KJCT*. "I changed bands 51 times. Next year at least one more final." — *W3MWC*. "Picked up a number of new c.w. countries with just a wire, half hanging out of a window and the other half indoors." — *W3CBF*. "Kudos to ZD8AR for making so many contacts in those fantastic pileups and to HA1KSA who seems to have the best receiver and/or ears in Europe." — *W42KZV/S*. "This 2-transmitter stuff is interesting. With luck, next year we'll have 3 c.w. stations going." — *W3WJD*. "Who says I don't know the code." — *W3ECR*. "New logging system is fine." — *W3GRF*. "The use of a second receiver proved a boon in pileups." — *W3AFM*. "Please, please, please exhort the DX to send the call of the station being worked at the end of the transmission on 40 and 80. Strong locals and long callers clobber the first part of the transmission." — *K2DCA*. "Nice surprise on 80 c.w. working KM6CE VK2EO and 7G1A on the first call." — *W42UJM*. "Wasted a lot of time listening to T-5/T-8C calls only to find they were U. S. stations." — *W42GHW*. "You QRX while the guy works 30 stations in a row without signing his call. Then comes the call and you worked him before. This is what happiness is NOT!" — *W2QQ*. "Hooray for the new reporting format." — *W3LOE*.

"The 6-element beam up 70 feet really made a difference." — *W49HJM*. "Many stations missed out on that 10-meter phone opening." — *K9PPX*. "Hope I'll be able to enter for another 50 years." — *W9EWC*. "Transceivers a problem." — *W9GIL*. "The bands were sure dead Monday." — *W9YT*.

"Congratulations to WB2PXX/VP9 for all of his operating time signing a call like that *every* QSO." — *W9IRH*. "The excellent operating abilities of most DX stations continue to amaze me." — *W9FNX*. "We have a beagle dog named Fonzo. He is only 5 months old and got into everything. He would jump on the desk and lick our faces, sit on our hand or on the bug . . . take a nap on our lap while we tried to operate or sleep on top of us while we tried to catnap." — *K9OTB*. "15 meters and South America saved the day." — *K9VQK*. "My last and best effort from W9. Hope to have a bigger and better setup next year from W4." — *W9QYW*. "Next year I'll be in from Florida as W4JDR with those big quads back in operation." — *W9ICD*. "The DX test and University tests don't mix, as I found out Monday morning." — *K9ZMS*, *opr. W9YT*.

"My 100 watts the first half did as well as 500 watts the 2nd weekend." — *W40HWZ*. "Phone courtesy far superior to last year." — *W0RRW*. "Surprised at the number of W6s who think they are W5s when the DX called 8s only, hil Glad to hand out the South Dakota multiplier." — *K0CER*.

From top to bottom an array of the world's classiest contest pros: **HK6AI** topping the six-hundred thousand mark and close to 3000 code exchanges; **VK2EO** (keyed by **W9WNV/VK2ADY**) in a fabulous performance for Oceania and the best dupe sheet kept by anyone in the test (well over 600-K for 78 hours); **CR6AI** top c.w. in Angola, over 220-K points in a 4-band operation (John's antennas include 3-element arrays for 14-21-28 Mc., plus a dipole for 40); **YV1DP** with almost 3000 exchanges for 629-K c.w. points (Gregorio uses a trap beam and vertical).



"Why don't more hams use 15 c.w. other than contest times?" — W40MKB, *opr.* W6YQ. "Phone weekends superior to c.w. Best operators ZD8AR HK3RQ PY2SO CP5EZ HK0AI VP5AR and KG1CX. A salute to a fine gentleman, W0BLZ." — K0CER.

"My first 15-meter phone contact was XW8AZ, long path, exemplifying the great openings on both 15 and 10. Old 20 should be getting a much needed rest now." — W5AJY. "I worked hard and it paid off, I enjoyed every minute." — W5KC. "My country #100, 731A." — W5EAM. "Being a math major I have come up with a new formula. The proof is obvious, just ask anyone after the DX test (people with shiny new equipment disregard). $Lr + Oa + W = P$. Little time, plus old age, plus hurricane weather equals PHFFFF (low score.)" — K5MDX. "This contest is still the high point of the year." — W5QFT. "W5CKY too tough! Just wait till next year!" — K5RFI. "The XYL made me paint the house the 2nd weekend." — W5EHC.

"I hope I've put Kentucky on the ham map." — W4BCV. "Imagine what conditions will be like next year." —

W8TWA/8. (Haaaalp — W1YYM) "JA1DSW completed my 75-meter s.s.b. WAC." — W8DGP. "The contest provided hours of pure enjoyment plus a chance to check equipment and antennas under heavy competition." — K8OVK. "Made DXCC for the first time in a contest." — W8NGO. "Worked my first VK on 40 phone." — K8AXG. "Boy am I tired." — W4SLEO.

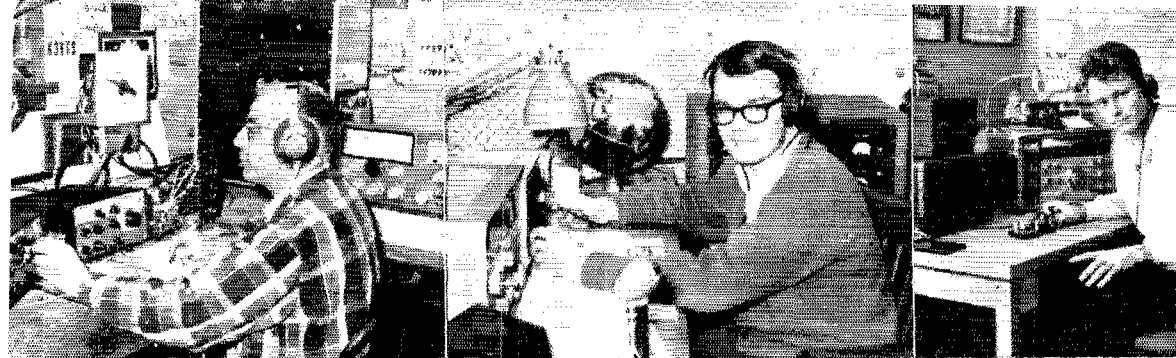
"For the first time in ten years I didn't work or even hear G4CP or JA1VX. I hope their absence is only temporary because I consider them tops in the class when it comes to contest operating." — W8UCI.

"Best multiplier yet on 80." — W8FGX. "Biggest thrill was beating out the west coast to K6GCE on 7 Mc." — W4D.K.A. "My log will give you a little practice before W8FGX's arrives. What an operator he is!" — W8GQU. "Once in a big pile-up on KG6IG on 20, CR4BB called CQ Test zero beat. You can imagine the chaos that followed." — W4SMQE. "Merely listening is an interesting experience and something of an education in propagation, etc." — W8AJW.

"Our friends to the south fielded the 10-meter calls in

Minimum Number of Countries					Minimum Number of Countries					Minimum Number of Countries					Minimum Number of Countries				
Band	30	50	80	60 15	Band	30	50	80	60 15	Band	30	50	80	60 15	Band	30	50	80	60 15
W1AW*	37			61	WA2OJD	36	50	83	64 27	W4BFA	37	57	91	68 21	K6KA				18
W1BGD	35			62	W2PCJ	43	72	106	19	W4BGO	55	56		64 21	W6KTV				21
W1BHH	31			62	K2QLL				18	W4BRB	39			64 22	W6LDD				17
W1BPW	53	83	102	85 21	W2QKJ				16	W4BVV*	83	92	129	100 37	W6NLX				20
K1CDN				92 65 16	W2RFT			86	20	W4BYB			74	K6OHJ					17
K1DIR	50	67	102	67 26	W2SSC			96		K1CG				23	W6ONZ			95	
W1ECH	37	56		70 23	W2SUC				22	WA4CGA				17	W6RW*	50	102	124	72 27
W1EOB	36			92	WA2UJM			50	60	W4DVT			52	W6UJ					19
W1EVT	63	83	96	70 28	W2VJN	40	63	102	80 28	W4DXI	30		81	62 29	W6ULS			51	
W1FJJ	53			80 66 16	W2ZKQ				103	K4EZ	37		90	65 16	W6UMI*				18
W1GOG				18	W3AFM				121	W4HOS				65 22	W6WX	33	50	86	20
W1JYH	45	63	101	84 20	W3BES	14	66	101	82 31	W4HUE	37	63		72 32	W7SFA				89
K1LPL	54	55			W3BGN*	61	68	109	91 32	WA4HKU	42			18	W8CJN			50	
W1MO				19	W3BIP	43	52		26	W4KFC	61	83	107	89 36	W8DUS*				15
K1RQE				88 71 18	W3ECR*	36		86	29	W4QXV*	77	86	129	98 31	WA8DXA				15
W1SWX	53				W3EKN	42		84	75 28	W4LHW				15	W8FGX	48	77	96	76 31
W1UUK				84	WA3EPT*	46	62	88	67 27	K4OA			80	W8GQU				80	
W1WLZ	55				W3EQA	53			23	WA3LP	30			60 15	W8KMD				87
W1WPO				120	W3GHM	47		81	21	W4EYB				18	W8UM*	49	62	104	66 18
W1WY				38	W3GHS*	36		80	69 25	W4ZYZ	47			101	K8UDJ*				86 60 15
K1YKT	39				W3GRF	62		96	77 34	W5AV				101	W8VSK			85	74 21
K1ZND				23	W3GRS	39		97	52 17	W5B				36	W8ZCQ				91
K1ZVU				56 101 67	W3HHA	40			54	K4YYE			87	66 24	W8ZJM	32	54		
K2AJA	53				W3HHK	38		82	70 24	W4ZYZ			85	89	W9FWC	38	69	89	69 22
WB2APG	61	67	88	68 26	K3JCT	35	71	102	81 29	K5ABV				27	W9GIL			90	61
W2AYJ	51				W3KDF			55		W5BRE	33			81 25	W9ICD				19
WA2BLV*	36	62	94		W3KFK	54	89	64	15	K5BXG				16	W9IOP	38	82	105	86 16
K2CHQ	40	56		25	K3KMO			81		W5CKY	34	60	80	62 30	W9IRH				61
WB2CKS	51	74	93	19	W3KT			83		K5JVF			58		W9KMN	30			
WB2CZZ				95 78 23	W3LOE	56	79	103	77 30	K5JZY				63 31	W9LKI				18
K2DCA	46	64	97	71 33	K3MBF*	51	60	107	64	W5KC				65 22	K9OTB*	30			
K2DGT	52	65	81	60 21	W3MCG	31	58		61 19	W5LJT				62	W9QYW				97
W2GGE	35	58	89	80 24	W3MFJ			80	64	W5LUJ				21	W9SCZ			85	
W2GGL	32				W3MFW	60	71	85	75 31	W5MUJ				70 22	W9VZP				15
W2GKZ				81 62 20	W3MSK*	82	104	129	109 42	W5OGS			85	20	W9FDL				16
W2HO				61 82	W3MSR			96	68	K5RFJ			50	73 22	W0LYH			109	
W2HSZ				20	W3MVB			55	17	W5WQN			52		W0OAW				15
WA2HUV				83	W3MWC	42	70	91	75 29	W5ZD				16	VE1RB			50	81 63 19
W2HZY	58				K3NHL	44	63	96	60 25	W6ANN*			54	22	VE1ZZ			79	
W2IRV				66 20	W3NOH	51	91	74	18	W6BCEP				16	VE2NV	53		80	18
W2KHT				15	W3QQL				61 25	K6ERV	32		101	19	VE2WA			81	
W2LXK	35	68		67 27	W3VEQ				73	W6GRX				83					
W2MEL	39			86 69 14	W3WJD*	80	88	114	99 35	W6HOC				91					
WB2MFX	46	67	85	68 23	W3WPG*	55	72	104	79 19	K6HOR					15				
W2NEP				17 1	W4BCV			58	16	W6ITA	38	70	102	24					

* Multi-operator Station.



Contest regulars (L-R) Washington's **W7MX** participating in both modes, **W1BPW** edged out of the E. Mass. c.w. award in one of the closest battles this test and **K5ABV** one of the c.w. So. Texas competitors.

fine style." — **WA2QJD**. "I never knew there were so many D1s!" — **WB2MIDH**. "Fine phone activity." — **W2WZ**. "A special award should go to the XYLs of contest operators for their help and patience in putting up with those lost weekends." — **K2DGT**. "No laughs at my low score, it took me 30 years to get around to entering one of these contests!" — **W2KJR**. "Much impressed with increasing phone activity this year. W2VZ had to be off on a space shot the second weekend and decided to leave his effort as is." — **K2HLB**. "Don't know how many OOTs do this anymore. I've been in almost every DX contest and still get a kick out of it. That Sunday opening on 10 phone was a real thrill." — **W2IVV**.

"Could improve my c.w. score if I gave up the corn cob." — **W2MEL**. "Murphy's Law never fails." — **W2HO**. "My only claim to glory in this one was a good start (CR9AH) and a good finish (KG61G)." — **W2RFT**. "This may be the last big year for 80." — **WA2HLH**. "Have you noticed how the number of 7 Mc. countries seems to closely follow the number of 21 Mc. countries in every multiband contest over the years?" — **K2DGT**. "Biggest c.w. thrill was working VK2GW on 80 at 1000Z. Enjoyed working PJ5ME on 10-80." — **WB2FON**. "Uugggh." — **WA2BFN**. "With the same equipment I can't figure out why my score keeps going up and shows no signs of leveling off." — **W2HUG**. "Terrific to see ten open and also have eighty in fine shape." — **W2NEP**.

"First DX Contest in 30 years of operating. Next year Kansas will kill 'em." — **W0YUQ**. "Hard to work through the east and west coast on 20 phone." — **W0GNX**. "After section awards in other contest, I thought I would give this one a try. Whew, what a shock! The competition in this one makes the SS and FD seem like child's play. The best contest I've ever been in." — **K0SCM**.

"New forms a real help." — **W0PDL**. "Best op. PY1-MCC, best signal ZD8AR on 40." — **W0EMA**, *opr.* **W0YI**. "Biggest thrill on c.w. was working OD5LX for a new country and have him say FIRST KANSAS-FIRST KANSAS, pse QSL! Two CR4s in one hour — unbelievable." — **K0BHM**.

"Never again a phone contest without something better than dipoles." — **W1BGD**. "Sick most of the 2nd phone weekend. Hats off to Roger, W1JYH." — **K1HVV**. "Never worked so many new countries in such a short time." — **WA1EOX**. "Good opportunity to check on the effectiveness and characteristics of my groundplane as conditions changed by the hour." — **W1TKG**. "Best signal overall: KP4CKU 7 Mc., VP2KJ 28 Mc. There should be a special award for VP2KR with 30 watts on 40 phone." — **W1BVP**. "My first contest and I had a wonderful time, see you again in 1967." — **K1OBT**. "A great opening on ten phone the last Sunday afternoon and it seemed as if every single W was on, with only about 20 DX stations to go around." — **W460JM**, *opr.* **K1CTQ**.

"Best c.w. QSO was long-path with FB8WW." — **K1ZYU**. "Worked J1IAG on 20, but never heard a JA." — **W1BCJH**. "First weekend conditions fantastic. Hard to leave that 250-K score as is for the PJ5ME stint." — **W1BGD**. "Conditions on the whole good, although 15 c.w. disappointing the second weekend." — **W1WY**. "Gad, almost dropped my teeth when I heard 5A3TX for the first real east-west opening on 10. CR1BB absolutely pinned the meter up there." — **K1ZND**. "My first competi-

tion and I must say that the spirit of competitiveness is not realized fully until one actually participates in such a test. WOW!" — **W1AIAPY**. "World's best contest, bar none." — **W1EVT**. "E. Mass. competition is getting to be like down W3-way. It makes for great fun competing with local friends." — **K1DIR**. "Spent more time on top of the tower than in the station" — **K1CDM**. "ZD8AR must be the DX version of W3MSK. Conditions unbelievably good on all bands." — **K1YKT**. "Quite a change from the First Trans-Atlantic Test back in the spark days. Anyway it is just as interesting but a bit more QRM, hi!" — **W1BQL**. "A bout with mononucleosis kept me at home instead of on a DX trip to Bermuda." — **W1NLL**. "Conditions in the first section poor for 160, the second section — WORSE! — **W1BB**. "Biggest thrill, the VKs on 40." — **W7UXP/I**. "Forty was the bomb. EU very loud from just before sunset and VK2EO audible here four hours after sunrise!" — **W460JM**, *opr.* **K1CTQ**. "Hope to see more Vermont activity in 1967." — **W1WTE**. "Drove 600 miles for this one." — **W1AYK**.

"Excellent conditions here in the Aleutians during the 2nd weekend. Good timing — immediately following this, conditions were unbelievably poor." — **K17FMM**. "What a mess!" — **W4ZABW**. "Not in the contest for a high score, just looking for #298, 299, 300 — then sanity." — **W7DLR**. "OH2AM and DJ6QT were 40 db. over 9 here on 40 meters and I couldn't touch them. The ten-meter opening on the last day was tremendous." — **K7UDV/7**. "My new 5-L 20-meter homebrew beam on a 48-foot boom up 100 hundred feet works like a bomb." — **K7VAL**. "Good openings to Europe on 20 the last day of the test and a total of 19 new countries worked!" — **K7YDZ**.

"I'll never know how FL8RA popped through all that QRM, my rarest DX to date." — **K17FMM**. "Amazed at the lack of Oregon competition — quite a change from my Los Angeles QTH." — **W4ZANB/W46AYU**. "A real feeling of competition, seldom found in other contests. My greatest thrill was working H18XAL on 7 Mc." — **W47CRB**. "Transceivers not flexible enough for c.w." — **W7ACC/7**. "Getting too old for this sort of thing and don't know if I can last through another." — **W7MX**. "Standing in line behind the high-powered stations cooled

TOP TEN W/VE High Scorers

Under 150 Watts Only

C.W.	Score	Phone	Score
VE2NV	353,292	W8LXU	98,640
W4BRB	316,707	WA9HJM	97,536
K2QIL	200,208	WA8MCR	67,980
K1ZND	181,608	VE3BHS	63,012
WB2CON	142,760	W8ECA	51,030
W4WYJ	136,431	K4KZZ	46,800
W2HUG	130,824	WA5LOB	41,612
WB2FIT	114,432	W1EJE	34,272
WA4CGA	99,000	W3BYX	33,441
W3ISE	97,104	VF3DAM	32,550



On the left, the crew manning **LUTDAY** during the c.w. portion of the test for a resounding 585-K (L-R, LU8s DLG DAY DQ DKG). This contest-minded group feels any idea of shortening the affair is nothing less than criminal! An interesting sidelight, three of the operators celebrated birthdays during the test! **YU3BC** (seated YU3s LC LB and standing YU3BC) presented a flawlessly typed log recording an impeccable 66-hour performance. Station equipment included a homebrew transceiver plus separate receiver, the antenna in use was a Vee.

my final score considerably." — **WA7BDF**.

"I would like to see Hawaii and Alaska as separate from the U. S. and I am in favor of abolishing the quota system on c.w." — **KH6IJ** (See you in the pileups, Nose!) — **KH6/-KL7** should be DX! Most DX stations are beaming mainland U.S.A. and can't hear Hawaii or Alaska. I expanded my pipeline to include Australia." — **WOPAN/KHG**. "The name of this contest should be the ARRL Annual Frustration Contest. Anyway, mucho fun." — **WA6JDT**. "Keep contest two weekends." — **W6WB**. "Only one weekend but PS7RT was worth it." — **W6ZKM**. "Near the end of the contest, KA7AB called me on 15 and said 'Why didn't you answer me? I called you for a half hour on 10!' You guessed it, I needed JA/KA on 10." — **K6OHJ**.

"Is there any truth to the rumor that you contest-checking people spend the rest of the year working with archeologists figuring out hieroglyphics?" — **K6LRN**. "Best 20-meter EU signal as SM6BIM, WOW. Best VK VK2EO (all bands), best GI, GI3OQR on 20." — **W6BOU**. "Trying for 100 on one band but conditions rough. Made 95 which included CR3AD, a new one." — **W6ONZ**. "This year I was determined to break 100-K. I spent almost as much time chasing down man-made QRN as I did operating." — **WA6IVM**. "Best time I've had since before joining the Navy." — **WB6FCE**, *opr. K6NCG*. "My best score to date, but still not good enough for SCV." — **W6WY**. "51 band changes in 51 hours. No wonder handswitches wear out!" — **W6CUF**. "Best test in years." — **K6HOR**. "Received the same report as W6AM on 40 from SM1BB, 599. Finally completed WAC on 80, 40 and 15." — **W6KHS**. "Worked 12 new ones to bring my 6-months total to 66. Hard work from this QTH with just 100 watts input. I'm only 14 and my parents thought I was crazy to spend two whole weekends listening to dots and dashes." — **WB6KRW**. "A very rewarding and interesting experience operating a first-class station from a first-class location." — **W6RGQ**, *opr. K6OHJ*.

"Best operator, VP5AR." — **WA4TLI**. "The phone section was much more strenuous than c.w." — **K4YYL**. "Had to stay close to home to greet the stork." — **K3WUW**, *opr. K4CG*. "Biggest kick was having 10 phone open up." — **W4WBC**.

"Missed my chance to be a millionaire, so near and yet, so far." — **W4KFC**. "One of these contests the real BFA (my XYL) and I will multi-op., but with 4 jr. operators ranging from 2½ year-old-twins to the oldest at 9,

she is too QRL." — **W4AKK/K**, *opr. W4BFA*. "Don't you feel a pang for WR2PKZ/VP9?" — **W4ZSH**. "Looks like I can hold my own on 80, but on all other bands I'm just another Indian." — **W4DVT**. "Pleased to QSO HP1TE and HI8XAL on 6 bands, also 9V1LP on 5 bands (we missed him on 160)." — **W4BTV**. "This contest gets to be more fun each year. For example, we almost made DXCC on 20 in the first 24 hours. The skill level of the younger operators increases markedly each year." — **W4KXV**. "I was a winner for West Virginia in 1931, how about one more for this year? My vote for the most outstanding signal on 40, 20 and 15 was HK6AI. Best operators were HK6AI, OA4PF and PY2SO." — **W8AZD**.

"My first real effort on sideband." — **K5STL**. "My first experience in the phone scramble. I had a great time." — **W7NPU**.

"CO2BO's '090' sounded like 2-KW." — **K6VFN**. "Largest score I've ever made. A great c.w. contest with bigger pileups than in previous years." — **W7NPU**. "YJ1DL made my 102nd country." — **K7OXB**.

"Worked G2PL again after working him for the first time 30 years ago. He was my first Q back in 1936." — **W4CYC**. "Ten meters was terrific for EU. High points: Working GW3NWY 10-80, hearing ZS9G call me on 10 working KW6EJ on 80, ET3AC on 40." — **W4APXP**. "Most fun of any contest ever. Worked 3 new ones and worked Asians like never before. You can bet I'll be in this one every chance I can get." — **W4FRO**. "We skipped the 2nd weekend in order to begin planning for next year's multioperator station. Our first real try and we found much in need of change. This call is now kaput, hereafter I'm W4ETO (33% shorter on c.w.l.)." — **W44NGO**.

"Great operating practice by ZD8AR." — **W4AYDR**. "Stood the strain fairly well for my 70-years young. Had a lot of fun." — **W4HUE**. "Good contest but inadequate foreign participation. Biggest thrill was working two Gs on 160 with my QRP 25-watter. Entered my first ARRL DX Test in 1933 and the pileups get bigger every year." — **W4BGO**. "These were my finest hours." — **W4BRB**.

"Could you recommend some pills which would send the XYL on a trip or something?" — **K4RQE**. "Sure enjoyed seeing what I could do with my 40 watts and groundplane against all the KWs and hogs." — **W44SDK**.

"You sure pulled a boo-boo on your new forms." — **W7ENA** (????????) "Phone conditions above average, particularly the second weekend, making the best phone contest in my experience." — **W6ITA**. "I've never worked a European during a phone contest on any band." — **K6KA**. "Poor conditions to Europe. VP2KY my #300." — **K6JIC**.



W6BLZ has won the South Dakota c.w. competition for 15 of the past 17 years. This year "Duke" used an SX-101, HT-32 and T-Bolt feeding either 4-L on 20, a tribander or phased verticals on 40. (Photo by K6CER)

QST for



On the left, three of the four VEs responsible for an almost-half million phone points from the Caymans at **ZF1BP** are (L-R) VE3RX VE3CJ and VE2BK. Absent from the photo is VE8AA a vacationing volunteer reported to be a whiz of an operator averaging 100 QSOs an hour for 6 hours. This is the "line up" responsible for that March c.w. spectacular by **PJ5ME**. (L-R) W2ADE W9GVZ W1BGD PJ2ME W1TCJ W1DYE W1BIH. The 48-hour operation averaged 98 QSOs/-hour. Best signals; VE1ZZ on 80, W1EVT and WA6SBO on 40, W4BGO on 15 and W6RW on 10.

Minimum Number of Countries					Minimum Number of Countries					Minimum Number of Countries					Minimum Number of Countries									
Band	75	40	20	15	10	Band	75	40	20	15	10	Band	75	40	20	15	10	Band	75	40	20	15	10	
W1AW*				60		W3MVB					19	W5LUJ					27	W8LXU					20	
W1BIH				70		W3MWC*					79	20	W8LXX					21	W8MCR					19
K1CSQ			80			K3NHL	36			90	70	29	W5LZZ				66	23	W8NGO*		93		73	18
W1FJJ				16		K3PSW					16		W55NVY					22	K8TIG*				63	17
K1HVV				63	17	W3TLN				83	64	31	W5ODH				62	27	W8TWA/8					21
W1JYH			96	74	17	K3TPL					71	16	W5OGS					32	W8WT					19
W1RF				69	17	W3VEQ					78		W5PTG					21	W8WUO					16
W1YRC					25	W3WJD*	49			104	99	28	K5QMC					18	K8YRN					22
K2CHQ				16		K4AQQ				86	76	25	K5STL					28	W9AQW				60	16
W2CYQ				68		WA4ARV					74	17	W6BSY					24	W9EWC				61	27
W2DAJ				62	24	W4BCV				92	80	29	K6ERV					35	W9GLL				67	20
W2EXH			106			W4BFA				83	72	24	W6GRX/6					27	WA9HJM					15
W2FFQ				18		W4BVV				100	80	28	WA6HAE*					29	W9IRH					18
W2GKZ				60		K4CG					20		K6HOR					20	W9J CZ				80	26
K2GXI	33	53	87	75	26	WA4...	87	79	22	...	...	...	...	...	...	...	...	36	WA9PBW*					17
K2HLB			96	61		W4C...					...	...	...	...	...	...	...	27	W9WGQ				70	
K2IML				18		W4D...					...	...	...	...	...	...	...	25	W9YT*					22
WA21ZS				67	22	K4E...					...	...	...	...	...	...	...	23	K9ZBI					19
K2LWR			99			W4F...				86			...	...	...	...	...	29	K9ZV					21
WB2MDH				70	16	K4KZZ				15			W6LV					16	W9ZTD				62	19
WB2MFX			85	70		K4MSK					18		WB6MZX					18	W6CU					74
WA20JD*				61	21	WA4NGO*				87	80	18	W6NJU					15	W6DSP*					16
W2PDB				18		WA4XP*	30			81	93	52	K6OHJ*				85	31	W6FDL					23
W2QWS				67	21	K4RZK					86		W6SIA					19	K9FLJ					17
W2TQR			88			WA4WAO					71	22	W6UMI*					28	WA9HXW*					22
W3AZD				77	25	K4WJT				85			W6VUW					26	W9LYH			98		
W3BES				31		K4YYL				95			W6WB					29	WA9KXZ*					20
W3BGN				65	26	K4ZJF					68	29	W6WX					31	W0LBB					20
W3HIP				20		WA5ALB					17		W6YMV					20	W0LBS				70	26
K3BNS				67	19	W5AJY					68	29	KH6LJ					23	VE1AFY			93		
W3BWZ				20		WA5AVL*					69	28	W7ATV					16	VE1PL			100		
WA3EPT*				26		W5BRR					20		W7AAY					20	VE2ANK				80	
W3EQA				15		W5EHR					21		K7UDV/7				88	16	VE6GX*				83	
W3GHM				20		W5EQT/5*					30		K8AXG					19	VE6MF				87	
W3GRF				28		WA5GLC*					23		WA8DAU					15	VE7AAA				81	
W3GRS				26		W51PH					18		W8DGP					61	24	VE7PV				104
W3HHK				28		K5JZY					74	38	W8ECA				74							
K3JCT				69	26	W5KC					65	28	W8EDU*					16						
W3LOE	35		103	84	29	W5KTR					76	38	W8PYR					66	23					
W3MSK*	50	71	133	109	35	WA5LOB					17		WA8HXR					15						

PHONE

* Multi-operator Station.

CLUB SCORES

	Aggregate	Entries	C.W. Winner	Phone Winner
Frankford Radio Club	18,668,219	75	W3BES	K3NHL
Potomac Valley Radio Club	14,221,043	41	W4KFC	W4BVV
Northern California DX Club	4,632,464	50	K6ERV1	K6ERV
Niagara Frontier DX Assn. (N. Y.)	2,003,528	22	K2GXT	W2SSC
Rochester DX Assn. (N. Y.)	1,725,476	15	W7AMFX	W2B1FX
Connecticut Wireless Assn.	1,720,431	14	W1BHH	W1BHH
Suffolk County Radio Club (N. Y.)	804,975	9	W2GKZ	W2GKZ
Miami Valley Amateur Radio Contest Society	642,927	10	W8ZJM	W8FYE
Louisville's Active Radio Operators (Ky.)	523,361	6	W4BCV	W4BCV
Order of Boiled Owls of Ohio	277,859	4	W8ZCQ	.....
West Park Radclaps (Ohio)	218,848	9	W8ADW	W8WUO
Limestone Amateur Radio Club (Ala.)	51,963	5	W4LHW	.....

1 W6BHY, opr.

"Thanks a lot for sponsoring such an f.b. show!" — **W6RCV**. "Surprised at the results of only using an all-band vertical." — **KOGJD/6**. "Worked DL1JW for a DX-Test WAC." — **W4BKHK**. "Surprised to work ZD8AR on 40." — **W6KTL**. "My first DX test and I made up for my poor score with all the fun I had." — **W6MPE**. "Don't let the WB6 call fool you. I can remember when the contest lasted two weeks. As W2FBS I worked DX from the East for years." — **W6LZI**.

"Overheard on 15 meters, HK3RQ saying 'I cannot copy a.m., go away.'" — **W5KTR**. "Now I know why I'm a confirmed c.w. man." — **W50GS**.

"American operator's impatience and crudeness was evident, as usual." — **W5LUI**. "P15ME and ZD8AR were my only 5-banders." — **K5BXG**. "Hey, this is more fun than courting." — **W4SKYY**. "I wouldn't have believed that a VKØ could ever have come in here 599. It happened during the test when VKØMI came through one night for about 2 hours." — **K5LMG**. "The last c.w. section was terrible here in Texas." — **W5BRR**. "Murphy's Law worked overtime in the first half. Wrapped up beam coax lines, tore up lines and broke joint between the prop pitch and beam support mast. Hauled it down in the middle of the night and lost 1 1/2 hours of choice operating time." — **W5ZD**. "Conditions fine to AF and SA but punk to EU/Asia. After the pile-ups on the lower bands, it was nice to work CR4BB CR6A1 7G1A ZD8AR and VR2DK all on the first call on 28 Mc." — **K5ABV**. "DX station just aren't signing their calls often enough." — **W5MCO**. "I hate 'breakers', 'tailend Charlies' and abbreviated 'call boys'. Let's play by the rules." — **W5WQN**.

"My first try from VE1 and improvement over past efforts as VE2UX, VE3FLO and VE2UI. There were few surprises except what I worked with the vertical on 40, the wonderful opening to the far east over the North on the night of March 12-13 and the brief 10-meter opening to G-land late on Sunday afternoon." — **VE1PL**. "I could write a book. Two new ones, worked my first ZL on 75 s.s.b., VKs coming in fine L-path the first weekend, topped off by the arrival of twin daughters on March 13." — **VE2ANK**. "VE2AYH's operating ability varies inversely as the level in the Smirnoff bottle." — **VE2BAW**. "Antenna height increase on 20 paid off in 70% score improvement." — **VE3BHS**. "For information concerning WAVE/-

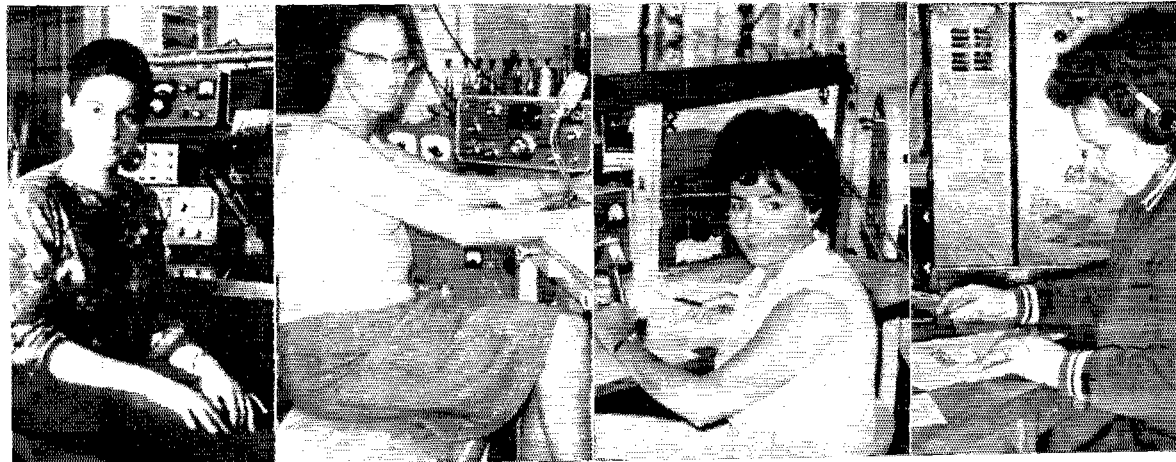
WACAN write the Nortown ARC, Box 356, Toronto 1, Ontario, Canada." — **VE3EVZ**. "Rules are excellent." — **VE3DEU**. "Picked up ten new ones, though 10 and 15 meters were poor here in Winnipeg." — **VE4SD**. "Conditions best since 1960 at this QTH." — **VE6FM**. "W stations will still call me even though W/VE contacts do not count." — **VE7PV**.

"Conditions in my part of the country were disappointing. I think I've pushed my 150 watts far enough." — **VE2NV**. "My first crack at this single-operator and sure enjoyed myself." — **VE3DFM**. "What a beautiful R.A.T. RACE!" — **VE3DKB**. "In a period of one hour I worked 5 continents on 80, but never heard a single EU during the whole test." — **VE7BDJ**.

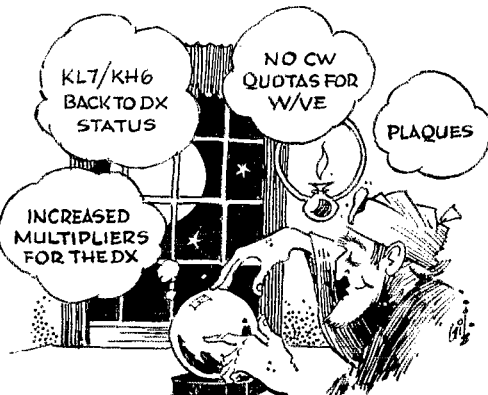
C.W. HIGHLIGHTS

AF CR3AD's appearance made 293 coustesters extremely happy. Thanks to some snappy operating by CR4BB in this and recent tests, the once-rare Cape Verde Islands are not-so-rare. Tomaz almost doubled his 1965 QSO figure. His few 599 7 Mc. reports went to W6ITA, K3MBF, WB2APF, W6BLZ, W6ANN, WA2OJD, K4YYL, K1ZVU, and just a few others. Reliable CR6A1 put in a 4-band appearance for well over 1300 exchanges. John too found those W6ITA 10-meter signals a potent 599. In his first ARRL contest, CR6E1 particularly was looking for Wyoming, to no avail. CR7IZ found band conditions fair-to-good on 20 and 15 with 10 a nice surprise. Ru felt his QSO rate would have been higher but for the QRM from some of the chaps who didn't understand that he couldn't QSO them more than one at a time. Though pressed for time, EL2D found conditions very good topping 120-K and planning bigger thinks next year. ZD6M hopes he gave some of the gang a new one and was happy to meet lots of old friends. Des comments on the outstanding signals of W3MSK. Many comments were received concerning the fabulous Ascension Island performance by the ZD8AR crew. With 100 watts input, the operators (ZD8s BC RD WZ J) turned in an outstanding performance from Africa joining the select "millionaire's club." Their 5-band performance recorded 263 exchanges on 80, 884 on 40, 1394 on 20, 1343 on 15 and 367 on 10. 3-element beams were used on 10-15-20 plus a groundplane for 40 and a vee and longwire. A superlative performance! ZS10

On the distaff side, some of the finest YL operators in the world (L-R) **PY2SO** leading some of the toughest c.w. competition anywhere—those savvy Brazilian operators. Sonia's 61-hour effort on five bands topped 600-K by a considerable margin. **OH55M** shows a fine phone sum of 449 exchanges on 20 and 15 meters (Carola runs 500 watts p.e.p. to a homebrew linear and uses a quad on 20 and 3-L on 15). **YV11K/5** with a one-weekend 132-K phone performance to lead Venezuela and **UA9PO**, Anna Glotova, one of the fine c.w. operators in Novosibirsk and a Champion of the U.S.S.R.



reported a very short opening on 10 with great storms following the opening of the bands. He reports that he made F.B.T.O.C. twice. (Any interpreters in our reading audience?) *5A3TX* found, all in all, it was another enjoyable contest. He says he had a bit of a problem convincing several stations that he wasn't an HA. Carl says this was his last one from Libya since he planned to be on his way back to the U.S.A. as this report was being prepared. *606BW* topped 1,200 exchanges on 80-40-20-15. Bee says his first 35 contacts yielded 11 different call areas and he then had to work 378 additional stations before getting a new multiplier. He found *QRN* on 80 20 db over S9. Best signal reports on that band (569) sent to *W4KXV* and *W3MSK*. Bee thanks all participants for the QSOs and their courtesy . . . a reminder too to QSL via *W4HKJ*. *7G1A* turned in a superb single operator performance from the Republic of Guinea with better results on 40 and 20 and best of all on 15. Josef topped 2200 QSOs for close to a half-million points. *9G1FQ* experienced the worst of all problems, restriction of 9G1 operating privileges just after the first c.w. weekend.



IN VIEW FOR '67

ASIA The *H10US* crew (WA2SPL WA6FWE KL7ELD WA3ERL K8ZXP K9UNY K6-ETM and K3RIX) found signals the first weekend much stronger. *HM5BF* was a welcome addition to the c.w. ranks with his 445 two-ways. Kim runs 100 watts input to an 811 and used 2 element quads for 20 and 15 and verticals for the lower bands. *JA1IBX*, leading his country both modes, went well over the thousand contact figure on c.w. in a total of 52 hours. His printing is a veritable comfort to the contest checking crew — completely legible! His one-QSO success on 10 was a 2-way with *K6ERV*. Another superb c.w. endeavor from Japan was presented by *JA1CIB* with close to 130-K. Takeo's big band was also 20 with good reports to 575 thereon. Many fine JA c.w. logs were received and welcomed. Top Asiatic Russian score was *UA0KZB*, single-operated at Petropavlovsk on the Kamchatka Peninsula. Vlad worked 883 stations to take top country honors. His old antenna was a ground-plane. Among many *UA9/UA0* logs is one from *UA9PO*, an active YL from Novosibirsk and a champion of the U.S.S.R. A fabulous multiplier score by the *UA0KFG* crew of *UA0EH* *UW0s* *FM* *FK* and *UA0KFK* added up to 278-K and hundreds of QSOs on 4 bands. Their best band was 20, almost 1000 contacts. *V56BJ* reports the non-contest JAs a problem, plus the speciality of the day, Radio Peking on 40. Maurice reports that the "wolf" howl of the west coast was wonderful. Ranga, *VU2GW*, found it fun working some of the old timers and top DXers and plans another go next year. *911LP's* comments could fill a page. Bob says that every year *W4KFC* comes up with another first for him in the ARRL c.w. test. This year he was his first east coast station ever worked in a contest on 15 meters. This was his first year to make 5-band QSOs (*W6RW* 160 through 15 the February weekend). In what he considers an outstanding feat for the east coast, *W4BVV* managed to make it on 80 through 10. His biggest thrill was late the second night of the March weekend when after vainly trying to make it on 10 with

Over 300 QSOs/band — DX					
	80	40	20	15	10
<i>CR4BB</i>			312		
<i>CR6AI</i>			491	500	
<i>DL2DJ</i>			366		
<i>ZD8AR*</i>		884	1394	1343	367
<i>5A3TX</i>			391	552	
<i>606BW</i>			662	413	
<i>7G1A</i>		578	540	684	
<i>9Q5RD</i>			308		
<i>HL9US*</i>			430		
<i>JA1CG</i>			350		
<i>JA1IBX</i>		328	642		
<i>KG6IG*</i>			598		
<i>UA0KFC*</i>		377	984		
<i>UA0KZB</i>			529		
<i>CT1OI</i>		311			
<i>DJ2YC</i>			511		
<i>DJ5BV</i>			530		
<i>DL1RK</i>			524		
<i>DL6VP</i>			427		
<i>DL7BQ</i>			447		
<i>DM4WPL</i>			424		
<i>E1DJ</i>			700		
<i>F8VJ</i>			578		
<i>G2QT</i>			437		
<i>G2RO</i>			449		
<i>G3SSO*</i>		333	1178	309	
<i>G1BOGR</i>		303	1153	403	
<i>GM3GUJ*</i>			372		
<i>GW3JI</i>			513		
<i>HA1KSA</i>		352			
<i>HA1SD</i>			360		
<i>HA5KDQ*</i>			497		
<i>HR0JG</i>			525	447	
<i>I4NT</i>			1064		
<i>I4IH</i>			664		
<i>LA9HC</i>			579		
<i>OH1AA*</i>			401		
<i>OH2AM*</i>			885		
<i>OH3AH*</i>			673		
<i>OK1VK</i>			329		
<i>OK3OM</i>			401		
<i>ON4XG</i>			444		
<i>OZ1W</i>			330		
<i>OZ3FL</i>			589		
<i>PA0GMU</i>			395		
<i>PA0LOU</i>			721		
<i>PA0XPO</i>			388		
<i>SM5CCB</i>			662		
<i>SM5TW</i>			319		
<i>SM6BJI*</i>			1400		
<i>UR5WJ</i>			403		
<i>UP2KNP*</i>			788		
<i>YU1BCD*</i>			494		
<i>YU3BC*</i>		342	556	380	
<i>FG7XX</i>			363	385	
<i>H18XAL</i>	620	1016	950	917	
<i>HK0AI</i>		354	1050	984	
<i>HP1BR</i>			456		
<i>HP1IE</i>	372	333	677	711	327
<i>KP1BBN</i>			641	421	
<i>KP4BJN</i>			644	700	
<i>WA4MFS/KP4</i>		337			
<i>KV4CK</i>				665	
<i>KZ5JF</i>		402	419		316
<i>PJ5ME*</i>	459	785	1804	1173	
<i>VP5AR</i>	336	533	486	418	
<i>VP6PJ</i>			367		
<i>WR2PXX/VP9*</i>	385	410	896		
<i>XE1AX</i>				391	
<i>XE2AAG</i>		329			
<i>XE0AL</i>	659	1246	977	748	
<i>KM6CE</i>			357		
<i>VK2EO</i>		798	936	548	
<i>VK2GW</i>		446	364	339	
<i>VK3APJ</i>		415	573	378	
<i>VK3AXK</i>			396		
<i>ZL1DV</i>			466		
<i>ZL1HW</i>			490	450	
<i>CE1AD</i>			585	1130	
<i>HK3BAE</i>			595	492	
<i>LU3BRQ</i>			1040	1143	
<i>LUIDAY*</i>	610		654	1131	319
<i>LU5AES</i>	414		303		
<i>OA4PF</i>			595	812	317
<i>PY1MCC</i>			492	602	
<i>PY1NO</i>			427	399	
<i>PY2BGL</i>			808	389	
<i>PY2SQ</i>			1293	780	
<i>PY7AKQ</i>	474	487	320	562	
<i>YV1DP</i>	328	308	986	818	515

* Multi-operator station.

W6RW, he heard a wee small signal as from outer space calling. It turned out to be W2GWE for Bob's first W-contact on 10 in 3½ years in Singapore. GWE was followed by W4BVV, W3MSK and W4KXV before the opening gave out.

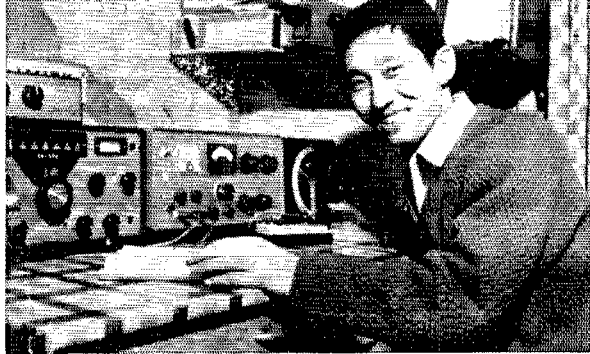
Over 300 QSOs/Band — DX					
	75	40	20	15	10
ET3AC			831		
ZS6NM				330	
9L1JW				735	
9Q5FV				574	
EP3AM			320		
JA1IBX			669		
JA8AA			630		
KA7AB			479	308	
DJ18X			522		
DJ5BV			470	392	
DJ5HN				327	
DJ6QT			950	433	
DJØLDA			508		
DL1LK			568	532	
DL4LG			1071		
DL6VP			550		
EA4DO			709		
F2SY			629		
F3KW			382		
G2QT				309	
G3SVH*			750	721	
G3UML			501	388	
GB2DX*			1186	507	
GW3NWW*			524	520	
I1BAF			1755		
I1CAQ			923		
I1CGE*				305	
IØFGM*			1157		
OH2AM*			1043		
OH58M			366		
OK1MP			796		
OZ3SK			766		
OZ9SL			604	711	
SM6DLL*			953	484	
SM7CRW			482		
UA2KBD*			553		
UB5WJ			351		
UP2OK			461		
YU3BC*			425		
4U1ITU			307	348	
CO8RA*				337	
FG7XL			933	1005	310
H18XAL			790	772	
HØ1JC			318	382	448
KP4BFF*			633	763	
KP4CKU			1210	1129	394
WA4MFS/KP4	439	330	481		
KV4CF			1100	749	
OX3JV			650		
TG8CJ				991	
VP2AC			510		
VP2KY*				429	
VP5AR			478	800	
XE2JZ			425	349	
YN3KM					316
ZF1BP*			547	1062	376
6Y5OF			364	390	
KG6APD			328		
VK2AAH/p*			333		
VK2APK			407		
VK2FU*			457		
ZL1HW			356		
CE6EZ				577	337
HC1RT			309	905	594
HK3RQ			921	809	335
HK4KL			880	1141	
OAIW				306	360
PJ2CR			458	613	417
PJ3CD			795	913	
PY2BJO			518	795	328
ZP9AY				455	

* Multi-operator Station.

EU DLIRK enjoyed the test and hopes it will bring him nearer several awards. Klaus didn't hear a single Nevada, the last state he needs for WAS. He hints he operates regularly around 14,030 from 14-1800Z. He commends the operating skills and discipline of the W/VE group. **DLIQT** found good conditions on 40-20 and 15 and hopes for better luck next year with a beam. **DL6VP** also needs Nevada. Hans found better phone conditions this year than the c.w. section. **DJØYC** soloed on 20 meters with most QSOs to W2 (104) and W6 (94). **DL1TA** found second weekend conditions shocking, the worst ever experienced in a contest. **DMØATD** comments that this is the fastest DX contest. **DL6WD** needs Nevada. **E1ØJ** operated five bands to top the two-hundred thousand mark. His multipliers included 8 on 160. In his 22nd test, **F8VJ** again found the going interesting. Lucien could not make it on 10 although he heard W4KFC, W3BES, W3GRF, etc. We all look forward to his participation in 1967. Another old-timer, **F2PO**, at 72 years of age, found time to operate four bands for over 400 exchanges. **F9ØE** always finds this a very fine contest for c.w. operators. **F8TQ** found the lower bands good though poor on 20 and absolutely "shut" on 15 and 10. The ubiquitous **GØRO** led England with 877 two-ways. **GØQT** found 80 disappointing though 10 briefly opening for the first time since the 1960 contest. **G6VC** hopes to round up a few of the crew next year to run multiplier. **G8HLW** says that awful gale in England on the last day must have blown all the signals off of 21 Mc. — it blew the top off of his vertical! The resounding results of **G3SSO** (G2RT, G3s CNW MSV NHF PEOP PYL, G8VX and G8s FF KG) filled all spots on the summary sheet with fine results. Best band 20 (1178 QSOs) then 40, 15, 80, 10 and even 4 contacts on 160. The crew found the test as enjoyable as ever with first-rate conditions in February. **G1ØQR** with close to 400-K put in his first appearance on 160 working a number of his old friends on that band. Dick found both weekends enjoyable and says 'cuagn next year.' **GMØHCZ**'s question "Are there any stations active in Nevada?" begins to have a familiar ring. **HA1KSA** failed to top his previous record due to that giant sunspot prior to the second weekend. Nonetheless Fred topped 1000 exchanges. **I1NT**'s certificate-winning performance netted 1459 two-ways for well over the 200-K mark. **DJØST**'s LX-pedition was a popular c.w. tidbit for 67 of the alert ones. The Olls turned out in good numbers despite particularly poor conditions in their area the second weekend. Good multiplier performances from Finland were topped by the **OH2AM** group for 1053 c.w. two-ways. **ON4NM** reports those pileups much fun and will return next year. **OZ3FL** asks us to try one year to arrange the c.w. section without sunspots and with conditions the same as on phone. **OZ1LO** hopes to have antennas up for the higher bands for next year. **OZ7G** stayed on 21 Mc. for 122 exchanges. If the army permits, **OZ5DX** plans more activity in the next one. If conditions had been better, **PØLOU** would have spent more than 60 hours. Lou's new TH-3 helped greatly on 20 and 15. He reports finally managing to make a few 160-meter contacts although just two W3s heard him. He called, unsuccessfully, W1s BB IGT, W2GGE, W4s etc. Final score, 153-K with over one thousand exchanges. **PØXPQ**'s funniest experience was hearing the ZØ8AR crew work W/VE stations one a minute on ten meters while the band was completely dead there. **SM6CCE** joins the rest of the EU stations commenting on the poor second-weekend conditions. Watch out for **SM6BTS!** Rune is planning a V-beam aimed U.S.A. for next year. The **SM6BJI** operators (SM6s BJI AOE CKV DLL) had hoped to reach the 2000-QSO figure but 21 Mc. failed to open the second weekend. In spite of conditions, **SP5AHL** found it a real pleasure to work the stateside crew. In his last test from the continent, **SVØWAA** found 21 Mc. the lifesaver in his area with 7 Mc. holding its own and 20 poor. **UB5WJ** stuck to twenty meters and managed to snag 403 W/VEs in 18 areas — *spasibo* George! The **UP2KNP** crew offer their thanks for a nice test, with four hands worth of exchanges. Look for their effort in 1967. The savvy **YU3BC** team (YU3s BC I.B LC) keyed 1377 exchanges for well over 200-K, with good results on 80-40-20-15.

NA COØBO was the single-operator DX sensation this test with his almost-million pointer. Jan is an old pro at this business, recording an eye-opening 6-band 86-hour performance. At the time of this writing

JAI1BX operated both sections of the test emerging with top phone and top c.w. for Japan. Nob runs 100 watts input on both modes and uses a groundplane for 80 and 40 and quads for 20, 15 and 10.



Jan (ex-OK3MM) planned to return to Czechoslovakia. Another ex-OK, **CM2BL** (ex-OK1AOT) provided Cuban interest, working 1465 on 5 bands. **FG7XX**, an ever-popular multiplier, made 154 W/VEs happy on 80 meters. Maurice had various problems, but nevertheless turned in a fine 40-hour performance. **H18XAL's** customary top-notch performance itemized 31 exchanges on 160, over 600 on 80, over 1000 on 40, close to 900 on both 20 and 15, and almost 100 on 10 — an almost-million pointer. Work kept **HP11E** very QRL but Pete still found time for almost 600-K worth of points. He notes this year the caliber of operation was really clean with his dupes way down from the customary percentage. A nice turn out from the KP4s this year, led by **KP4BJM** with over 400-K. The top DX score this year, the multiplier performance by **PJ5ME** (W1s BGD B1H DYE TCJ, W2ADE, W9GVZ and PJ2ME) drew raves from the faithful. This Connecticut Wireless Ass'n.-sponsored 48-hour expedition wound up with well over 1.1 million points. The fellows ran two stations, using a quad for 20-15-10 and an inverted vee for 80-40. **W1BGD** sums it up nicely with one sentence, "Many thanks to all those who worked us only once on each band." The **XE0AL** crew turned in an almost 900-K sum with activity on all 6 bands. 160 provided them with a pleasant surprise. Although they never did work the east coast, they heard **W2EQS W3MSK W4BVV** and others. **W6RW** was their only 6-bander.

OKG6APD reports the most unlikely DX conditions seen on Guam for the past six months. **VK2EO** (op. **W9WNV/VK2ADY**, put in a 78-hour 600-K topper from Oceania. Don comments: "Conditions to the east coast on 10 and 15 discouraging, worked **W6RW** on 160 though I heard **W1BB W3MSK** and **W4KFC** f.b., even 10 meters produced 71 exchanges in 7 areas." **VK3APJ** found that the W-operators generally were very good, not enough activity from **VE/VO** and **KL7** and making the report out a chore. **VK2GW's** breakdown clearly illustrates the pipeline between **W6** and **VK**. World-traveler **VK2VN** spent the second weekend overseas and was limited as to time the first session. Using a beam (for the first time) netted **Morrie** twice as many contacts as during the previous year's 9-hour period. **VK5KO** met his personal goal in making contacts on all six bands. 7 Mc. specialist **VK2QK** worked 275 in 14 areas. Old Blue, **VK9WE**, had his problems too. A power failure in February (just as he was getting going) was attributed to a snake getting across the high voltage lines, blacking out most of Port Moresby. **YJ1DL** operated four bands for 309 exchanges (183 of these with the sixth call area!). Reliable **ZL1HW** presented excellent activity working 984 participants. **ZL2PM** was glad to hear so many new stations. He comments that there are just too many double contacts and that the DX countries must rely upon the W/VEs to avoid these. (We try to make it easy for W/VEs by furnishing a record sheet which will be required by all phone and c.w. W/VEs in 1967).

SA **CE1AD's** biggest band was 15, with over 1100 exchanges. **CE6EF** made 35 times his previous score and finds the discipline of the W-hams superb. **HK3RQ** enjoyed the test and will try to do better next year. Bill says look for **HK3BAE**, a real comer. **HK3BAE**, in his first ARRL c.w. contest (licensed just 8 months) turned in a fine score, well over 200-K. After using a manual key the first weekend he rapidly acquired an electronic one in time for the second period! One of the outstanding multiplier S.A. scores was that of **LUIDAY** (keyed by **LUIDAY LU2DKG** and **LU8s DLK DQ**). With 100 watts input on 5 bands they amassed 2583 two-ways for close to 600-K. **OAAFF** found discipline extraordinarily good. He completed his WAS with a Vermont contact. He looks for more of a challenge in the next test which we hope will be furnished by the rules changes. **PY2SO** almost tripled her score over the past year and says, "Wow, this was fun." Sonia writes, as well as operates, in top-notch fashion. Some of her comments: "Only

one **KL7**, where are they hiding? **VO1AW** is never able to have his QSOs fast, what with everyone asking him to look for them on this or that band, **W1EVT** my first U.S.A. for my 3.5 Mc. **WAC** . . . a thrill working operators like him, **W1ECH** (with welcomed honest reports), **W4KFC**, **W9IOP** and others on five bands." Sonia puts in a justifiable plug for her patient OM Joe, **PY2CQ**. True to her predictions **PY** activity was superb, with a 343-K score by **PY2BGL**, **PY7AKQ** with 275-K, and big totals by **PY1MCC** **PY1NO** etc. **YV1DP**, as always with a tremendous performance came close to 3000 exchanges in 70 hours, and an absolutely superbly presented log. **3Y4VU** felt his new prefix accounted for his bigger score.

PHONE HIGHLIGHTS

AF **CR8HG** may have begged his pardon for his submission but 450 neatly typed exchanges made scoring a breeze at Hq. Thanks to **W1RF**, **CR7FE** submitted a brief extract of 21 Mc. a.m. operation which included (natch!) **W1RF** and the neverfail **W3MSK**. **ETS-AC's** big band, 20 meters, included 831 two-ways. The contest staff urgently request him to use a better grade of carbon paper in 1967! Just a few received **VQ9BF** credit due to the loss of their original log. John says that their maids clean up just too well at the Satellite Tracking Station! **Z86NM** stuck to 15 meters, working more sixes than threes. Thanks to **K9RNQ** for forwarding along the **9L1JW** information and credit for 737! (Of these, 733 were on 15 meters.) **9Q6F1's** 36-K summary and log shows many many repeats reminding us all that the burden of keeping track of previous QSOs must be upon the W/VE. How about it, fellas?

ASIA U. S. Ambassador to Iran, **EPSAM**, is an old pro at the contest game having activated many rare countries in past competitions. Hank's first 8 contacts included 3 KH6s, 3 KL7s and 2 VESs. His refreshing reporting indicated most everybody was readability 4. Just a few notable exceptions included a 5-9 for **K2HLB**. The crew manning **HL9US** found band conditions not too great. Their 501 exchanges were due to the efforts of **WA2SPL**, **WA3ERL**, **KSZXP**, **K9UNY**, **K6FTM** and **K3R1X**. Thanks from Hq. particularly go to the group's activity manager **WA2SPL** (**HL9TM**). **JAI1BX's** 100-K-plus phone resume is a vow of a phone effort for Asia. His sole QSO on 7 Mc. records **W3MSK**, who else? **KA7AB** (**K1KTH**) topped 100-K, s.s.b. John's first test abroad was faster and more fun for him than the SS. His best hour recorded 97 exchanges. Next year he plans a winning effort on c.w. for Asia. **JAI1CG** had sideband-exciter trouble 10 times during the test. **Murphysan** sure gets around! **JAGBJM** notes 20 watts p.e.p. for his input on 40 and 15, with 47 exchanges and 9 multipliers — f.b. Shizu! **4X4FV** waxed at great length on the merits of states being used as multipliers for the DX contingent. (Great minds run alike, Bill; it's on the books for 1967!)

EU **CT11W** found his first contest lots of fun. He's looking forward to next year and Wyoming. **DJ6QT** topped his 1965 effort. Walter found 80-meter activity as good as last year but no openings to the west coast. In between contest weekends he built a ground plane and with it found good conditions to mid and far west. In his first ARRL contest, **DL4LG** tallied 1071 exchanges on 20 and over 200 on 15, quite a respectable first go! **DL4NS** found the 2nd phone weekend by far better with 15 wide open. His only 10 meter contact was with **WA4PXP**. **DL6VP** thanks all U. S. and Canadian hams for a fine time. He enjoys working the states and has made

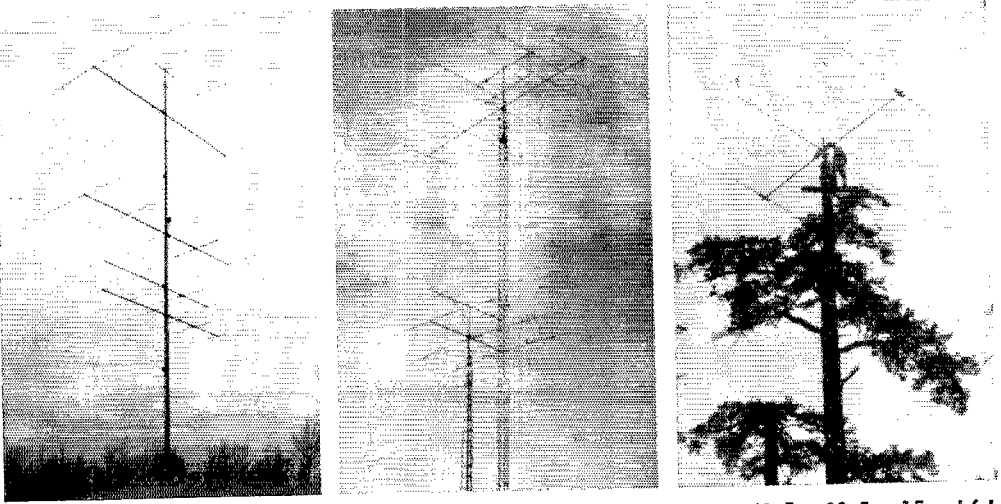
over 3000 U.S.A. QSOs. Next year *DL6JJ* plans to be more successful with a 6-L tribander! Among *EA4DO's* one-thousand-plus contest QSOs were 181 on 75. Young *G3UML* entered his first ARRL contest and won for England. A key to his abilities, however, is his career of SWLing, since before 1959. On the morning of March 13 he found 40 in fine shape producing his first W6s on that band. On that afternoon 15 exploded with activity and in 3 hours he moved frequency just twice . . . just a matter of sorting out the pile-ups! Laurie still needs Nevada and Wyoming for his WAS. *G2QT* comments that many stations have their VOX delay set too short making the operator talk too quickly and leading to many misread calls. The crew at *GB2DX* upped their previous year's performance with a 5-band effort by G3s JOC KFX TUZ and G5AAM/WA6ZIQ, G3s NLY PLD and SVH, manning *G3SVH*, reported local TVI and some unusual neighbor retaliation. They report one neighbor revved up a 2-stroke motorcycle against the shack wall for about an hour while another neighbor amused himself by hammering on a large piece of corrugated sheet iron! GW3s *DIX* and *NIVV* continue to be impressed by the considerable operating skill and courtesy of U. S. stations. *11BAF's* walloping 363-K total includes the big band (20 meters) with 1755 exchanges . . . almost 50 exchanges an hour for a 44-hour stint . . . and an impeccable report. *11CAQ* specialized on 20 meters for a 923-QSO total, *10FGM*, with 242-K vocal honors by IIs *B6R LCK GAD* and *ZSQ* reminds prospective QSLers that *11LCK* does the honors. *LA9HC* joins dozens of other DXers in a plea for a Nevada QSO. *LA9OI*, frequent operator at *LA1H*, always enjoys a contest. Olav soon will be radio-operating aboard a ship. Conditions didn't favor Norway, report *LA1EE* and *LA3JJ*, operators of *LA1K*. They look for a change in their antenna system during the fall and better results next year. *OE3-BGL's* highlights were his first transatlantic 40-meter phone exchanges, thanks to *K2GXI* and *W3MSK*. *OH5SM* reports that the OM and older children took care of the baby so she could take part in the test. *Carola* reports a fine time all 449 QSOs. The *OH2AM* crew type well in addition to operating well. OH2s *BC BH BQ SB* and *QV* talked up 1282 contacts running the two stations. *WOW*, *OZ9SL* wants log forms for 1967, 1968, 1969 . . . ! Guess that 200-K score is just a warm-up. Enthusiastic *OZ3KE* enjoys this affair but reports QSL results only average 50%. Just think, says *OZ7DY*, if my dipoles favored the U. S. instead of the North Pole. Perennial *PA0LOU* regrets no s.a.b. gear for 40 and 75. He is sorry about that! *SM7CRW* says he QSLs 100% (including 741 in the test) and sure hopes all W and VE stations will do the same. The *SM6DLL* crew (*SM6s AOE BJI CKV DLL*) report unstable conditions. Saturday mornings on 75 and 40 nice but Sunday mornings poor. They heard all America south of Florida but the only U. S. stations ever heard occasionally were *W3s MSK* or *WJD*. *SV1BL* reports the 21 Mc. opening from 1410-1900Z March 13 a very good one.

NA Monique operating *FG7XL* found both 20- and 15-meter conditions excellent both weekends with 10 meters good March 13. Her 2551 QSO-total covers 5 bands of operation for well over a half-million points. A delightful surprise was the appearance of *FS7RT*, the renowned *W6TTH*. Reg topped the 2100-QSO figure with multipliers on 6 bands, including a Florida phone contact on 160! *H18XAL* spent most of the second phone weekend putting up antennas for 40 and 80 for the 2nd c.w. weekend. Under 24 hours at the mike for 1746 two-ways. Fred says please send a brand-new Wouff-Hong to the guy who, after receiving the usual 50000 exchange, said "That's a pretty good signal for no power." *KP4CKU* topped 1100 contacts on two bands for an overall sum of 3335 exchanges, over 790-K. Radiators included a tribander up 35 feet plus an inverted vee for 75 and 40. The *KP4BFF* group (*K3SBF*, *WA5BGW* and *K0KYE*) did an interesting break-down of contacts in call areas on all bands. Best area on 10 was *W6*, on 15 *W4*, on 20 *W2*, and on 40 *W8*. The fellows operated the station during off-duty military hours and worked all states and provinces except *VE8* and *VO*. *KV4CF* must have writer's cramp copying those 2000-plus contacts (a signed legible copy is sufficient fellows . . . a clean carbon, or photocopies, acceptable). *OX3JV* wishes Ws would realize that the DX portion of 75 is not only 3780-3800. *Jorgen* says that in most countries it goes all the way from 3600-3800. *TG8CJ* found the contest experience most enjoyable with 15 the best band for stateside contacts. *Juan* finds duplicate contacts a problem with over 1400 exchanges! 16- and 17-year-old *T12AAC* and *T12KR* multioperated *T12AAC* with fine results, 168-K. The Caribbean-west coast path on 10 was proved out by *VP2KR* doing very well indeed though recovering from the flu, ex-*VP7CC* now *VP5RS* was a popular Turks/Caicos multiplier though getting set up quite late. *Chuck* plans bigger goings next year. *YN1TP's* best area on ten was (ditto) California, for 42 two-ways. In fact, *Tomas* had his best success into that area on 21 also. The Canadian contingent ably manning *ZF1BP* (*VE2BK*, *VE3s CJ RX* and *VE8AA*) put in a relaxed 38 hours for an almost-half-million-pointer. Their *BIG* band was 15 with 1062 contacts. Though new to amateur radio, *6Y50F* presented a first-class able performance to the tune of 206,115. *Vic* is looking for a real breakthrough on 28 Mc. next year. *6Y3BS* enjoyed the 2nd weekend better from Jamaica than the 1st one at home *VE3BS*. He says he felt more wanted, hi!

O *K66AD* would like to have spent more time in the test. *Bill* made schedules on 10 but the path proved fruitless. *K9OAZ* *K4DRD* and *WA1FDW* were pleased to operate *KJ6DA* providing a Johnston Island multiplier for 380 participants. QSL say they via *WA6OET*. They found 112 to talk with on 28 Mc., in ten call areas. *VK3ATN* promises to enter more seriously one of these years. *K4LT* found QRN a particular problem on 7 and 3.5 Mc. *VK3-ARX* vehemently declaims that one cannot win using a

DX-pedition phases of *VP2KY* (operated by *W0s* *IIC QUU* for 152,703 phone points from Anguilla) include; loading the 51-ft. ketch, erecting the antennas atop the highest hill (213 ft.) with that view towards mainland U. S. A. and operating from the inside of an abandoned police training barracks. Besides talking up almost 900 contacts, the crew stayed on to give some happy Novices their first Anguilla QSO.





First-class antennas in use by top phone contestants (L-R); **K2GX1** top W.N.Y. using 3-L on 40, 5 on 20, 5 on 15 and 6-L on 10; **W4BCV** tops for Kentucky with a tri-bander at 51 ft., 3-L on 15 at 37 ft., 5-L for 20 at 115 ft. and 2-L 40 at 125 ft. plus a quarter-wave 80-meter vertical; **VE7PV** with a quarter of a million points from B.C. showing his 3-L 20-meter antenna up 80 feet. Ian now has a 15-meter Yagi above this one.

transceiver. Rick stayed on 20 for 312 QSOs. **VK2FU** feels single-band classification might be an inducement for those not equipped for all-band operation. (The charts herein point things this way Gil. Your 457 exchanges show nicely thereon!). **VK9DJ's** sole 40-meter phone exchange was with **W6LTA**. **W6KG's** sojourn at **VR1Z** was more than popular for 700 of the faithful. Nice going Lloyd!

SA **CE8EZ** found 20-15-10 outstandingly good. Ralf heard mostly W6s with their rock-crashing 9-plus signals. What he liked best was the discipline shown by the W-crew. His 2nd-weekend-only stint ran up 993 exchanges. **CE8s** **CG** and **CM** took turns banding out exchanges on 3 bands from Punta Arenas. **HC1TH** says ten meters was wild and **KL7AIZ** made *his* day; 50 an hour or better for about 40 hours for well over 400-K. **HC1RT** was a close runner-up down in Ecuador with almost 400-K and a 5-band 30-hour effort. (Just wait till conditions are good . . . Ed.) **HK4KL's** fat log showed 15 his major band with 1141 exchanges — his entire 2396 listing impeccably typed. Contest knowledgeable **HK3RQ** found conditions poorer than last year. Bill congratulates the "WB" gang with doing a superb job with rigs and mikes, as good as, or better than, the older participants. Final score for about 35 hours, 478-K. **OA7AX** found his first DX test very enjoyable. Even with the fantastic pileups, **PJ2CE** found it possible to make many many contacts with a transceiver in the American phone band. His customary good effort produced 326-K . . . best band 15 meters. A nice showing too on 10-417 QSOs. **PJ3CD** down in Curacao commented on the good conditions, particularly on 15. Many of us had the pleasure of meeting Jonas earlier this year on a visit to the U.S.A. Hooray, **PY2BJO** found his Nevada for WAS and doubled his previous score . . . big things planned with a rhombic under construction. **ZP2AY** does his contesting the hard way. His location is without commercial power and Robert uses a gas engine and alternator. 678 exchanges are particularly meritorious under those conditions.

Disqualifications

The calls listed in this paragraph are all deemed ineligible for score listings or awards. In each case disqualification was under contest rule 14 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, key clicks, spurious emissions, etc. were the basis for these disqualifications. *C.w.* — **K2LWR**, **W3EYF**, **K3NYC**, **W3ZQ**, **W6CLZ**, **WA6EPQ**, **W6NJJ**, **WA6UUS**, **W7BTH**, **W7MVC**, **WA8GQL**, **WA8HGY**, **W8KER** and **WA8MWZ**. Phone — **W3EVW**, **KS6BO** (**W9WNV**, opr.).

Thirty-Second ARRL

International DX Competition

Operator of the station first listed in each section and country is winner for that area. . . . The multiplier used by each station in determining score is given with the score — in the case of U.S.-Canada this is the total of the countries worked on each frequency-band used; in the case of non-W/K/KH7/VE/VO entries it is the total of the U.S.-Canadian districts worked on each band. . . . The total number of contacts is listed next. . . . The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 150 watts; B indicates over 150 watts, up to and including 500 watts; C indicates over 500 watts. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Examples of listings: **K3NHL**. . . . 517,536-288-599-C-76, or final score 517,536 multiplier 288, 599 contacts; power over 500 watts; total operating time 76 hours. . . . Stations manned by more than one operator are grouped in order of score following single-operator listings in each section or country tabulation; calls or numbers of participants at multi-operator stations are listed in parentheses. . . . In sections or countries where three or more multiple-operator entries appear, the top-scoring station is being awarded a certificate. An asterisk denotes a *Itq.* staff member, not eligible for an award.

C. W. SCORES

ATLANTIC DIVISION

Delaware		W3CGS	121,635-153-265-	C-44
K3NHL	517,536-288-599-	W3BN	(K3TEJ opr.)	C-27
W3DRD	131,262-167-262-	W3ISE		99,396-132-251-
K3VSV	675- 15- 15-	W3INH		97,104-136-238-
Eastern Pennsylvania		W3PN		84,942-143-198-
W3BES	690,120-324-710-	W3QMZ		76,230-121-630-
W3MFW	664,620-330-672-	K3EUR		65,637-117-187-
K3JCT	618,150-325-634-	K3HTZ		49,914- 94-177-
W3MWC	564,573-307-616-	W3YYX		47,700-106-150-
W3JHM	428,536-274-522-	W3CAA		46,992- 88-178-
W3NOH	417,381-263-529-	W3CBF		42,966- 93-154-
W3HHK	411,060-260-527-	K3BNS		40,950- 91-150-
W3KFK	389,550-245-530-	W3CGB		36,720- 80-153-
W3BIP	310,905-235-441-	W2KZV/3		33,660- 85-132-
W3HHA	306,380-233-444-			29,580- 85-116-
W3GRS	291,084-254-382-	W3QLV		29,187-669-141-
W3KDF	278,842-214-435-	K3JGJ		22,509- 61-123-
W3EQA	231,603-200-387-	WA3CUO/3		21,828- 68-107-
K3JH	179,780-178-340-	W3AEQ	(W8BJD , opr.)	21,384- 66-108-
W3KT	169,653-171-325-	W3IZI		17,493- 49-119-
W3EVW	136,245-153-293-			

W3NM 16,995-55-105-C-12
 W3DBX 15,372-61-84-B-
 W3GHD 10,434-47-74-B-
 K3RFB 5814-38-51-B-25
 W3NCW 1734-17-34-A-10
 W3YUW 507-13-13-C-6
 K3ZOL 216-8-9-A-2
 W3WJD (4 ops.)
 1,269,216-416-1017-C-96
 W3BGN (W3s BGN YUW)
 908,276-361-841-C-79
 W3WPG (K3WJV, W3s SQX
 WPG) 699,783-329-709-C-90
 K3MBF (K3s JLI LJZ MBF)
 503,565-295-569-C-75
 W3GHS (K3s YOV YUA,
 W3GHS)
 413,766-254-543-C-78
 W3ECR (W3s ECR RRV)
 340,860-247-460-C-47
 K3WNT (K3s VJA WNT)
 5220-30-59-A-39

Maryland-D. C.

W3GRF 817,950-350-781-BC-
 W3EKN 482,287-277-592-C-70
 W3MSR 437,493-251-581-AC-86
 W3MCG 399,645-249-535-AC-59
 W3MFF 528,925-223-492-C-60
 W3MVB 274,776-214-430-C-42
 W3QQI 207,339-183-379-B-59
 K3JYZ/3 132,345-173-255-C-33
 W3AFM 124,993-121-345-C-66
 W3AKW 57,615-115-167-AC-36
 W3EPR 31,734-86-123-C-23
 W3FRB 21,840-65-112-B-17
 W3RNY 20,709-59-117-C-18
 W3ZNB 15,912-68-78-C-
 K3WUV 12,936-56-77-B-24
 W3EEQ 9333-51-61-BC-51
 W3LMZ 8880-48-63-A-12
 K3QDD 4743-31-51-C-8
 W3ACRA 27-3-3-A-2
 W3MSK (6 ops.)
 1,723-120-476-1208-AC-96
 WA3EPT (8 ops.)
 529,248-296-596-AC-96

Southern New Jersey

K2DCA 605-115-315-41-AC-77
 WB2APG 570,090-310-615-C-61
 K2QIL 200,208-172-388-A-60
 W2GYL 132,134-154-286-AC-53
 W2QDY 102,816-126-272-B-
 W2DAJ 96,624-132-244-C-27
 W2QEL 66,330-110-201-C-56
 K2BG 42,228-92-158-B-20
 K2CPR 40,950-105-130-B-21
 K2OFA 38,592-96-134-A-10
 K2AGJ 32,784-79-139-C-21
 WA2ZS 31,525-75-109-C-
 WR2MRA 23,808-62-128-B-43
 WA2KIZ 4386-34-43-A-10
 W2EBW 1620-20-27-B-7
 W2HAZ 672-14-16-A-4
 WA2HSP 12-2-2-A-
 WA2BLV (WA2s BLV WLN)
 380,034-258-491-C-60

K2AA/2 (4 ops.)
 20,088-72-93-AB-
 Western New York
 WB2MFX 525,402-289-606-C-83
 W2SSC 278,460-210-442-C-47
 WA2UJM 230,811-203-379-B-90
 WB2CON 142,760-166-287-A-62
 W2LJK 126,768-152-280-B-60
 WA2HUW 125,400-152-275-BC-31
 K2INP 119,970-155-258-C-
 WB2PCP 102-6-6-A-10
 W2TAB (K2BPF, WA2RJZ)
 131,930-158-279-C-80
 Western Pennsylvania
 W3LOE 731,400-345-712-C-82
 W3VEQ 217,728-189-385-C-76
 K3KMO 186,339-179-347-B-48
 K3ZMH 54,282-109-166-BC-27
 WA3FIN 15,582-49-106-B-30
 W3VK 363-11-11-A-6

K9OTB (K9s BGL OTB)
 220,800-200-368-C-77
 K9YHB (K9RHY, WA9EJD)
 86,016-112-256-C-24
 Indiana
 W9IOP 696,837-327-717-C-85
 W9LKI 79,380-126-210-B-
 WA9ITB 54,510-115-158-A-35
 K9VQK 15,996-62-86-A-38
 K9FIC 630-14-15-A-5
 WA9KDC 468-12-13-A-7
 W9ACS 108-6-6-B-2

Wisconsin

W9EWC (W9AQW, opr.)
 514,878-287-598-C-75
 W9GIL 313,941-237-461-C-
 W9QYV 301,644-233-441-C-67
 W9VZP 217,086-194-373-C-67
 W9ICD 197,208-198-332-C-75
 W9YT (K9ZMS, opr.)
 138,000-156-295-C-52
 W9KXK 108,504-137-264-C-45
 W9NLJ 89,010-138-215-B-10
 W9OW 64,974-98-221-C-
 W9SCZ 54,315-85-213-B-52
 K9KKU 40,218-86-156-C-43
 W9IHN 35,334-78-151-B-
 K9YBC 21,507-67-107-B-20
 WA9JDK 1083-19-19-B-6
 WA9AQE 546-13-14-B-10
 WA9PBW (K9s FWF IBI)
 27-3-3-C-2

DAKOTA DIVISION

Minnesota

WAØKDI 39,897-93-143-C-44
 W9AHI 15,461-59-93-C-5
 W9YU (WAØMKB, opr.)
 6048-36-56-B-18
 W9RXL 4410-35-42-ABC-23
 W9KUI 27-3-3-B-5
 WAØKQU 2-1-1-B-1
 W9IVZ (W6s ISJ IVJ)
 34,104-87-131-C-26

South Dakota

W9BLZ 63,345-103-205-C-
 K9CER 28,413-77-123-C-15
 WAØCJI 3567-29-41-B-16

DELTA DIVISION

Arkansas

K5TYW 69,469-127-183-C-25
 W5GPT 12,150-54-75-B-35
 WA5KUD 300-10-10-B-3

Louisiana

W5KC 235,476-211-372-AC-50
 W5BUC 46,800-104-150-C-30
 WA5EAM 8640-45-64-B-9
 W5MOQ 4830-35-46-C-17

Mississippi

W5CKY 379,316-266-476-C-60
 K5REF 313,782-241-434-C-65
 W5MUG 112,140-140-287-C-15
 W5OER 18,837-63-101-
 WA5EHC 9225-45-69-A-28

Tennessee

WA4CGA 69,000-150-221-A-43
 K4SXD 77,625-125-207-A-41
 W4ZWZ 9720-45-72-B-49
 K4QVZ 4092-32-44-A-12

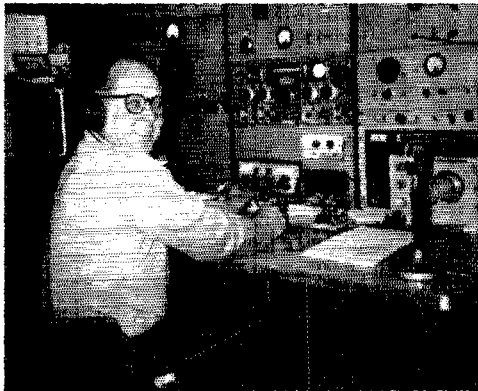
GREAT LAKES DIVISION

Kentucky

W4BCV 261,294-214-407-C-50
 W4MPV 56,547-103-183-C-25
 K4RPZ 20,679-61-113-C-36
 WA4ZIR 1242-18-23-B-6

Michigan

W8VSK 445,775-275-541-BC-62
 W8UCI 209,223-189-369-BC-59
 W8VPC 108,360-140-258-C-50
 W8EW 71,568-112-213-AC-29
 W8NDG 45,441-99-153-C-26
 WA8SJS 41,310-90-155-C-28
 K8ERO 19,341-63-110-C-52
 W8TJQ 19,158-62-103-A-24
 K8ZVF 9027-51-59-C-16



K3MBF, one of the potent c.w. multioperators in Eastern Pennsylvania, produced a half million of those FRC club points. Shown is K3MBF who was aided by K3s JLI LJZ. The major antenna at K3MBF is a 4-L 20-meter rotator on a 130-ft. self-supporting tower accounting for 107 countries on that band.

CENTRAL DIVISION

W2FXA 100,410-135-248-C-22
 WB2PGM 53,802-98-183-C-25
 W2SAW 46,197-87-177-C-25
 WA2GHW 44,800-83-180-C-40
 W2BJH 41,325-85-145-C-25
 K2VOC 31,833-81-131-B-16
 WA2NFY 26,492-74-123-B-40
 W2PHT 23,310-70-111-A-42
 W2QQ 22,572-76-99-C-15
 W2DOD 22,561-77-99-C-8
 K2OUS 21,810-70-104-C-30
 W2PHT 20,700-60-115-C-17
 K2LAF 20,306-71-96-A-32
 W2PDB 17,088-64-89-C-10
 WA2PCW 14,691-59-83-AB-24
 K2KNV 13,167-55-77-C-10
 W2VXA 12,116-52-78-B-37
 W2RPP 10,650-50-71-A-19
 W2SRT 4104-36-38-B-10
 WA2JBV 3456-32-36-C-
 W2UVE 3450-23-50-C-4
 WA2OIL 234-9-9-A-6
 W9IRH 188,916-182-346-C-44
 W9JCV 169,812-159-356-C-69
 WA9KQU 80,682-119-226-C-50
 W9UJX 74,613-119-209-BC-
 W9WIO 39,897-93-143-C-12
 W9EFS 38,130-82-155-C-30
 WA9MFX 28,050-85-111-B-42
 WA9HJM 24,921-71-117-A-36
 WA9LMY 16,320-64-85-B-
 WA9KQS 13,050-58-75-C-30
 W9BZW 8208-48-57-C-23
 W9MZP 6348-45-46-C-
 W9DGG 6042-38-53-A-18
 K9DWG 4968-36-46-B-10
 W9KMN 3420-30-38-C-9
 W9FNX 2340-26-30-C-8
 W9EVX 2040-24-20-A-9
 WA9MWA 270-9-10-A-7
 K9YRA 147-7-7-B-5

DIVISION LEADERS

C.W.			Phone		
Single Operator	Multioperator		Single Operator	Multioperator	
W3GRF	W3MSK	Atlantic	K2GXI	W3MSK	
W9IOP	K9OTB	Central	W9EWC	W9YT	
W9BLZ	W9IVZ	Dakota	WAØKDI	W9IVZ	
W5CKY	.....	Delta	W5AJY	.....
W8FGX	W8UIM	Great Lakes	W4BCV	W8NGO	
W2VJN	WB2MDH	Hudson	K2HLB	W2SKE	
W9FDL	WAØHXW	Midwest	WØCU	WAØKXZ	
W1EVT	W1AW	New England	W1JYH	W1AW	
W7SFA	.....	Northwestern	K7UDV/7	KL7EFT	
K6ERV	W6UMI	Pacific	K6ERV	K6OHJ	
W4KFC	W4BVV	Roanoke	W4BVV	W4KFC	
K5STL	.....	Rocky Mountain	W9GAA	W9YDM	
W4HUE	W4ZYQ	Southeastern	WA4PXP	WA4NGO	
W6ITA	W6RW	Southwestern	W6ITA	.....
W5BRR	.....	West Gulf	W5KTR	WA5AVL	
VE1RB	VE6GX	Canadian	VE1PL	VE6GX	

W6FLT 3675-25-49- C-15
 W6YLL (W6s QOW YLL) 3900-26-50-AB-14

Hawaii
 KH6JJ 27,750-74-125- C-24
 KH6FRI 93-48-38-82- C-25
 KH6FRI 91-43-41-76-AB- -
 W6PAN/KH6J 49-11-27-61- B-19
 KU6FON 825-11-25- A-5

Nevada
 W7VIU 2588-26-46- B-6

Sacramento Valley

W6GRX 217,168-196-370- C-70
 W6FOU 89,914-122-247-BC-70
 W6SLA 77,172-118-218- B-50
 W6ONZ 27,075-95-95- C-37
 W6AJDT 5310-30-39- A-27
 K6DQB 2925-25-39- A-14

San Francisco

W6WB 188,616-174-392- C- -
 W6AIVM (15-479-141-273- C-65
 W6PFRS 86,580-130-222- C-80
 K6NCG (W6BFCE, opr.) 71,955-117-205- C-67
 K6LXS 31,710-70-151- C-26
 K6ANP 22,378-62-123- C-24
 W6ADJJ 7056-42-56- B-17
 W6GCM 1422-22-67- B-21

San Joaquin Valley

W6TJ 170,850-170-335- C-80
 W6KTW 160,776-174-308-BC-66
 W6WWD 18,786-62-101- C-15

Santa Clara Valley

K6ERV (W6BHY, opr.) 370,500-247-500- C-85
 W6WX 225,108-228-456- C-74
 W6CIF 182,196-180-322- C-61
 W6HOC 153,576-158-324- C-67
 W6BCWP 120,498-151-366- C-70
 K6HOR 114,972-143-288- C-40
 K6ALH 88,375-125-326- C-72
 W6RJM 80,688-126-230- C- -
 W6FYM 64,975-115-189- C-32
 W6GYMX 61,632-114-186- C-42
 W6GNYK 61,632-107-192- C-47
 W6KHS 55,278-111-166- B-41
 W6RFY 59,828-74-133- C-30
 W6GQK (W6SLR, opr.) 29,016-78-124- C-26
 W6BLEI 22,035-65-113- A-35
 W6ATO 16,380-52-105- C-21
 W6BKRW 14,382-51-94- A-40

W6QDE 12,495-49-85- C-14
 W6A7QK 10,191-43-79- A- -
 W6VVR 6264-36-58- C-11
 W6BVB 4371-31-47- A-9
 W6QBY 3828-29-44- C-9
 W6CLM 3225-25-44- C-32
 W6APMK 2475-25-33- C- -
 W6BKMV 2337-19-41- A-17
 K6OZY 2220-20-37- C- -
 K6VTC 720-18-40- C-4
 W6JKJ 108-4-9- C- -
 W6UMI (W6WMI, W6A6SI) 204,088-194-352- C- -

South Carolina

K4YJT 385,140-245-524- C-73
 K4WJT 148,169-149-327- C-47
 W44KU 273,762-227-102- C-35
 W44VZK 9900-50-66- B-20
 WN4VZC 504-12-14- A- -

Virginia
 W4KFC 990,600-381-867-AC-70
 W4BFA (WA4RPK, opr.) 438,126-274-533- C-68
 W4ZSH 148,685-165-298- C-20

W4LHW 29,755-71-135- C-27
 W4NML 8280-46-60-AC-19
 W44YDR 864-16-18-AB-7
 K4KJD 210-7-10- C-3

Eastern Florida

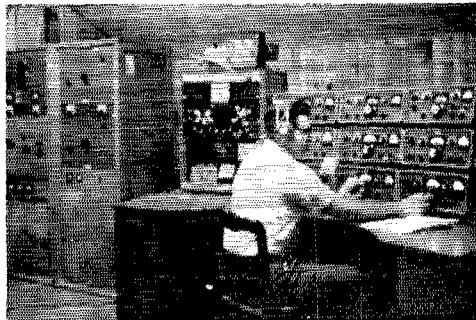
W4HUE 487,760-280-581- C-76
 W4BGO 485,248-272-599-AC-78
 W4PRB 316,707-329-468- A-80
 W4HOS 247,293-213-387-ABC-68
 W44XPX 223,713-201-373- C-59
 W4WYJ 136,431-163-279- A-37
 W4WHK 124,476-164-253-AB-50
 K44JH 51,345-105-163-AB-33
 W4WYH 51,150-110-155- A-22
 W4EIE 45,288-102-148- C-38
 W4BYB 37,074-74-167- A-52
 W4NTE 22,356-69-108- A-10
 W4ASDK 5900-38-50- A-25
 K4QLJ 1764-21-28- B- -
 K4ZD 1122-17-22- C- -
 W4EE0 300-10-10- C-4
 W4BCAP 75-5-5- A-12
 W4ZYQ (W4s ZYQ ZYS) 302,967-229-443- C-76

Georgia

K4EZ 391,560-251-520-BC-69
 W4DXI 321,836-244-442-AC-76
 W4EPM 9555-49-65- A-23

Western Florida

K4OA 125,268-146-286- C-53



W4BVV was manned solo during the phone test to top Virginia with 869,799 and multiperated by 6 of the PVRC crew for 1½ million c.w. points. In front of Tom are 4 S-lines and a KWM-2. The short rack to the left contains control units, beam indicators etc. and the large rack to the left houses four separate 4-1000Z finals.

K6OHJ (K6OHJ, W6RGG, WA6QGW) 191,862-187-342- C-64
 K6LY (7 oprs.) 177,671-173-343- C-86
 WA4HSM/8 (K4EID, WA4HSM oprs.) 180-5-12- A-26

W4DVT 145,512-173-282- C-57
 W4CQI 130,746-154-283- B-38
 W4YGY 123,120-144-285- B-20
 W4GPF 122,706-153-269-AC-27
 K4CG (K3WUW, opr.) 101,330-147-230- C-38
 W4RKY 76,890-120-213- C-39
 W4WBC 67,374-114-197- B-36
 W4ZM 63,180-117-180- C-15
 W4DKU 52,884-113-186-AC-16
 W4YZC 46,820-105-148- C-15
 W4WSP 10,656-49-74- C-10
 W4CRW 7300-40-60- A-30
 W4AVAI 5610-34-55- C-26
 W4KMS 4811-33-49- B-14
 W4NXP 1026-18-19- B-16
 W4BVV (6 oprs.) 512,448-448-1126-AC-96
 W4KXV (8 oprs.) 1,357,433-427-1061-AC-96

ROANOKE DIVISION

North Carolina

W4OMW 76,611-113-226- B-39
 K4ADT 39,900-95-110- B-26
 W4AMQW 29,250-73-129- A-41
 W44XU 6156-38-54- A-12

West Virginia

W8AZD 56,448-96-196- B-41
 W8AQYK 2051-26-27- C-4
 K8UZX 9618-18-20- C-3
 W8BKK 75-5-5- A-3

ROCKY MOUNTAIN DIVISION

Colorado

K6VFN 41,322-97-142- C-38
 W8JKA 8184-44-62- A-36

New Mexico

K5STL 116,208-144-269- C-53
 W5WJU 74,052-121-204- C-50
 W5ODJ 51,410-67-178- C-36
 W8BZY/5 39,336-88-149- C- -
 W5HMT 8235-45-61- C-9

Utah

W7NPU 104,520-134-260- C-62
 K7OXB 3402-18-63- C-10

Wyoming

W7PSO 26,670-70-127- C-40
 W7GGG 1026-18-19- B- -

SOUTHEASTERN DIVISION

Alabama

K4NMM 71,370-122-196-AB-40
 W4KVC 58,824-114-172- C-32
 K4EDF 38,280-88-145- C-40

K6HYZ 132,312-149-296- C-60
 K6CYX 70,983-99-242- C-38
 W6GTL 43,407-91-519- A-51
 W6RHTJ 12,015-45-89- C-19
 W6HJ 6896-36-62- C-25
 W6WNR 6680-37-60- B-23
 W6MPP 2457-21-59- A- -
 W6ANN (W6s ANN DFY) 370,756-218-414- C-75

San Diego

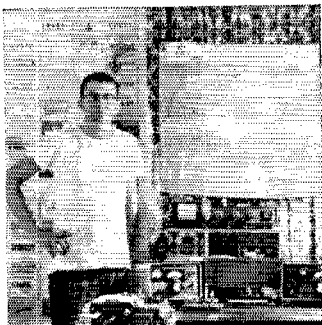
W6BLZI 142,188-164-289- C-42
 W6CHV 80,892-126-214- B-53
 W6KNE 29,748-74-134- C-24
 W6ADMN 11,421-47-81- B-22
 K6CNV 5100-34-50- A-15

Santa Barbara

W6UIS 102,258-138-247- C-48
 W6PQW 53,016-94-188- C- -
 W6AQM 39,411-87-151- B-27
 W6BLV 32,417-77-141- B-40



W9IOP's Central Division c.w. score is an eye-opener, almost 700-K topping Indiana with one of the high single-operator code performances this test. Larry worked different 125 countries over-all in a 5-band performance producing 327 multipliers and 717 exchanges.



African activity was evidenced by (L-R): **5A3TX** with almost 200-K c.w. and an additional nice phone log, **9G1FQ** top Ghana c.w. who finds this event always enjoyable and **9Q5FV**, top Republic of Congo phone.

W6JTA (W6JTA, WA6QDA, WB6PGK)
61,692-106-194- C-60

WEST GULF DIVISION

Northern Texas
W50GS 251,664-214-392- C-70
W5LJL 167,007-179-311- C-70
K5BXC 105,111-153-220- C-60
K5QMC 71,955-117-205-BC-24
WA5JMK 47,595- 95-167- C-37
WA6JSH 29,868- 76-131- B- --
W5VLL 5586- 58- 49- A-17
WA5KYY 3812- 31- 41-AB-20
W5MSQ 714- 14- 17- A- 6

Oklahoma
K5LMG 39,330- 90-146- C-55
W4SKL/5 25,272- 72-117- C-53
K5JVF 19,314- 58-111- B-40

Southern Texas
W5BRR 391,090-259-504- C-87
K5JZY 249,480-216-385-BC-60
W5ZD 214,890-190-377-BC-66
W5LJT 96,744-139-132- C-30
K5ABV 81,606-134-203- A-41
W5LZG 63,283-121-175- C-18
W5MCO 62,586-114-183- C-46
W5WQN 12,844- 52- 85- C-33
WA5AUZ 4590- 34- 45- C-22
W4SMUF 27- 3- 3- A-22

CANADIAN DIVISION

Maritime
VE1RB 363,490-223-550- C-51
VO1AW 109,434-122-305- A-41
VE1ZZ 41,949- 79-177- C-68
VE1WP 24,705- 61-140- A-16
VE1EK 11,850- 50- 79- A-13

Quebec
VE2NV 353,292-236-499- A-75
VE2AYU 153,990-145-354-AB-64
VE2WA 144,900-161-300- C- --
VE2CK 3564- 27- 44- B- --
VE2JD 1800- 20- 30- C- --

Ontario
VE3ES 123,120-144-285- C- --
VE3DBB 77,589-111-233- B- 5
VE3DFM 62,100- 92-225- A-33
VE3FID 56,307-137-137- C-23
VE3DKB 21,452- 62-116- B-39
VE3DGB 243- 9- 9- A- 4

Saskatchewan
VE5PM 24,340- 71-110- B- --

Alberta
VE6AKV 7215- 37- 65- B-21
VE6CX (5 ops.) 56,289- 87-129- C-38

British Columbia
VE7BDJ 55,200- 96-193- C-55
VE7CE 36,720- 80-154- C-24

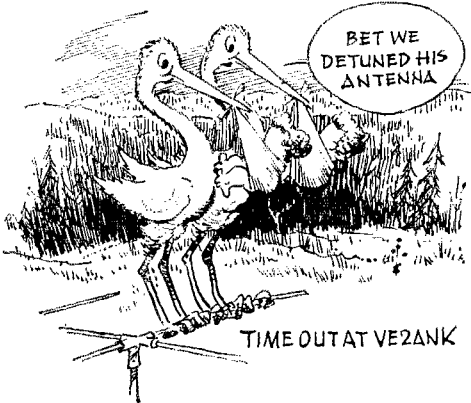
Yukon - N. W. T.
VE8BB 20,832- 56-125-AB-30

AFRICA

Portuguese Guinea
CR3AD 21,096- 24-293- A- --
Cape Verde Islands
CR4BB 195,975-65-1005- A-49
Angola
CR6AI 220,304-56-1315- B-57
CR6ET 71,250- 50-475- A-40
CR6HG 21,321- 23-309- B- --
Mozambique
CR7IZ 13,608- 24-189- A- --

Ghana
9G1FQ 82,115- 47-585- C-26
Republic of the Congo
9Q5RD 20,097- 21-319- A- --
9Q5FA 5364- 12-149- A- 4
Asia
Iran
EP3AM 23,328- 36-216- B-36
Korea
HM5BF 48,060- 36-445- A- --
HL9US (multiopt.) 53,070- 29-610- A- --

UW0IW 9027- 17-177- A- --
UA0TR 4488- 11-136- A-12
UA0DT 1560- 10- 52- A- --
UA9MR 1218- 14- 29- A- --
UA0AG 828- 12- 23- B- --
486- 9- 18- A- --
UA9MX 234- 6- 13- A- --
UW9CS 216- 8- 9- A- --
UA0GF 153- 3- 17- B- --
UA0KFG (4 ops.) 277,704-56-1704- B-96
UA0KCA (3 ops.) 13,419- 21-213- B- --
UA9KUA (3 ops.) 7650- 17-150- B- --
UA9KTE (2 ops.) 1683- 11- 51- B- --



Turkoman
UH8DH 72- 3- 8- A- --
Kazakh
UL7RN 1353- 11- 41- A- --
UL7CQ 918- 9- 34- B- --
Hong Kong
VS6BJ 1896- 8- 19- A- --
India
VU2GW 1071- 9- 41- A- 4
Singapore
9V1LP 70,560- 48- 500-A-40
9V1MT 612- 6- 34- A- --

EUROPE

Portugal
CT1OI 64,476- 36-597- A-50
CT1SQ 7392- 28- 89- B- 7

Germany
DJ5BV 178,002-58-1046- B-66
DL1RK 108,100-46-784-A-45
DM4WPL 93,312- 48-648- B- --
DI78Q 58,242- 33-558- B- --
D18QM 42,180- 37-388- A- --
D11QT 37,872- 48-263- B-23
D16VP 28,050- 22-430- B-35
DJ2YC 27,270- 18-511- B- --
D14LG 22,050- 25-294- H-13
DL1TA 6840- 19-120-AB- 8
D13CM 4731- 19- 83- B- --
DM2ATD 4560- 19- 80- B- --
DL6WD 3348- 18- 62- B- --
DJ6HE 2244- 11- 68- B- 7
D1JJC 424- 8- 18- A- --
DM2BBE 225- 5- 15- A- --
DL6JA (7 ops.) 34,221- 33-347- B-38

Liberia
EL2D 120,204- 53-756- A-21
Ethiopia
ET3AC 1764- 12- 48- A- --
Swaziland
ZD5M 1485- 11- 45- A- --
Ascension Island
ZD8AR (4 ops.) 1,096,758-8F-4251- A- --
South Africa
ZS6FN 29,160- 42-235- A- 9
ZS1O 513- 9- 19- A- --

Japan
JA1IBX 166,504-52-1069- A-52
JA1CLB 129,438- 51-846- A- --
JA1CG 56,293- 37-512- A-36
JA1DFQ 31,328- 32-333- A-27
JA8SW 30,944- 22-319- A-72
JA1LWI 6272- 14-151- A- --
JA2CPD 5628- 14-135- A-24
JA8GR 5343- 13-137- A-19
JA7BJL 3926- 13-101- A-43
JA2CVB 2010- 15- 45- A-10
JA2XI 1908- 12- 53- A- --
JA2XI 960- 8- 40- A- --
JA2BNJ 400- 5- 27- A- --
JA8CZ 72- 3- 8- A- --
JA2CPK/1 27- 3- 8- A-12

Bonin & Volcano Islands
KG6IG (K3HPS, WA4YLP) 126,420- 43-980- C-39

Lebanon
OD5LX 18,009- 23-263- A-11
Asiatic Russian S. P. S. R.
UA0KZB 84,768- 32-883- B- --
UA0KZD 21,024- 22-363- B- --
UA0KCO 15,181- 17-298- B- --
UW6IX 14,307- 19-251- A- --
UA0KZD 13,923- 21-221- B- --

EA3KT 43,622- 34-432- A-50
EA2DT 13,450- 25-182- A-11
EA3NA 7038- 23-104- A- --
EA2CR 6165- 15-137- A- --

Republic of Ireland
EI9J 200,187-59-1134- A-34
EI5F 16,375- 25-220- A-18

France
F8VJ 161,512-52-1038- A-44
F9ZF 90,850- 46-685- A-40
F8CF 65,106- 43-504- A- --

#2PO 57,546-46-422-A-
 #80P 50,280-40-119-A-
 #90E 22,464-26-229-A-
 #8TQ 11,840-20-198-A-12
 #8TM 10,602-31-114-A-
 #5NG 8064-14-192-A-11
 #2GO 3570-10-119-A-
 #5EF 3195-15-71-A-
 #8SF 3-1-1-A-

England

G2RO 138,701-53-877-A-51
 G2QT 117,060-50-784-A-
 G2DC 95,472-52-612-A-
 G3APN 44,550-55-271-A-40
 G3VC 31,008-34-304-A-32
 G3KSH 8208-36-228-A-8
 G3HLW 6800-25-91-A-
 G3AJB 3840-20-64-A-12
 G3SSO (8 oprs.) 414,060-67-2060-A-95

Northern Ireland

#H3OQR 387,072-64-2016-A-62

Scotland

GM2HCZ 34,020-30-378-A-21
 GM3JDR 14,208-16-296-A-
 GM3GUJ (GM3s GUJ UBK) 63,843-39-549-A-96

Wales

GW3JI 137,000-50-916-A-
 GW3FTZ (4 oprs.) 58,820-36-545-A-96

Hungary

HA1KSA 163,080-54-1027-B-60
 HA1SD 52,299-39-447-A-32
 HA5DJ 41,144-37-377-A-
 HA1KVM 37,476-36-347-A-
 HA1VA 4182-17-82-A-
 HA1ZH 3318-14-79-A-
 HA5KQD (HA5s DJ FK KDQ) 111,390-47-797-B-47

Switzerland

HB9JG 227,563-59-1288-B-
 HB9KC 85,536-44-648-AB-28
 HB9DX 68,166-42-541-B-
 HB9RX (HB9s ADJ RX) 54,432-36-507-B-39

Italy

I1NT 218,850-50-1459-B-49
 I1LAO 137,853-51-918-A-
 I1AV 36,371-37-337-A-
 I1KE 33,785-29-420-A-19
 I1PPI 31,581-29-365-A-24
 I1IAGA 30,600-34-303-A-46
 I1HL 6688-19-118-A-

Norway

LA9HC 96,360-40-803-A-35
 LA1H (LA9OI opr.) 65,568-32-705-A-35
 LA5HE 22,828-26-293-A-
 LA2Q 1056-16-189-A-49
 LA7H 8100-18-150-A-
 LA8PF 2805-11-85-A-
 LA1K (5 oprs.) 54,450-30-605-A-91

Jan Mayen

LA6XF/P 3009-17-51-A-

Luxembourg

DJ6SL/LX 2814-14-67-A-

Bulgaria

LZ1KAA (6 oprs.) 49,440-32-575-B-73

LZ1KKZ (3 oprs.) 16,720-20-263-B-
 Finland
 OH1XX 65,310-35-633-B-
 OH2FS 11,220-17-220-B-34
 OH3MF 5778-18-107-A-
 OH5VT 2310-14-56-A-15
 OH2BFE 957-11-29-B-
 OH2YL 371-7-18-B-
 OH4VE 357-7-17-A-
 OH5UX 165-5-11-B-
 OH2AM (7 oprs.) 149,904-48-1053-B-
 OH2TI (5 oprs.) 104,841-33-1059-B-
 OH3AH (6 oprs.) 60,117-29-691-B-85

OZIW 51,012-39-436-A-40
 OZILO 40,494-34-397-A-52
 OZ7X 22,194-27-274-A-46
 OZ4UN 8910-18-165-A-
 OZ7G 3660-10-366-A-
 OZ8E 3486-14-83-A-
 OZ7BG 1776-16-37-B-
 OZ4DX 972-9-36-A-
 OZ3FI 756-12-21-A-
 OZ5DX 330-5-22-B-

Netherlands

PA0LOU 153,250-50-1043-A-60
 PA0XIPQ 72,996-39-623-A-42
 PA0GMU 40,977-39-479-A-
 PA0FLX 18,720-32-196-A-
 PA0WAC 10,164-22-154-A-
 PA0VB 4920-20-82-A-

Dodecanese
 SV0WF 3-1-1-A-1
Greece
 SV0WAA 26,022-29-308-A-24
Iceland
 TF3AB 4320-18-80-A-

European Russian S. F. S. R.

UA1ZW 9027-17-177-A-
 UA6XQ 1190-10-40-A-
 UA1SW 744-8-31-A-
 UW3CS 384-8-16-A-
 UA1KCR 336-8-14-A-
 UA3KRO 300-5-20-A-
 UA1MA 231-7-11-B-
 UA1YY 198-6-11-A-
 UW3BX 180-5-12-A-
 UA1SP 144-3-16-A-
 UA4ZA 180-5-12-A-
 UA1NA 40-2-7-B-
 UA4AZ 27-1-9-A-
 UA6KAF (2 oprs.) 41,013-49-279-A-
 UA1KUA (2 oprs.) 28,455-21-451-B-
 UA3KAO (2 oprs.) 5355-15-119-B-
 UA1KUZ (3 oprs.) 2706-11-82-A-

Kaliningradsk

UA2KAW (LIA2s BO CA CD) 29,634-22-449-B-
 UA2KAP (3 oprs.) 5187-13-131-A-

Ukraine

UB5WJ 17,722-18-403-A-20
 UB5HN 480-8-20-A-
 UB5TR 415-13-29-B-
 UT5KLL 255-5-17-A-
 UT5HP 24-2-4-A-
 UB5KFF (3 oprs.) 7722-26-99-A-
 UB5KHQ (3 oprs.) 3444-14-82-A-
 UB5ARTEK (8 oprs.) 782-8-33-B-
 UB5KGL (3 oprs.) 390-5-26-B-

White Russian S. F. S. R.

UC2AW 7776-18-144-A-
 UC2WP 2460-10-82-A-
 UC2KMZ (3 oprs.) 3105-15-69-A-
 UD6BZ 1845-15-41-A-

Georgia

UF6LA 1728-12-48-A-
 UF6HK 105-5-7-A-
 UF6KAF (UF6s (IE (IM) 24,186-29-278-B-

Lithuania

UP2PT 6474-13-166-B-
 UP2KDA 2178-11-66-A-
 UP2KNP (5 oprs.) 95,064-36-908-B-
 UP2KBA (2 oprs.) 19,080-24-265-B-

Latvia

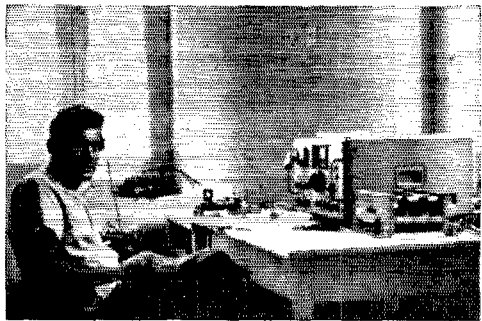
UQ2HO 1980-11-60-A-
 UQ2GQ 1728-8-72-A-
 UQ2MK 255-5-17-B-
 UQ2KDM (3 oprs.) 2432-13-88-A-

Estonia

UR2LO 4395-15-99-B-
 UR2BU 1234-11-38-B-

Rumania

YO8DD 15,057-21-243-B-
 YO3RO 3861-11-17-A-
 YO3JW 3180-10-106-A-
 YO3CR 2604-14-82-B-
 YO7VS 1944-9-72-A-
 YO3RF 792-12-22-B-
 YO9HH 711-9-27-A-
 YO5LN 330-5-22-A-
 YO5KOL 115-5-8-A-
 YO3KSD (YO3s ADJ GU) 6318-26-81-A-



For a serious contester there seems hardly a better spot in the world than the Caribbean. CO2BO proved this point the c.w. weekends in a first-rate performance for close to a million c.w. points. Jan ran 90 watts input and operated all bands with homebrew transmitters (6146s crystal control). Recognize that old OK3MM style?

OH1AA (OH1s VR WK) 22,800-19-101-B-18
Czechoslovakia
 OK3CCC 33,300-30-370-A-
 OK1VK 30,156-28-359-B-
 OK1AHZ 21,780-33-220-A-
 OK30M 19,248-16-401-B-27
 OK2PO 17,024-19-300-A-
 OK1AFO 7335-15-163-B-
 OK2DB 6045-13-155-B-
 OK1AEZ 4845-19-85-A-
 OK1UK 4485-13-115-B-
 OK1KDT 2604-14-62-A-
 OK3KGI 2568-8-107-A-
 OK1AJR 2310-10-73-A-
 OK1AES 2046-11-62-A-
 OK2ABU 1960-14-47-B-
 OK3CED 7778-8-74-A-
 OK2CX 1080-8-45-A-
 OK2BCI 513-9-19-B-
 OK1AOX 450-6-25-A-
 OK1KDO 190-1-15-A-

Sweden
 SM5CCE 66,528-33-693-B-32
 SM5TW 12,291-37-381-B-
 SM5CEU 10,149-17-199-B-
 SM5UU 8944-26-115-B-21
 SM5BNX 7776-18-144-B-
 SL6BH (SM7CUDY opr.) 5355-17-105-A-
 SM7DVF 4452-14-106-B-
 SM3CJD 4368-14-104-A-
 SM5RTS 3008-16-64-B-
 SM5ALJ 2592-12-72-B-
 SM5BRL 1521-13-39-A-
 SM7TV 1342-11-41-A-
 SM6CMR 616-8-26-A-
 SM5BDS 75-5-5-B-
 SM6RJI (4 oprs.) 253,980-51-1663-B-60

Poland
 SP7HX 47,538-38-417-B-
 SP6AKK 11,995-37-393-A-35
 SP6AAT 24,480-30-275-B-12
 SP8MJ 18,270-30-203-B-
 SP8AKY 13,296-16-279-A-
 SP5AHL 11,730-23-170-A-35
 SP5ADZ 6900-25-92-A-
 SP6SO 2520-12-70-A-
 SP6TP 1620-10-54-B-
 SP9AMA 522-6-29-A-
 SP3AOT 456-8-19-A-
 SP8KBM (SP8s AJE ARY) 7054-19-122-A-

ON4XG 92,619-41-753-A-35
 ON4NM 40,194-29-462-A-
Faeroe Islands
 OY6FRA (multiopr.) 18,333-21-291-A-
Denmark
 OZ3FL 100,674-42-790-A-

DX CONTINENTAL CHAMPIONS

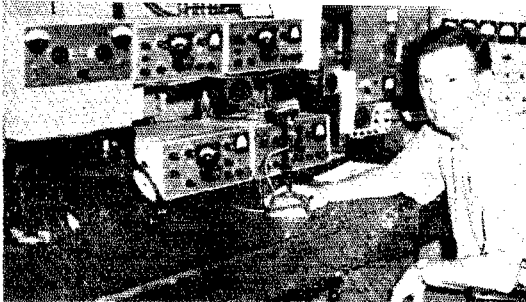
G.W.

Single Operator Multioperator
 7G1A ZD8AR
 JA1IBX UA0KFG
 #H3OQR G3SSO
 CO2BO P3JME
 VK2EO KG6IG
 HK3RQ LU1DAY

Phone

Single Operator Multioperator
 ET8AC
 JA1IBX
 IUBAF GB2DX
 KP4CKU ZF1BP
 VR1Z KJ6DA
 HK4KL

A half-million points c.w. and even more on phone were registered by Los Angeles top single operator **W6ITA**. The 5-L on 20, 4-L on 10 and 15 and 3-L on 40 (plus an 80-meter dipole) produced fabulous reports seen in hundreds of DX logs received for this test.



PHONE SCORES

Yugoslavia
 YU4JOP 840- 8- 35- A -
 YU3BC (YU3s B/C LB LC) 213,512-52-1377- B-66
 YU1BCD (4 oprs.) 112,294- 47-832- B-96
 YU1EXY (2 oprs.) 61,308- 39-537- A -

Tuam
 KG6APD 20,010-23- 290- C-10

Midway Island
 KM6CE (K7RSM opr.) 157,950-54- 975- B-45

Australia
 VK2EO (VK2ADY/W9WNV opr.) 606,771-81-2497- A-78
 VK3APJ 295,745-66-1497- A -
 VK2GW 242,580-65-1244- A-63
 VK3AXK 123,921- 49-843- A-42
 VK2VN 69,972-49- 476- A-10
 VK5KO 31,650-50- 211- A-16
 VK2QK 11,550-14- 275- A -
 VK3XB 6222-17- 122- A -
 VK3KS 1080-10- 36- A -

I. T. U., Geneva
 4U1TU (4 oprs.) 31,976- 23-385- C-15

NORTH AMERICA

Cuba
 CO2BO 978,924-97-3364- A-86
 CM2BL 263,709-60-1465- B -

Guadeloupe
 FG7XX 214,272-04-1116- A-40

Dominican Republic
 HISXAL 972,290-90-3627- C-58

San Andres & Providencia
 HK9AI 609,606-71-2862- B -

Panama
 HP1HE 569,322-78-2433- A-65
 HP1BR 23,256-17- 456- B-20
 HP1AC 6660-20- 111- A -

Puerto Rico
 KP4J3M 419,040-72-1960- B -
 KP4BBN 306,068-68-1515- C-45
 WA4MFS/K14 67,824-36- 628- A-14

Virgin Islands
 KV4CK 184,800-55-1120- B -

Canal Zone
 KZ5FX 682,560-80-2851- C-54
 KZ5JF 331,062-69-1608- A-54

Sint Maarten
 PJ5ME (7 oprs.) 1,187,714-87-4474- A-48

Costa Rica
 TI2KR (TI2s CJH KR) 34,476-39- 295- B -

St. Kitts, Nevis
 VP2KR 81,053-47- 433- A-19

Turks and Caicos Islands
 VP5AR 394,476-71-1852- A-30

Barbados
 VP6PJ 140,508-54- 868- A-17

Bermudas
 WB2PXZ/VP9 (5 oprs.) 362,565-63-1943- A-96

Mexico
 XE2AAG 100,150-50- 676- A-37
 XE1AX 85,520-40- 718- B-11
 XE2DD 32,400-36- 300- A-13
 XE9AL (12 oprs.) 867,396-88-3362-AB-96

Nicaragua
 YN1AA 119,190-58- 685- A -
 YN6BF 9288-24- 129- A -

Cayman Islands
 ZF1XX 2052-19- 36- A -1

OCEANIA

New Caledonia
 FK8AH 16,215-23- 235- A -8

Papua
 VK9WE 1872-12- 52- A - 3
 VK9TB 16- 2- 3- A -1

Fiji
 VR2DK 44,268-42- 356- A-10

New Hebrides
 YJ1DL 25,029-27- 309- A -

New Zealand
 ZL1HW 129,668-44- 984- A -
 ZL1HI 108,000-50- 720- A-37
 ZL1DV 74,052-33- 748- A -
 ZL1PM 56,595-35- 539- A-18
 ZL1AMQ 28,080-27- 347- A -
 ZL1QW 6072-22- 92- A - 8

South America

Chile
 CE1AD 300,060-66-1974- B -
 CE1EF 6384-99- 112-AB - 9
 CE3AG 3822-14- 91- A -2

Bolivia
 CP3CD 10,416-14- 248- A -

Uruguay
 CX1OP 39,560-43- 308- A -
 CX1FB 8910-30- 99- A -

Colombia
 HK3RQ 714,680-74-3220- C-54
 HK3BAE 209,952-54-1296- B-45
 HK3ASJ 39,350-25- 539- A -

Argentina
 LU3DSI 69,482-34- 681- A -
 LU3AES 57,482-41- 534- A -
 LU3BAJ 44,100-35- 420- B -
 LU1DAY (4 oprs.) 585,352-76-2583- A-90

Peru
 OA4PF 376,788-68-1847- B -

Brazil
 PY2SO 620,475-75-2638-ABC-61
 PY2BGL 543,125-75-1525- C-57
 PY7AKQ 274,700-59-1552- A-50
 PY1MCC 243,573-61-1332- C-34
 PY1NO 152,496-64- 948- A-84
 PY1BLG 76,222-46- 554- B-48
 PY7AEE 39,270-42- 316- A -

Venezuela
 YV1DP 629,415-71-2955- B-70
 YV1OB 41,240-40- 345- B-12

Trinidad
 9Y4VU 60,108-42- 490- A-24

Atlantic Division

Delaware
 K3NHL 567,378-266-711- C-83
 K3NYG 44,121- 77-191-ABC-30

Eastern Pennsylvania
 W3BES 323,146-247-708- C-75
 K3JCT 405,544-224-602- C-76
 W3BGN 313,296-214-488- C-39
 W3WPG 234,040-180-526- C-93
 K3TPL 282,576-203-404- C-68
 K3BNS 199,479-161-413- C-47
 W3EQA 155,844-146-356- C-40
 W3GHS 123,669-151-273- C-23
 W3HHK 113,766-134-283- C-34
 W3CGS 109,620-126-290- C-49
 W3N0H 99,099-121-274- C-35
 W3GGM 86,652-116-294- C -
 K3PSW 71,173-103-231- C-44
 W3BIP 62,037-113-183- C-40
 W3QMZ 52,488- 81-216- C-36
 W3NM 50,797- 79-215- C-25
 W3KTT 48,804- 83-196- C -
 W3BYX 33,441- 71-517- A-30
 W3UJF 32,472- 88-123- C-26
 W3KDF 31,968- 74-144- C-40
 W3GHD 15,399- 59- 87- B -
 W3QLW 6300- 35- 60- B-16
 W3BCR 3744- 32- 39- B -3
 W3IZI 396- 11- 12- A - 3
 W3WJD (4 oprs.) 1,112,576-328-1132- C-96
 W3MWC (K3JLL W3MWC) 378,338-22-1563- C-80
 W3GHS (W3GHS, K3YUA) 34,658- 78-152- C-20
 K3MBF (K3s LJJ MBF) 11,616- 44- 88- C -7
 W3KQF (K3JCF, W3KQF) 7958- 64- 78- C -8

Maryland-D. C.
 W3AZD 511,104-242-704- C-70
 W3TLN 393,714-207-634- C-61
 W3BWF 284,153-191-461-AB-70
 W3GRF 216,040-164-445- C -
 W3MCC 178,200-165-360-ABC-58
 W3MVB 99,960-119-280- C-43
 W3AXW 40,992- 96-143-AC-42
 K3RME 36,984- 92-134- B-48
 W3FYS 31,725-75- 141- A -
 W3ZNB 16,512- 64- 86- B-14
 W3QCE 12,267- 47- 87- B-17
 K3CBW 11,376- 24- 45- C-22
 K3VUV 7620- 44- 55- B-32
 K3UTH 1920- 20- 32- B -
 W3MSK (7 oprs.) 2,290-092-398-1918- C-96
 WA3EPT (8 oprs.) 225,090-183-410- C-96
 K3LCH (K3s JYZ LCH) 30,396- 68-149- B-19
 K3JYZ's (K3s JYZ LCH) 22,464- 64-117- C-20
 K3QDD (K3s UAE QDC QDD) 5916- 34- 58- C - 8

Western Pennsylvania
 W3LOE 562,888-284-662- C-82
 W3VEQ 194,880-145-448- C-74
 K3KMO 103,194-126-273- B-40

Central Division

Illinois
 W9JCV 281,600-200-436- C -
 K9ZBI 98,736-136-242- B-43
 WA9JHM 97,536-126-254- A-63
 W9IRH 90,768-122-248- C-32
 K9PPX 81,396-114-238- B-33
 WA9KQU 70,278-106-221- C-40
 K9ZJV 63,828-108-197- C-62
 W9WGG 56,709-100-189- B -
 W9BZW 20,805- 73- 95- C-46
 W9MZW 8810- 40- 77- C-21
 W9KPU 4290- 26- 55- C-16
 K9LDD 3045- 29- 35- C-15
 WA9QIT 855- 15- 19- A-14
 W9VTO 714- 14- 17- C-4
 K9BJM (2 oprs.) 3960- 33- 40- C -7

Indiana
 W9AQW 118,272-154-256- B-51
 W9W2D 81,774-118-231- C-25
 WA9CYV 32,400- 60-180- C-47
 WA9BXO 1584- 22- 24-BC-10

Wisconsin
 W9EWC 309,168-226-456- C-60
 W9GHL 170,232-164-346- C -
 W9KXL 45,390-89-170- B-32
 K9YCB 1560- 20- 26- B- 5
 W9VT (K9ZMS, WA9s CBP QMP) 89,020-130-228- C-60
 WA9PBW (K9BLI, WA9GBM) 7658- 44- 58- C-14
 K9PWF/9 (K9PWF, WA9BZY) 432- 12- 12- 5

Dakota Division

Minnesota
 WA9KDI 46,228- 99-158- B-49
 W9J3M 15,930- 59- 90- A-29
 WA9HWZ 6000- 40- 50-AB-20
 WA9KQK 3807- 27- 47- B-11

Virginia
 W4BVV 869,799-291-997-AC-79
 W4BFA (WA4RPK, opr.)
 436,821-217-673- C-66
 K2AAQ 373,032-198-628- C-65
 W4NJP 267,273-171-521-BC-58
 K4CQ (K3WUW, opr.)
 72,591-109-222- C-37
 W4JVU 15,675-55-95-AC-26
 W4DKU 82501-50-55-AC-8
 W4GFF 8184-44-43-AB-10
 W4WBC 5772-37-52- C-8
 W4ZM 3645-27-45- B-3
 K4PRT 3078-27-38- B-6
 W4WSF 396-11-12- B-3
 W4KFC (W1FRF, W4KFC)
 7560-45-56- A-5

West Virginia
 W4SDAU 113,064-128-206- B-52
 W4BAIN 48,786-94-173- B-40
 K8UZX 1638-21-26- C-3
 W4WSP/8 684-12-19- B-3
 W48QYK 3-1-1-A-

ROCKY MOUNTAIN DIVISION

Colorado
 W0GAA 85,935-105-273-AC-57
 W0YDM (W0YDM, WA0s LMX IOR)
 168,276-148-379- C-77

New Mexico
 K5STL 72,468-122-198- B-50
 W8BZY/5 4128-32-43- C- -
 W5EQT/5 (K5CLV, W5EQT)
 111,580-140-267- B-78

Utah
 W7NPU 55,803-89-209- C-56
 W7LEB 14,700-50-98- B-12

Wyoming
 W7PSO 1056-16-22- C-3

SOUTHEASTERN DIVISION

Alabama
 WA4GCS 253,692-193-438- C-64
 WA4WAO 99,065-155-215- B-33
 W4CYC 17,445-95-157- C-22
 W4HA 31,257-69-151- B-20
 W4LHW 22,509-61-123- C-21
 K4KJD 297-9-11- C-3
 WA4GNK 192-8-8-A-2

Eastern Florida
 WA4XPX 661,380-292-755- C-81
 W4FRO 159,768-168-317- C-55
 W4DRK 66,240-115-192- C-51
 WA4110 13,500-45-100- C-23
 W4EE0 630-14-15- C-10
 K4RQE 198-6-6-A-1
 WA4NGO (5 oprs.)
 450,720-240-626- C-48

Georgia
 WA4ARV 252,324-172-489- B-75-
 K4EZ 65,712-111-199- B- -
 WA4TWQ 21,708-67-108- B-5

Western Florida
 K4ZJF 245,520-186-440- C-6

SOUTHWESTERN DIVISION

Arizona
 W7AYY 27,522-66-139- C16
 W7ATV 8361-41-68- C-18
 W7ENA 216-8-9-A-2

Los Angeles
 W6ITA 576,675-233-825- C-82
 W6LDA 148,212-138-358- C-47
 K6KA 100,233-111-316- C-80
 W6NJU 48,804-98-166- C-48
 W6NQT 20,178-57-121- C-16
 W6ANB 13,677-47-97- C-21
 W6RCV 8436-37-76- B-17
 W6BLCS 5619-34-55- B-24
 W6GURS 5355-35-51- A-12
 K6JJC 4446-26-57- C-7
 W6NKR 2160-20-36- C-6

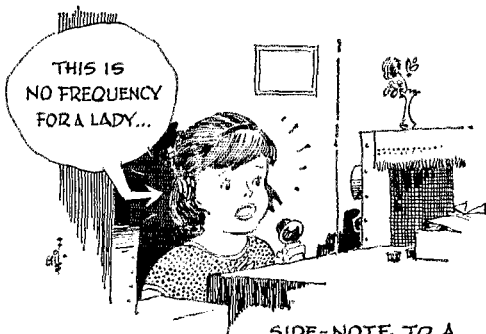
Orange
 W6LCX 123,816-134-308- C-64
 W6YMV 90,420-110-274- C-80
 W6RKP 88,822-89-334- - -
 W6B0JU 20,340-60-121- C-96

San Diego
 W6BGGI 1275-12-25- B-9

Santa Barbara
 W6GRX/6 90,384-112-269- C-53
 W6AEPY 7720-40-63- C-43
 W6BLV 4020-30-46- B-12

WEST GULF DIVISION

Northern Texas
 W5KTR 265,359-197-450- C-70
 W50GS 140,343-163-287- B-65
 WA5ALB 109,032-132-276- C-43
 WA5NVY 78,560-116-220- C-43
 W5LOJ 63,690-110-193- C- -



SIDE-NOTE TO A YL, OVERHEARD IN A 10-METER PILE-UP

K5QMC 58,656-104-188- B-70
 W5PTG 40,128-88-152- C-32
 WA5JSI 34,935-85-137- B- -
 W5LPH 27,594-75-126- C-16
 K5BXC/5 3861-33-39- B-8
 W5MSG 12-2-2-A-2
 WA5AVL (WA5s AUS AVL)
 196,416-176-372- C-96

Oklahoma
 WA5LOB 41,612-101-138- A-34
 WA5HTS 35,757-87-137- B-30
 W5EHR 19,998-66-101- A-24

Southern Texas
 K5JZY 230,958-182-423-AC-68
 W5LZZ 75,516-116-217- B-42
 W5LJT 20,928-64-109- C-14
 W5BRR 18,297-57-107- C-10
 WA5IPM 4860-30-54- A-11

W5RO 3906-31-42- B- -
 W5BDX 588-14-14- B- -

CANADIAN DIVISION

Maritime
 VR1PL 309,208-206-501- C-65
 VR1AFY 173,808-136-428- C-41
 VE1NV 90,889-97-313- C-55

Quebec
 VE2ANK 211,680-160-441- C-50

VE2WA 120,960-140-288- B- -
 VE2JD 31,062-62-167- C- -
 VE2CK 5655-29-65- A-10
 VE2BAW (5 oprs.)
 78,498-98-267- B-73

Ontario
 VE3UX 218,772-177-412- C-56
 VE3FN 87,670-110-271- C-39
 VE3BHS 63,012-89-236- A-26
 VE3DAM 32,550-70-155- A-33
 VE3BS 25,728-64-136- A-17
 VE3EVZ 10,707-43-83- B-11
 VE3DEU 2484-23-36- A-11
 VE3BSJ 585-13-15- A- -
 VE3AEV 60-4-5-A-3

Manitoba
 VE4SD 50,778-91-186- C-54

TOP TEN

Single-Operator DX

C. W.	Phone
CO2HO.....978,924	KP4CKU.....790,395
HI8XAL.....972,290	FS7RT.....642,300
HK3RQ.....714,680	HK4KL.....560,664
YV1DP.....629,415	FG7XL.....542,724
KZ5FX.....682,560	HK3RQ.....478,000
PY2SO.....620,475	UC1TH.....420,003
HK0AI.....609,606	HY2BJO.....400,554
VK2EO.....606,771	HC1RT.....395,541
HP1IE.....569,322	11BAF.....362,691
7GIA.....483,114	VP5AR.....362,043

Saskatchewan
 VE5DP 18,060-60-101- A-38
 VE5GF 2964-26-38- B-12

Alberta
 VE6MF 63,609-91-233- C-42
 VE6BR 59,940-90-222- C-45
 VE6IN 11,745-45-87- C- -
 VE6AKO 10,878-41-88- B-30
 VE6GN 8820-42-70- B-12
 VE6GX (8 oprs.)
 116,466-118-329- C-40

British Columbia
 VE7PV 221,850-150-493- B- -
 VE7AA 18,843-81-201- C-48
 VE7BDJ 648-12-18- B-3

Yukon-N.W.T.
 VE8BB 26,880-64-140- B-44

AFRICA

Angola
 CR6HG 52,650-39-450- B- -
 CR6HF 27-3-3-B-7

Mozambique
 CR7FR 75-5-5-A- -

Ethiopia
 ET3AC 96,390-35-918- A- -

Seychelles
 VQ9EF 195-5-13- A- -

Swaziland
 ZD5R 38,892-28-463- A- -

South Africa
 Z36FN 24,651-33-249- A-8
 Z36NM 11,890-12-330- A- -

Libya
 5A3TX 15,980-20-267- A-20

Nigeria
 5N2AAF 17,850-25-238- A- -

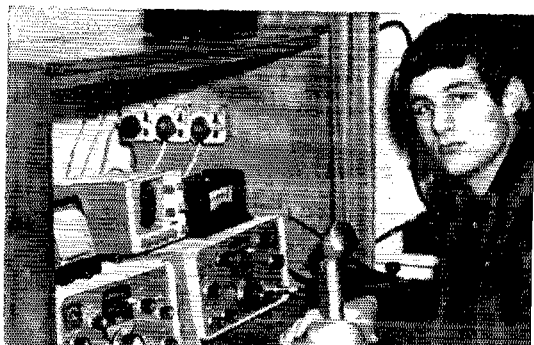
Sierra Leone
 91LJW 39,798-18-737- A-20
 91LHX 26,901-21-427- B- -

Republic of the Congo
 9Q5FV 35,760-20-597- A-42

ASIA

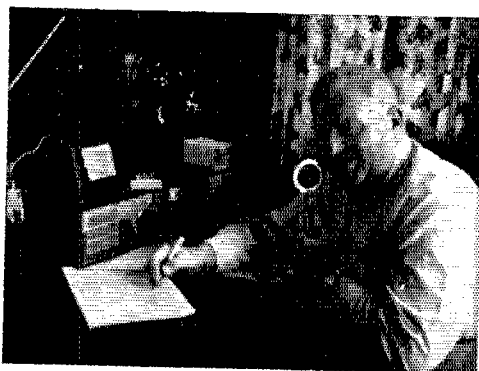
Iran
 EP3AM 44,541-32-464- B-36

In an excellent "first-try" in an ARRL contest, 15-year-old **G3UML** took top phone honors for England. Laurie scored 137,664 points and almost 1000 contacts. He found 75 particularly good although there appeared to be a scarcity of W/VE stations on that band.





VE1PL, top Canadian phone with over 300-K, feels the test is about the only time to say hello to friends each year. Sort of like sending Christmas cards!



OT W2IUW has been a regular in DX contests for most of his 42 years of hamming. Chas. got a particular thrill out of that Sunday opening on 10-phon.

Korea
 HM5BF 16,254-21- 258- A -
 HL9US (6 oprs.) 48,096-32-501- A -

Japan
 JA1IBX 102,256-44- 777- A-42
 KA7AB 101,205-39- 865-AB-28
 JA8AA 35,872-19- 630- C -
 JA8CKC 35,700-34- 351- A-26
 JA1CG 26,610-30- 301- A-25
 JA2BAY 6501-11- 198- B-24
 JA1RJU 5616-13- 144- A -
 JA1DDZ 4650-10- 155- A -
 JA7DY 4257-11- 129- A -
 JA0BLU 3456- 9- 128- A -
 JA5BJM 1260- 9- 47- A-14
 JA8AIP 864- 9- 32- A-11
 JA8GR 810- 5- 54- A-5
 JA1PTE 405- 9- 15- A -
 JA1PAH 322- 7- 16- A -
 JA1KPA 180- 5- 12- A- 3

England
 G3UML 137,664-48- 956- A-51
 G2QT 88,215-46- 609- A -
 G1B2DX (4 oprs.) 305,816-56-1823- B-88
 G3SVH (G3s NLY PLD SVH) 210,936-47-1496- B-42

Wales
 GW3NWV (GW3s DIX NWV) 192,780-54-1190- C-64

Hungary
 HA5KBB (3 oprs.) 11,220-17- 220- C -

Switzerland
 HB9DX 2760-10- 92- B -
 HB9RX (HB9s ADJ RX) 882- 9- 33- B- 3

Italy
 I1BAF 362,691-57-2121- B-44
 I1LAO 28,928-32- 303- A -
 I1KE 1800- 8- 75-AB- -
 I0FGM (4 oprs.) 241,733-53-1521- B-52
 I1CAQ (11s CAQ CZW) 55,180-20- 923- B-22
 I1CGE (11s CGE FLD) 44,190-30- 495- B-16

Norway
 LA9HC 26,892-27- 332- A-35

LA1H (LA9OI opr.) 9456-16- 199- B-16
 LA5HE 4752-18- 88-AB- -
 LA4ZB 1806-14- 43- A -
 LA4LG 1584-11- 48- A- 2
 LA1K (LA 1EE 3J) 29,568-28- 352-AB-92

Austria
 OE2EGL 165,120-43-1280- A -

Finland
 OH2TI (OH5SE opr.) 82,068-28- 977- B -
 OH5SM 32,475-25- 449- B -
 OH2WI 31,475-25- 420- B -
 OH2CP 4230-10- 141- B -
 OH8OS 3068-13- 79- A- 5
 OH2AM (5 oprs.) 157,686-41-1282- B -

Aland Islands
 OH0NI 1215-15- 27- B -
 OH0NJ 120- 4- 10- A -

Czechoslovakia
 OK1MP 117,219-41- 953- B-43
 OK1AHZ 2340-13- 60- A -

Belgium
 ON8UA 17,651-19- 310- A-22
 ON4ZU 5976-12- 166- B -

Denmark
 OZ9SL 206,100-50-1374- A-32
 OZ3SK 70,383-29- 809- A -
 OZ3Y 34,254-33- 346- A-20
 OZ3KE 24,702-23- 358- A-18
 OZ7DX 2622-13- 65- A- 8
 OZ7HM 1323- 9- 49- A -
 OZ1RH 336- 7- 16- B -
 OZ7BG 165- 5- 11- A -
 OZ3FI 3- 1- 1- A -

Netherlands
 PA0EEM 68,727-31- 739- A -
 PA0DEC 27,950-26- 459- A-18
 PA0LOU 17,472-26- 227- B-10
 PA0XPQ 8778-22- 133- A-15

Sweden
 SM7CRW 68,758-31- 741- B -
 SL6BH (SM7CUIY opr.) 38,970-30- 433- A -
 SM5WT 6345-15- 141- B -
 SM8ALJ 81- 3- 9- B -
 SM6DLL (4 oprs.) 197,280-48-1370- B -

Poland
 SP7HX 4545-15- 101- B -

Greece
 SV1BL 8532-12- 237- A- 7

Dodecanese
 SV0WF 4004-11- 122- C -

European Russian S.F.S.R.
 UA1IG 5130-15- 114- B -

Lebanon
 OD5BZ 69,597-33- 703- A-25

Asiatic Russian S.F.S.R.
 UA0KKB 15,390-19- 270- B -

Hong Kong
 VS8AJ (OZ7SM, opr.) 12- 4- 1- A -

Israel
 4X4FV 3564-11- 108- A -

EUROPE

Portugal
 CT1HW 14,904-23-316-ABC-13
 CT1SQ 2244-17- 44- A- 2
 CT1BB 2160- 9- 80- B -

Germany
 DJ6QT 284,160-60-1580- B-60
 DL1LK 192,132-54-1186- B -
 DJ5BV 176,073-57-1037- B-60
 DL4LG 126,621-33-1279- B-28
 DJ0LDA 83,196-36- 772- B-38
 DJ5HN 50,406-31- 542- A -
 DL4NS 43,065-29- 496- B-46
 DL6VP 42,050-25- 562- B-26
 DJ1SX 28,804-19- 522- B-28
 DJ8YQ 6967-17- 117- A-15
 DL9HC 6472-16- 114- B-14
 DL1TA 3213- 7- 153-AB- 9
 DL6JJ 2196-12- 61- B -
 DJ9MH 1464- 8- 63- A -
 DM3XED 1950-10- 65- A -
 DL3RA 1344-14- 32- A -

Spain
 EA4GZ 142,545-43-1105- A -
 EA2EL 10,992-16- 229- B -
 EA4DO (2 oprs.) 173,826-54-1075- A-84

France
 F3KW 65,205-35- 621- A -
 F2SY 35,853-19- 629- A -



As he promised after the last test, **I1BAF** had a new antenna ready for this one. Mino used a 5-element wide-spaced array atop a home-built 100-foot tower. On the other bands: dipoles 80-foot up for 40 and 75, and 3 elements 60-foot up for 15 meters. Final results an outstanding two-thousand plus contacts.

UW3BJ 2170-10- 77- B- 4
 UA3KAG 483- 7- 23- B- -
 UA3KAO 27- 3- 3- B- -

Kaliningradsk

UA2KBD (3 oprs.)
 31,621-19- 553- A- -

Ukraine

UB5WJ 20,880-20- 351- A-15
 UB5FG 546- 7- 26- A- -
 UB5ARTEK (2 oprs.)
 306- 6- 17- B- -

White Russian S.F.S.R.

UC2BF 714- 7- 34- A- -

Lithuania

UP2OK 33,534-23- 486- B- -

Yugoslavia

YU3BC (YU3s BC LB LC)
 108,231-43- 839- B-60

Cyprus

ZC4RM 6864-16- 144- A-24

I.T.U., Geneva

4U1TU (4 oprs.)
 34,350-25- 469- C-22

NORTH AMERICA

Cuba

CO2FA 22,487-39- 279- A- -
 CO8RA (2 oprs.)
 84,456-51- 552- A-33

Guadeloupe

FG7XL 542,724-71-2551-AC-60

Saint Martin

FS7RT 642,300-100-2141- A- -

Dominican Republic

H18XAL 340,470-65-1746-BC-23

Panama

HP1JC 332,280-78-1420-AB-37

Guantanamo Bay

WA4FIJ/KG4
 14,124-22- 214- A- 9

Puerto Rico

KP4CKU 790,395-79-3335- B- -
 WA4MFS/KP4
 88,725-35- 845- A-39

KP4BFF (K3SBF, WA5BGW,
 K0KYE)
 399,924-69-1932-AB-52

Virgin Islands

KV4CF 357,222-58-2053- A-35

Canal Zone

KZ5FX 65,415-49- 450-BC-16

Greenland

OX3JV 118,266-46- 857- B-40

Guatemala

TG8CJ 244,776-56-1457- A-44

Costa Rica

TI2AAC (TI2s AAC KR)
 168,012-52-1077- B- -

Antigua

VP2AC 35,397-23- 521- A-15

Anguilla

VP2KY (W0s HC QUU)
 152,703-57- 893- A-44

St. Kitts, Nevis

VP2KR 67,056-41- 509- A-29

Turks & Caicos Islands

VP5AR 362,043-69-1747- A-40
 VP5RS 10,080-20- 168- A- -

Mexico

XE2JZ 182,195- 65-936- A-29

Nicaragua

YN3KM 102,771-57- 601- B-24
 YN1TP 52,632-34- 516- B-40
 YN3FP 48,060-45- 356- C- -

Cayman Islands

ZF1BP (4 oprs.)
 494,361-78-2115- A-38

Jamaica

6Y5OF 206,115-65-1057- A-39
 6Y5BS 134,520-57- 791- A-24

OCEANIA

Guam

KG6APD 36,738-26- 471- C-16

Johnston Island

KJ6DA (WA1FDW, K4DRD,
 K9OAZ) 46,740-11- 380- B-19

Midway Island

WA6GFS/KM6
 3318-14- 79- C- L

Australia

VK2APK 59,394-38- 521- A- -
 VK3ATN 49,248-48- 342- A-10
 VK4LT 33,048-36- 306- A- -
 VK2WD 27,693-51- 181- A-17
 VK3ARX 15,912-17- 312- A-13
 VK3ZR 9135-29- 105- A- -
 VK3XB 1485-11- 45- A- -
 VK3AWI/P 414- 6- 23- A- -

Check Logs: (C.W.) W1FDL W1JKB WB2BTV W2EGI WB2ODI
 W2PXL W3BVO W3NNL K4BD W4JUK W6DQZ WB6IUH
 W6PIZ W7LNG KL7P1 W8EGR W8FEM W8FLX W9PWW
 K0HLL K0IIR VE4MF VO2AI CX2FD DJ2RE DM2CEL
 DM2RYO DM4BO E19F F3TZ HK3ADO LA4IG OH1SH OH3YH
 OH9NI OK1ALG OK1ALZ OK1DK OK1US OK2BZR OK2KLI
 OK2KOS OK3DRG OK3KAS OK3XW OZ4H PY2BKO SM5BXT
 SM5DFM SP2IU SP6AZ SP9ZW/6 JA1ZM/MM UC2AR
 XE1KD Y08C ZF3JJ ZL1HY 9V1MT; (PHONE) W1DEP
 WB2QKS W4DS W4HOS WA4TXD W4LYJ W6EUF WB6IUH
 W7LNG W8EGR W8PCS W9MG W9UAZ K0HLL K0IIR VO1AW
 VO2AI VE2DYB VE3EWE CP8AB DL1RO DJ2RE KP4XM
 OH1SH OH2AF OK1EV OK3KGI OZ3FI SM5BFF SM5BUT
 SM5CAK SM5IC SM5MC SM6AEK.

QST

VK3KS 120- 5- 8- A- -
 VK2FU (2 oprs.)
 23,307-17- 457- A-29
 VK3AAH/P (VK2s AAH SG
 19,608-19- 344- A- -

Papua

VK9DJ 8262-17- 162- A- -

Gilbert Islands

VR1Z 71,400-34- 700- A- -

New Zealand

ZL1HW 56,256-32- 586- A- -
 ZL1AGO 7236-12- 201- A- -
 ZL1BO 4872-14- 116- A- -

SOUTH AMERICA

Chile

CE6EZ 115,986-39- 993- C-46
 CE8CJ 47,040-35- 448- B-33
 CE8CM 23,670-30- 263- B- 7

Ecuador

HC1TH 420,003-69-2029- B-40
 HC1RT 395,541-71-1857- C-31

Colombia

HK4KL 560,664-78-2396- B- -
 HK3RQ 478,000-73-2186-ABC-35
 HK3AYA 7425-15- 165- A- -

Peru

OA1W 208,824-66-1056- C-26
 OA7AX 27,180-30- 302-BC-14

Netherlands Antilles

PJ2CR 326,000-68-1600- A- -
 PJ3CD 239,355-45-1773- A- -

Brazil

PY2BJO 400,554-77-1734- B- -
 PY3BAD 68,770-46- 507-AC-17
 PY2BGO 720-10- 24- C- I

Venezuela

YV1IK/5 132,328-56- 788- B- -

Paraguay

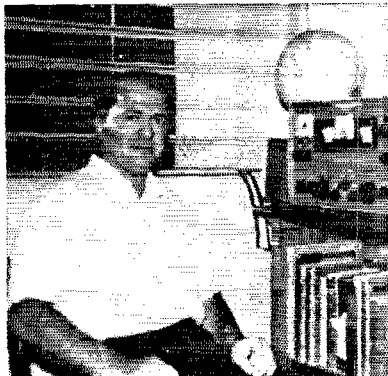
ZP9AY 54,702-27- 678- A-23

Trinidad

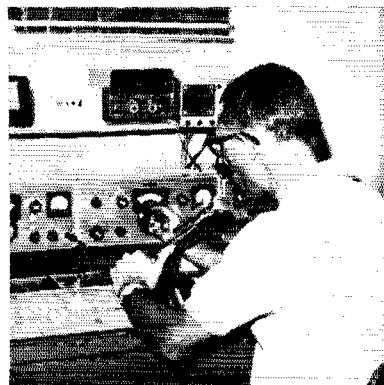
9Y4VU 231- 7- 11- A- -



HM5BF (shown with his XYL **HM5BG**) submitted winning logs for both test modes. Kim runs 100 watts input to a homebrew 811 transmitter and uses quads on 20 and 15, verticals on the lower bands.



On the left, **6Y5OF**, just newly licensed and top Jamaica phone with over 200-K. On the right, **KP4CKU** (now **W9JOE**) one of the big test scores almost 800-K phone with 3335 vocal two-ways.



Armed Forces Day - 1966

Communication Test Results

THE annual Armed Forces Day communication tests conducted by the Departments of the Army, Navy and Air Force on 21 May 1966, successfully demonstrated to the world the close partnership and mutual respect enjoyed between U. S. radio amateurs and the U. S. Department of Defense.

This year several military radio stations participated in the communication tests which included military-to-amateur crossband operations and receiving contests for both c.w. and RTTY modes of operation.

Crossband Results

Military radio stations WAR, NSS, NPG and AIR had a combined total of 7008 QSOs during the twelve hours and forty-five minutes devoted to the military-to-amateur crossband portion of the communication tests. Commemorative QSL cards have been mailed to all contacts that could be identified in the Spring 1966 issue of the *Callbook*. Any amateur who has not received a QSL card confirming his contact should address a request for clarification to the Armed Forces Day Contest, Room 5A522, The Pentagon, Washington, D. C. 20315. This request must include the amateur's call sign, the station worked, time of contact and the frequency utilized by the military station.

C.W. Receiving Contest Results

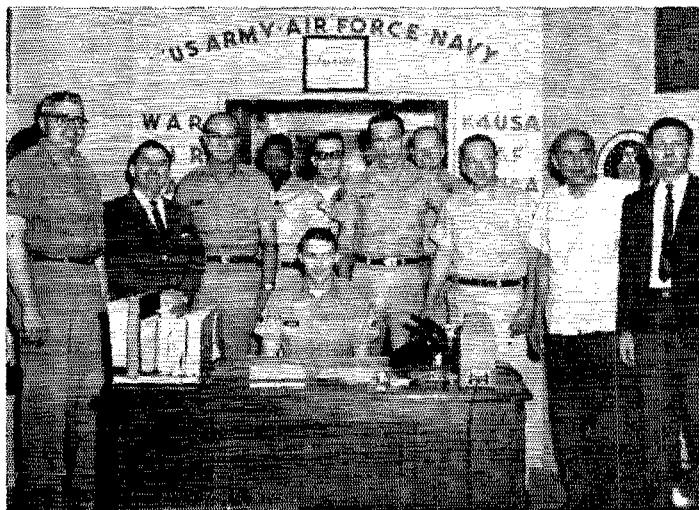
There were 482 perfect entries for the 25-w.p.m. c.w. broadcast message originated by the Secretary of Defense. The complete text of the 25-word-per minute International Morse Code message is printed below and followed by the call signs or names of individuals who received a Certificate of Merit for submitting a perfect contest entry:

THE 17TH ANNUAL OBSERVANCE OF ARMED FORCES DAY AFFORDS ME THE OPPORTUNITY TO EXTEND MY BEST WISHES AND PERSONAL THANKS TO ALL AMATEUR RADIO OPERATORS PD WITHOUT YOUR HELP AND DEDICATION DASH YOUR TRAINING AND PREPA-

RATION DASH THE RELAY OF MESSAGES ON MARS AND AMATEUR CIRCUITS TO AND FROM OUR MILITARY FORCES THROUGHOUT THE WORLD AND ESPECIALLY IN VIET NAM WOULD NOT BE POSSIBLE PD THE THOUSANDS OF MESSAGES HANDLED EACH MONTH BY THE MILITARY AFFILIATE RADIO SYSTEM AND AMATEUR RADIO OPERATORS ACROSS THE COUNTRY CONTRIBUTES IMMENSURABLY TO THE MORALE OF OUR MEN OVERSEAS AND BRINGS THEM A LITTLE CLOSER TO HOME PD YOUR ACCOMPLISHMENTS IN PERFORMING THIS SERVICE REFLECT CREDIT UPON THE ENTIRE AMATEUR RADIO FRATERNITY SGD ROR6RT 8 MCNAMARA CMM SECRETARY OF DEFENSE."

C.W. Certificate Winners:

K1AAA, W1AJJ, W1BDI, W1RGW, WA1BKQ, WA1DUK, WA1DWE, WA1DYZ, W1ECH, W1FJJ, WA1FWQ, W1GBB, W1HJP, K1KCF, W1LZL, W1MCG, K1NOW, W1O9Y, W1QMN, K1PLP, K1QZV, W1RXP, K1RYP, K1TFE, W1TO, W1UPG, W1WPR, K1YSD, W1ZLK, K1ZND, W1ZYQ, W2BVE, W2BXW, W2CLQ, WA2CKL, W2DBQ, K2EPQ, W2GOR, W2GQN, W2HGY, WA2HLH, WA2HSP, W2RHZY, K2JUA, W2JZG, WA2KIP, W2KLD, WB2LHF, W2LRW, W2LYH, WA2NDC, W2NEP, WA2NGP, W2NVB, W2OE, WA2OQY, WA2OWQ, W2PVY, K2QDG, WB2QZ, W2RJ, W2RN, W2RUK, W2RUZ, WA2SAB, WB2SCK, K2SEN, W2SKX, WB2SLI, K2SSX, WB2SXX, W2TUK, K2UFC, K2UGZ, W2UK, W2URP, WA2UPC, W2VEH, WA2VSQ, WA2VYS, W2YJS, K2YQK, W2ZMK, W2ZUX, WA2ZPR, WA2ZQH, WA3AHK, W3BFF, WA3CGE, K3EAL, W3ECP, WA3EEQ, W3EOV, WA3FKC, WA3G, K3GMA, K3GHO, W3GRB, W3HC, K3HNP, VE3IA, W3JRV, W3JZY, W3KSK, W3LBC, W3MCG, K3MQE, K3NAS, K3PZU, K3WIK, W3ZLP, W3ZN, K4AO, K4ASU, KP4ATS, W4BBZ, W4BP, A4BWR, W4BXV, W4CCC, K4CQG, WA4CJV, WA4CTD, K4DNZ, DL4DX, W4EFV, WA4EJU, W4FRO, WA4GOC, W4HOS, W4JRA, WA4JWV, K4JXC, W4KIS, W4KVO, WA4LUO, W4LY, W4MHW, W4MKU, K4MXZ, W4NEI, DL4NK, W4NPG, W4NTE, W4NWK, W4NZP, W4OSC, W4OZB, W4PED, W4PWF, K4QWQ, W4RQB, WA4RPU, W4RXY, W4SCF, WA4UBX, WA4UHA, K4URA, W4UUI, WA4UYT, K4UYU, W4VDY, WA4VPO, WA4VYZ, W4WHE, W4WJK, WA4WKL, WA4YDR, K4ZSX, W4ZY, W5AIR, W5AJG, W5AQN, W5ARK, WA5BNE, K5CAT, W5CCF, WA5CZR,



Some of the personnel who manned military radio stations during the Armed Forces Day Communication Tests. Shown (l. to r.) are Sgt. O'Leary, W4DIN, K3IMG, Sp4 Dingle, Sgt. Reasons, W4YNZ, Sgt. Eardley, Sgt. Atterson, K3LMM, W4LWG and (seated) WA4UOY.

W5EGX, W5EJV, DL5EO, W5EWF, W5FBJ, WA5FHM, W5FIW, W5GKV, W5GRT, WA5GV, DL5HH, W5IDZ, K5JGZ, WA5JMK, W5JPC, W5JWL, WA5KOI, K5LKI, K5MCM, W5NEO, WA5NOM, WA5NUT, K5OKR, WA5PAE, K5PEV, K5QVH, W5RCF, W5RTZ, W5SGA, K5URS, W5UY, W5ZU, W6AAH, W6AAQ, W6GADY, W6ABE, W6AEL, W6AJJ, K6H6A, W6ASH, W6AW, W6AWP, K6H6A, W6AXV, K6BCJ, K6H6BGW, W6BGX, W6BHG, K6BPL, W6BVB, W6ABYZ, W6CBX, W6CJB, W6CKU, W6CLB, K6DCF, W6DDB, W6DHX, K6DLY, W6DRY, W6DVD, K6DYX, K6EA, W6EEH, W6ELT, W6ENA, K6EPT, W6ERT, K6H6ETB, W6EY, W6FB, W6HII, W6FLW, W6GPM, K6H6X, W6FYM, W6FYW, W6FZC, W6GC, W6GGE, W6GUQ, W6H1A, W6ID, W6IDY, WA6IGY, K6IMJ, W6IQ, W6BIRJ, W6IZI, W6JF, W6KF, W6KGG, W6KYY, W6KZI, K6LJ, W6LMC, K6MHW, W6MMG, W6MXO, K6NCG, W6NRK, W6NXX, W6OJW, W6OZX, W6PCP, K6PRN, K6PWD, W6PYN, W6QLL, W6QNV, W6QQ, K6QXP, W6RDK, W6RPF, W6RXT, W6SAW, K6SHZ, K6TWE, W6TZK, WA6TZF, WA6VGE, WA6VHL, W6VPC, W6WAW, W6WPF, W6WUU, W6WXY, K6YKG, K6ZYU, W7BAJ, WA7BE, K7BPR, W7CBB, W7CZY, W7DIE, W7DKB, W7ESV, K7EXT, W7FOS, W7GVG, W7HNA, K7ICV, K7IWD, W7IZE, W7JMH, W7JX, W7KEG, W7KOI, W7KQV, K7KYG, W7LPM, W7MAE, W7MCU, W7MME, W7NGW, W7QUM, W7RBE, W7SMR, W7TCQ, K7UCJ, K7VCR, K7VSW, W7YAQ, W7YKQ, K7ZMR, W8BEK, W8BTW, K8COU, WA8CYT, WA8DJD, WA8DXS, K8EKG, W8FFK, WA8FTK, W8GMX, K8HKU, W8HSW, W8JVV, W8JBQ, K8KEM, K8KIR, WA8KKD, WA8KPO, WA8LBB, W8LEX, W8NEM, WA8NYC, WA8OBF, WA8OHX, W8QMY, W8QLJ, W8QMI, W8QQK, K8RKE, W8RLR, K8RMY, W8SQU, W8SSL, W8TZO, W8VMP, W8VPC, K8VWN, W8VZ, W8WYL, W8WXM, K9AHH, W9BIN, W9BRY, W9CBE, W9CF, W9CHD, WA9DHI, W9DJX, W9EGR, W9FFD, W9FKH, W9GCX, K9GDF, W9HTO, W9IDO, K9IZD, W9JCK, WA9LAE, WA9NFO, K9OJJ, W9QDM, W9SUF, W9UA, W9UBA, K9UQN, W9VHD, W9VUD, K9YRL, W9ZEN, K9ZPZ, W9AII, W9ASY, K9BLH, K9BRS, WA9CND, K9EEN, W9FA, W9FDJ, W9GWD, W9GNS, W9GRW, W9GTK, W9JAP, W9JHY, K9JPI, W9KIK, W9LJO, W9LQK, K9MDS, K9OAL, K9ODF, K9OKQ, W9TDH, W9WHE, K9WMD, W9WWI, W9ZGB

AMSTER, Z. M., Jr. ANT2, USN; ARCHER, F. O., Sr. RMC, USN(Res); ALYSWORTH, R. L.; BABB, J. W., RM1, USN; BEAUPRE II, A. Z., RMC(SS), USN; BELL, J. L., RM2, USN; BEWSON, Ralph E.; BOHNS, R. L., RMC(SS), USN; BROTHERMAN, J. O., RM1, USN; CLIFFORD, J. P., RM1, USNR; COLYAR, Floyd C.; DANIELS, Frank, Jr.; DAVIS, J. F., RMC, USN; FERGUSON, D. P.; FREEMAN, C. P., RM1, GATES, J. L.; HERSEY, G. C., RM1, USN; HINKEL, J.; HYLEN, Walter M.; KELLY, T. J., Jr., RM2(SS), USN; KNIGHT, W. P., RM2, USN; KORN, John M.; KULEMIC, Daniel E.; LATHENY, Ralph E.; MAXWELL, James A.; PANNOZZO, Jr., D., RM3, USNR; RAIN, C. F., RM2, USN; ROGERS, R. F., RM2, USN; SENICAL, R. L., RMC(SS), USN; SHERMAN, J. N., Jr., RM1, USN; SIOTWELL, C. M., RM2, USN; SMITH, H. J.; STEFFEN, Albert W.; STEWART, J. E., RMC, USN; SYRIAC, R. R., RM1, USN; TOEWS, Nathan E.; WALSH, John C.; WATERMAN, J. T., RM2, USN; WATKINS, J. D., RM3, USN; WHITE, C. J., Jr.; USNRTC Fort McHenry, Baltimore, Maryland; USS CHARLES R. WARE (DD-865)

RTTY Receiving Contest Results

There were 541 perfect entries for the 60 w.p.m. RTTY broadcast message originated by the Secretary of Defense. The complete text of the 60 word per minute radioteletypewriter message is printed below followed by the call signs or names of the successful participants who received a Certificate of Merit for submitting a perfect contest entry:

"I TAKE THE OPPORTUNITY AFFORDED ME BY THE 17TH ANNUAL OBSERVANCE OF ARMED FORCES DAY TO EXTEND MY PERSONAL THANKS AND BEST WISHES TO ALL AMATEUR RADIO OPERATORS. IT IS WITH



A well-deserved coffee break during the Armed Forces Day Communication Tests. Shown (l. to r.) are W4DIN W3ECP, K4KNV, W4YNZ and J. R. Johnson.

YOUR HELP AND DEDICATION — YOUR PREPARATION AND TRAINING — THAT RELAY OF MORALE MESSAGES ON MARS AND AMATEUR NETWORKS TO AND FROM US MILITARY FORCES THROUGHOUT THE WORLD AND ESPECIALLY IN VIET NAM IS POSSIBLE. AMATEUR RADIO OPERATORS ACROSS THE COUNTRY AND THE MILITARY AFFILIATE RADIO SYSTEM ARE HANDLING THOUSANDS OF MESSAGES EACH MONTH. THIS CONTRIBUTES IMMENSURABLY TO THE MORALE OF THE MEN AND WOMEN IN OUR MILITARY FORCES AND BRINGS THEM A LITTLE CLOSER TO HOME. I CONGRATULATE YOU ON YOUR ACCOMPLISHMENTS IN PERFORMING THIS SERVICE. THE AMATEUR AND MARS OPERATORS INVOLVED IN THIS ACTIVITY REFLECT CREDIT UPON THE ENTIRE AMATEUR RADIO FRATERNITY. SGT ROBERT S. MCNAMARA, SECRETARY OF DEFENSE"

RTTY Certificate Winners:

K1AAA, K1CLF, W1EFF, W1FKW, W1GKJ, K1GZII, J1GZY, W1HJP, K1IOW, W1KOT, W1MCG, K1OCS, W1OMN, K1OOZ, W1OQC, K1PLP, W1QP, K1YZG, W1ZLJ, W1ZLS, K2AGI, W2BLV, W2BVE, W2BXW, W2CCTU, W2ACUB, W2A2EMB, W2FYB, W2FYW, W2GOR, W2GQN, WA2GTH, WA2HDP, K2IF, W2JAV, W2JRU, W2JWS, K2JFU, W2KXC, W2KLD, K2LEQ, WA2LKF, W2LUW, K2M2P, W2NCA, W2NVB, W2OAP, K2OWC, K2OWD, WA2QEB, WA2QMC, W2RGO, K2RFH, W2ROX, K2ROI, WA2SAB, K2SBD, K2SEV, W2SUF, W2SUX, K2TSN, K2VRK, K2VTB, WA2VYS, W2ZBS, WA3BI, W3BFF, K3BHK, K3BIG, WA3BZO, VE3CM, W3CRO, W3DJZ, W3DNN, W3EOV, W3EYQ, K3GWX, K3GYS, W3HID, W3JRV, K3LMM, K3LTI, W3MHD, W3NNV, W3NSI, K3RCM, K3RHO, K3RTL, K3SYM, K3UMJ, K3UWJ, K3UPL, W3VXV, K3VAL, K3WGK, W3YPI, W3ZN, K4ZUC, W4ZVJ, W4AAD, K4ACZ, W4ADN, W4AMY, K4ANJ, WA4AQ, K4AWB, W4AWY, W4AZT, W4BWR, W4CCM, K4CCG, W4ACJV, W4CVQ, W4ADPQ, W4ADQE, K4DSI, K4EPM, W4EPZ, W4EUV, W4FPR, W4FR, K4FVO, W4JZD, W4GJY, K4GLQ, W4GTM, W4IGOC, K4GXJ, K4GXO, W4HCI, W4HHH, K4HTM, W4HNF, W4HT, W4JA, W4IMZ, W4IRZ, W4ISF, W4IU, WA4IUU, W4IYT, W4JOF, W4JWG, K4JXG, W4KTS, WA4KNO, W4KR, W4LDB, W4LPR, W4MDS, W4MHS, WA4MZZ, DL4NK, W4NTE, W4NTK, W4NVK, K4PGV, WA4QKQ, K4QOF, WA4RALX, W4SCE, W4SKX, WA4SSB, WA4TFE, WA4UDB, W4UHA, K4UMK, W44UT, W4VBD, K4VDM, W4VEY, WA4VYZ, W44WND, W4WPI, W4YBT, W4YLO, W4YSU, W4ZAG, W4ZBA, K4ZEB, W4ZXI, W5AJG, W5ANH, W5ARK, K5AYX, W5BOT, W5BPM, K5BQA, W5BON, W5CUD, K5DKR, W5EIB, W5EJV, K5EPO, W5FCP, W5GMM, W5GRT, W5GRV, W5HFN, W5IDZ, W5IFH,

(Continued on page 178)

• For Public Service

Announcing 21st Annual ARRL Simulated Emergency Test

October 8-9, 1966

SOME of you, tuning casually across the band during the Oct. 8-9 weekend, looking for DX or a ragchew, may come across a flurry of message-handling activity with some of the same frantic aspects as the SS or Field Day. Some will sigh or snort and say "Another one of those blankety-blank ARRL contests!" But you won't be included in this group, because having read this you'll know what it's all about.

No siree, the SET is *not* a contest. True, it does call for points and score, but nobody is competing with anybody and the purpose of the score is to make a contribution to the national total to see if we can better our last year's total, and to see if *you* can beat *your* last year's score. The only competition that exists is between sections, and we don't make too much of a point of this.

What It Is All About

The SET has two principal objectives. One is to give our organized amateur public service

setup a gruelling annual test, loading it to the limit to see how it performs under duress and get some idea when and where it breaks down and why. This part of the test is strictly introspective. The other part is just the opposite; it's a public demonstration of our capabilities, a showing of our wares to the agencies we serve, and in general a "brag" session.

Which of the two is the more important? Who can say? If we have something worth showing, it's a mighty good thing to make the most of the opportunity to show it. Thus, the best-organized ARPSG groups will want to make much of the public relations aspect of the SET. On the other hand, organizations that are just getting started or are otherwise somewhat shaky may prefer to conduct their sessions in private until they achieve enough efficiency to want to do some public bragging.

Scope of Test

The Amateur Radio Public Service Corps has three branches. Principally for natural disaster and other peacetime emergency communications is the Amateur Radio Emergency Corps, (AREC) the oldest and largest, in point of numbers, of the three branches. For civil defense and possible wartime communications is the youngest of the three branches, the Radio Amateur Civil Emergency Service (RACES). Then, since both AREC and RACES are organized mostly on a local basis, for medium and long haul communications we have the National Traffic System (NTS). Each branch has its own function to perform, each has the duty and responsibility of coordinating its activities with the other two branches, and each will receive a thorough testing in the SET. A few salient details about the operation of each might be in order.

AREC Role

This will be nothing new for the 1200-odd emergency coordinators of the AREC; it has been happening to them every year since 1946. The procedure is to spring a test drill of some kind on the unsuspecting AREC members, go through certain motions, originate certain messages to be put on NTS, and make a full report to the SEC and headquarters on the results, including the point score. Some ECs plan the SET far in advance, some even letting the AREC members in on it so the turnout will be maximum for publicity purposes. Others pull it as a complete surprise. Somewhere in between these two

(Continued on page 160)

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

During the SET, all NCEFs will be operated on a full-time basis, from 1900 GMT Oct. 8 to 0600 GMT Oct. 10, just as though this was a period of actual emergency. The following are the most-used frequencies:

3550	7100
3875	7250

Other NCEFs which can be used during the SET are:

14,050	28,100
14,225	29,640
21,050	50,550
21,400	145,350

The procedure: In case of simulated emergency, call "TEST QRRR" on one of the c.w. NCEFs, or "CQ Test Emergency" on one of the phone NCEFs. When contact is made, move off the frequency to handle any traffic.

For clearing regular traffic, call CQ followed by the destination of your traffic. When contact is made, move off the frequency to clear it.

Do not call CQ or make any but a *real* emergency call on any of the NCEFs during the first five minutes of any hour!

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 EC? If not, recommend the name of a likely prospect for the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION			
Delaware	K3NYG	John L. Pearod	Eagle Nest Road, RFD 1, Blackbird Townsend 19734
Eastern Pennsylvania	W3ELI	George S. Van Dyke, Jr.	4607 Convent Ave. Philadelphia 19114
Maryland-D.C.	W3CVB	Conan W. B. Barger	7512 Foster St., S.E. District Heights 20028
Southern New Jersey	W2BZJ	Walter H. Grover, Jr.	P.O. Box 212 Pennington 08534
Western New York	W2RUF	Clara Reger	435 Best St. Buffalo 14208
Western Pennsylvania	K3KMO	Al Brogdon	R.D. 1, Box 390-A State College 16801
CENTRAL DIVISION			
Illinois	W9RYU	Harry J. Studer	705 Hillcrest Rd. Milan 61264
Indiana	K9WET	Ralph L. Piery	RFD 1 Walton 46994
Wisconsin	K9ZPP	Bernard E. Tower	6921 W. Bennett St. Milwaukee 53219
DAKOTA DIVISION			
Minnesota	WA0IEF	Gary G. Hanson	719 North 18th Ave., E. Duluth 55812
North Dakota	WA0AYL	David E. Beach	Apt. 7, 1116-19th Ave., S. Grand Forks, 58201
South Dakota	W9SCT	Lester R. Lauritzen	R. 3, Box 32 Centerville 57014
DELTA DIVISION			
Arkansas	WA5KTX/ WA5ORE	Don Corley	c/o Ark. Baptist Medical Center, 13th & Wolf Sts. Little Rock 72202
Louisiana	K5KQG	Daniel J. Babin	217 Bellaire Drive Houma 70360
Mississippi	W6JDF	Charles R. Boone	1111 Mobley St. Columbia 39429
Tennessee	K4RCT	Harry A. Phillips	960 Bonnie St. Memphis 38122
GREAT LAKES DIVISION			
Kentucky	W4OVI	George S. Wilson, III	2114 Robin Rd. Owensboro 42301
Michigan	K6GOU	Donald R. Van Sickle	3925 Westpointe Court Southfield 48076
Ohio	W8HNP	Arlington A. Garu	5034 Oak Ridge Dr. Toledo 43623
HUDSON DIVISION			
Eastern New York	W2KGC	William L. Stuhl	58 Riley Ave. Fishkill 12524
N.Y.C. & Long Island	K2OVN	John S. Brandau	1859 East 46th St. Brooklyn 11234
Northern New Jersey	K2ZFI	John W. Banke	Main Rd., Box 177 Towaco 07082
MIDWEST DIVISION			
Iowa	K0BRE	Verlin B. Kowley	1008 So. Third St. Fairfield 52556
Kansas	K0EMB	Norman Stackhouse	1409 Willow Rd. Newton 67114
Missouri	W0BUL	Charles O. Gosch	711 South Oakland Webb City 64870
Nebraska	K0JXN	Larry Abbott	Abbott Ranch Almeria 68711
NEW ENGLAND DIVISION			
Connecticut	W1PRT	John R. Barber	19 Bidwell Parkway Bloomfield 06002
Eastern Massachusetts	W1AQC	Donald F. Guptill	17 Park St. Ct. Medford 02155
Maine	K1QIC	Cliff Stowers	38 West St. Fairfield 04937
New Hampshire	W1ALE/ W1TNO	Edward F. Everett	RFD 4. Concord 03301
Rhode Island	W1YNE	Gordon F. Fox	151 Whipple Road Esmond 02917
Vermont	W1VSA	Harry A. Preston, Jr.	Box 26 Charlotte 05445
Western Massachusetts	K1JJU	C. Norman Peacor	139 Cooley St. Springfield 01128
NORTHWESTERN DIVISION			
Alaska			
Idaho	W7RZY	Harry Roylance	P.O. Box 621 Harlowton 59036
Montana	W7AJN	Eyevet France	3835 S.E. 116th Ave. Portland 97266
Oregon	W7UWT	Raymond H. McCausland	2812 Hayton St. Bremerton 98310
Washington			
PACIFIC DIVISION			
East Bay	WA6OLF	Jack Palmatier	4135 Porter St. Oakland 94619
Hawaii	KH6CCL	Ernest J. Kurlansky	748 Kii St. Honolulu 96821
Nevada	W47BEU	L. L. "Mike" Blain	5000 Cherry St. Reno City 89005
Sacramento Valley	W6BWB	Donald F. Stromsted	6435 Orange Ave., Apt. 14A Sacramento 95823
San Francisco	W6KZF	Bill Ray	52 Matilda Ave. Mill Valley 94941
San Joaquin Valley			
Santa Clara Valley	WA6HVN	Harold L. Whitfield	3148 Jenkins San Jose 95118
ROANOKE DIVISION			
North Carolina	W4MFK	James W. Botsford	P.O. Box 452 Hillsborough 27278
South Carolina	WA4ECJ	Richard H. Miller	403 Hancock St. Beaufort 29902
Virginia	K4LMB	Ethel M. Smith	2012 Rockingham St. McLean 22101
West Virginia	W8SSA	E. K. Chambers	P.O. Box 62 Bluefield 24701
ROCKY MOUNTAIN DIVISION			
Colorado	W0SIN	Charles M. Cotterrel	430 South Swadley St. Denver 80228
New Mexico	K5HTT	William Helland	61 Isleta Drive Whiterock
Utah	W7WKF	McCarroll Petersen	4815 Yorktown Drive Salt Lake City 84117
Wyoming	W7YWE	Frederick L. Hildebrand	P.O. Box 143 Douglas 82633
SOUTHEASTERN DIVISION			
Alabama	W4NML	William G. Gann	2115 Brookline Dr. Huntsville 35805
Canal Zone	KZ5MV	Marvin G. Plyn	Box 4087 Albrook AFB
Eastern Florida	WA1YT	Andrew C. Clark	4 Lenape Drive Miami Springs 33166
Georgia	W4DDY	W. Homer Connell	2608 Apricot Lane Augusta 30904
West Indies (P.R.-V.I.)			
Western Florida	W4MLE	George L. Thurston	2116 Gibbs Drive Tallahassee 32303
SOUTHWESTERN DIVISION			
Arizona	K7NIV	George Mezey	P.O. Box 73 Sun City 85351
Los Angeles	W1KUX/6	Wallace R. Calkins	814 E. Cameron Ave. West Covina 91790
Orange	W6WRJ	Ralph E. Alexander	12621 Red Hill Ave. Tustin 92680
San Diego	W6SK	J. D. Campbell	3235 Idlewild San Diego 92117
Santa Barbara	W6BNDP	Bob Weaver	5573 Somerset Drive Santa Barbara 93105
WEST GULF DIVISION			
Northern Texas	W5PYI	James M. Coffey	308 East Oak Weatherford 76086
Oklahoma	K5DLP	William B. Pierce	901 Bell Ave. Lawton 73501
Southern Texas	K5QQG	E. Wayne Smith	1601 Ruth Ave. Houston 77004
CANADIAN DIVISION			
Alberta	VE6FK	Don Sutherland	444-25th Ave., N.E. Calgary
British Columbia	VE7FB	Harold E. Savage	4553 West 12th Ave. Vancouver 8
Manitoba	VE4OL	John H. Bell, Jr.	453 Rita St. Winipeg 12
Maritime	VE1HJ	F. R. Fraser	12 Albert St. Dartmouth, N. S.
Ontario	VE3BTM	Harry Walker	956 Lakeshore Rd. Burlington
Quebec	VE2ABV	Ken Ransom	30 Ninth Ave. Roxboro
Saskatchewan	VE5OU	W. H. Parker	1008-10th St., E. Saskatoon

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

Thoughts on RACES in ARPSC

SOMEONE recently, when advised that studies are being conducted regarding the inclusion of RACES in ARPSC, remarked: "What's headquarters up to *this* time?"

What headquarters is "up to," this time as all the time, is finding what steps are necessary to implement Board of Directors' decisions—in this case the order to include RACES in ARPSC. One thing obvious is that we cannot formally "adopt" RACES, because it's not ours to adopt. AREC and NTS, the other two divisions of ARPSC, were originated, sponsored and developed by ARRL. Administration is in the hands of officials appointed by elected heads or by the ARRL communications manager. While ARRL was instrumental in the formation of RACES and more than a little responsible for the form and shape it took, its active sponsorship and its entire administration has been in the hands of civil defense at various levels, its regulation in the hands of FCC, and its administration in the hands of radio officers appointed by civil defense directors and certified to FCC.

Thus, the dilemma: How can RACES be a part of ARPSC as AREC and NTS are, under these circumstances?

The solution? There is no simple one. But what we *can* do is extend our best cooperation and coordination and recognition to RACES as a part of the League's public service program. Since this has always been our intention, what we can aim for now is an expansion of this coordination and recognition by including RACES in all ARPSC activities as a part and parcel of ARPSC, to the extent this is possible.

We have heard it said that AREC and RACES are being "merged." This is a favorite word, these days, with big business mergers going on all around us: what it usually means is that one corporation is swallowing another in order to diversify products, or to extend an empire. The inclusion of RACES as a part of ARPSC does not at this time constitute a "merger" of RACES and AREC. Both AREC and RACES will continue to exist as separate parts of ARPSC—as the Emergency Division and the Civil Defense Division respectively. ECs will continue to direct the efforts of AREC groups under guidelines set down by SECs and headquarters. RACES radio officers (ROs) will continue to operate RACES at its various levels, under guidelines set down by state and federal civil defense; we couldn't change this if we wanted to—at least, not at present. The principal

difference will be that RACES is now considered an official part of the ARPSC family.

Now, the next question is, how will this change be in evidence? The principal evidence of it will be in the official inclusion of RACES in all ARPSC activities. In the forthcoming SET, RACES ROs are being asked to participate in the same status of ARRL ECs, and we are diligently at work trying to get a mailing list of ROs so we can communicate with them. The proposed ARPSC emblem and decal will be modified to include RACES. The League's Public Service Communications Manual will be modified, next printing, to show the three divisions of ARPSC, instead of two. The ARPSC slide collection will be modified, as soon as possible, to show the new order of things. These steps we can surely take. What others are appropriate will come from further study.

In August *QST's* editorial you will have noted that plans are being made for amateur radio to serve in the event of a national emergency. How much, if at all, such plans will affect any of the above we do not know at the present time. Meanwhile, RACES is a part of ARPSC but it is *not* being "merged" with AREC (except as found desirable at local level), and practical operations are pretty much as before. — WINJMJ.

Diary of the AREC

Tornados and Kansas are old friends. Each year, the state is visited by hundreds, some of which just knock at the door while others really raise the roof. From June 7 through 12, an untold number danced their way through



On May 7, AREC members (l. to r.) K2PBE, WB2GCN and WB2UEX were part of the crew from Glens Falls who provided communication for the annual White Water Derby. The clocks were used to keep the official race time and the crew relayed time signals to race officials (see Diary of the AREC for details).

* National Emergency Coordinator.

the state, giving AREC members plenty to do. The typical tornado is accompanied by heavy rain and hail. In this case, it was reported that the hail was as big as golf balls in some areas.

WØFRC, EC Topeka, sent us a detailed report of the activities of the Kansas Storm Net's operation for part of the emergency. He took over as NCS at 2005 CST, June 7, at which time all stations reported no sighting of any tornadic activity, although there was evidence of severe weather in the area. Fifteen minutes later, KØATS reported storm warnings for southeast Kansas. WØEHA reported a tornado, unconfirmed, east of Russell and a strong storm cell in the north central part of the state. KØBDP reported lightning all around his area while KØKED advised that the AREC in Salina was on watch. KØMZZ, EC Salina, informs us that at the request of the chief of police, fifteen mobile units were sent into the field to watch for any funnels. After four hours of waiting and looking, no tornadoes were sighted and the mobile units were called back.

All through the night, reports from the Storm Net continued to pour in regarding the location of storm cells and tornadoes, hail and rainfall amounts, wind speeds, any power outages and loss of telephone service. Thirty-two stations checked into the net, to make reports, handle traffic for their local areas and receive any warnings issued by the weather bureau. By 0100 CST, storm activity declined to a point where the net's operation was unnecessary.

WØFRC received a report of tornado activity in Topeka on June 8 at 2030 CST. He drove to Topeka where he was instructed by WØQNI to report to the Red Cross headquarters for instructions. For the next 10 hours, WØFRC gave first aid to the injured and helped them to hospitals. On June 9, he assisted in locating missing persons, relaying the information and receiving instructions from Red Cross headquarters.

KØMZZ took WØHJ's bus, with radio equipment and 5-kw. generator to Topeka where he aided the communication effort in the disaster area. He and WØQNI were on the air from Friday night, June 10, to Sunday afternoon.

On July 19, W1WKJ/mobile came upon an accident involving a truck and a car at the intersection of Pine Street and Post Oak Road in Bellaire, Texas. He had just initiated contact with W5SVL/mobile in Houston. An immediate clearing of several interfering stations on or near the frequency was accomplished and emergency traffic passed to W5SVL who telephoned the police and fire departments for aid. Help arrived within five minutes after the message had been delivered and the injured parties taken to the hospital.

On July 22, W1WKJ/mobile again came upon the scene of an accident, again involving a truck and car at the intersection of Interstate 410 and 10. Two women and an infant were injured and required immediate first aid which W1WKJ administered (he's a doctor). A distress call was attempted, without success; although several QSOs were in progress, no one acknowledged WKJ's call. Luckily, a motorcycle policeman arrived and was able to call for an ambulance using his two-way radio. The lesson learned by W1WKJ was to try the NCEFs in time of emergency and the lesson each amateur should learn is to keep his ears open at all times for any possible emergency call. — W1WKJ/5.

On July 26, VE1KK/mobile was at the scene of an accident on the St. Leonards-Campbelltown highway in which a man was killed and another injured. He sent emergency traffic to VE1YU for the Royal Canadian Mounted Police. An RCMP officer came to VE1YU's home for the traffic. scene of the accident was located in extremely hilly territory and the police were unable to maintain communication using their v.h.f. system. VE2WMM and VE1s FQ PX AJC assisted in the relaying of traffic. — VE1WB, SCM Maritime.

On the morning of August 4, VE2BWS was on his way to work when he heard from a newscast that three children were lost in the woods of Sainte Marguerite du lac Masson and had not been seen since the previous evening. VE2BWS gave a general call on the local emergency net frequency and was answered by VE2AKM, who in turn called the SEC, VE2ABV, VE2ANH, EC for Montreal, was called at work and while he was driving home, started getting a



One of the tornadoes that struck Topeka, Kans., on June 8, really tore up the city. WØIPV, who took the photo, notes that WØKOL was mobile on the spot where the twister is now. A few minutes earlier, he spotted the funnel and decided it was high time to get going (I don't blame him, do you?). See the Diary of the AREC for details.

search team organized. Shortly thereafter, VE2AUU, Canadian NEC, joined the crew.

Walkie-talkies, supplied by VE2AUU, were distributed and communication was established with VE2AKM, Montreal, and VE2BMS who went with the search party, and who, at one time, was the only communication link between the organization point and the search party.

The next morning, the children were found safe and sound by a provincial police helicopter. — VE2ANH, EC Montreal-Laval, Que.

Alerted by KØCEV, on May 11, the PHD Net was activated by WØAMO, KØIQS and WØFLL standing by for any tornado activity in or around Clay County, Mo. Reports had been received that a storm cell was in the vicinity, but no tornadoes struck the area. — WØFLL, PAM Missouri.

AREC members in Alexandria, Va., were asked to provide communication for a rowing regatta on the Potomac River, the competition being between two local high school rowing teams on Apr. 9. W3JSL located himself at the Woodrow Wilson Bridge starting point, W3DHQ and WB4CSO at the half way point, W4KVG stayed at the end of the pier to relay the judges' decision. K4SUM was up on the boat club deck so he could relay information to the public address announcer, while K4BAV was aboard the judges' boat, relaying all decisions and checking on the progress of the boats through the course and relaying same to the judges. — W4JXD, EC Alexandria, Va.

The Augusta and Richmond Co., Ga., AREC furnished communications for the movie crew making the club movie of the 1966 Masters Golf Tournament at the Augusta National Golf Course on Apr. 4-11. Sixteen 2-meter walkie-talkies operating on 146.94 Mc. were used, a base station was set up in the tournament headquarters and the director of the film was furnished an operator who relayed instructions to operators assigned to six camera crews, one sound man and two mobile units assigned to move crews from place to place on the course.

No formal traffic was handled but each operator gained valuable experience in voice communications and net discipline. Each man learned the value of transmitting only when required to and to remember details of information received without writing it down. — W4DDY, EC Richmond Co., Ga.

On May 21-22, amateurs in Wayne Co., Mich., provided communication for two parades, one in Detroit and the other in Ecorse. Two-meter f.m. rigs and walkie-talkies were used to coordinate the divisions of both parades. Base stations were set up at the starting and finishing points and mobiles placed within the parade itself to en-

able all divisions to move along at the proper speed without any tie-ups or large gaps. — *W8MPD, EC Wayne Co., Mich.*

Members of the Glens Falls Area, N. Y. AREC again provided communications for the annual White Water Derby, a canoe and kayak race held in the upper reaches of the Hudson River. On May 7, the novice and giant slaloms were held, and amateurs provided such information as timing and starting signals, and last minute entries and cancellations of participating teams. Stations were set up at the starting line and one at each finishing point. As per last year, the operation went smoothly and the assistance of the crew was greatly appreciated by the racing officials. — *K2AYQ, EC Glens Falls, N. Y.*

For the fourth year in a row, AREC members in Harris Co., Tex., provided communication for the gathering of election results in that county. An election was held on May 7, and with 289 precincts to report, some will be late and information may be inaccurate. Election officials requested K5HXR (EC) and his crew to gather election results and relay same to election headquarters. Local radio and t.v. stations were also kept abreast of the results via amateur radio and periodically made announcements to the general public that this information was relayed via amateur radio. A total of 19 amateurs participated in this operation. — *K5HXR, EC Harris Co., Texas.*

AREC members of Monroe Co., Mich., provided communication for a civic undertaking to clean debris from Sterling State Park in Monroe. This took place on May 14, shortly after the Lake Erie flood when the park was under water.

The activity started at 0900, with WA8MTX activated in the Red Cross building, and mobile units were dispatched to the park where telephone service was not available. Command traffic was handled throughout the day for Red Cross and other agencies. AREC operators kept close watch for any accidents since much heavy equipment was being used and, in some cases, by untrained persons. — *W8NDM, EC Monroe Co., Mich.*

Forty-five SEC reports were received for June, representing 17,973 AREC members. This is 4 more SEC reports and 656 more AREC members. We still seem to be having trouble getting those reports. How about it, fellows! Those Sections reporting are: Conn., E. Mass., N.Y.C.-L.I., N.N.J., S.N.J., E. Pa., W. Pa., Del., Ala., E. Fla., Ga., Ky., N.C., Tenn., W. Fla., Ark., Miss., N. Mex., Okla., S. Tex., E. Bay, Orange, Los A., S.F., S.V., Hawaii, Mont., Nev., Ore., Utah, Wash., Wyo., Mich., Ohio, W. Va., Ind., Colo., Kans., Mo., S. Dak., Ont., Man., Sask., Alta., B.C.

At the half way mark for 1966, 280 SEC reports have been received from 59 different Sections. This represents an increase of 33 reports and 9 Sections over last year. Those Sections at the 100% mark so far are: E. Mass.,

N.Y.C.-L.I., N.N.J., E. Pa., W. Pa., Del., Ala., E. Fla., Ga., N.C., Miss., N. Mex., Okla., S. Tex., Orange, S.F., S.V., Hawaii, Mont., Nev., Ore., Wash., Wyo., Mich., Ohio, Colo., Mo., S. Dak., Ont., Man., Sask., Alta., B.C. Good work, men. Keep those reports coming in.

RACES News

On June 19, seven members of the RACES unit of the Amateur Radio Club of Jackson Co., Mo., went mobile to the Rotary Camp for Handicapped Children. A base station was set up at the camp and four mobile units took the children, one at a time, for a trip around a lake. During the trip, the children talked with each other and with the children back at camp via amateur radio. As an outcome, other clubs in the area are investigating the possibilities of providing similar services to camps in their area.



National Traffic System

Elsewhere in this issue you will find the announcement of the annual Simulated Emergency Test (Oct. 8-9). NTS leadership officials have already received full information on the part the system will play in the exercise. We now wish to acquaint you NTSers with some of the details and urge your participation.

The function of NTS in the SET, as always, will be to relay traffic expeditiously from place to place — from anyplace to any other place, whether origin and destination be within the confines of a Section, Region, Area or between Areas. We call it a "simulated" emergency, but there are limits beyond which simulation cannot go. For example, we cannot simulate the tension and electric excitement and the chaos which would accompany a real emergency; nor can we simulate the dedication and extra effort that would undoubtedly accompany it. Therefore, since we cannot simulate these, we are not trying to do so. NTS will not operate officially 24 hours per day for the full two days of the test, as it undoubtedly would if the real thing occurred. It will operate during a scheduled period for eight hours on Saturday (Oct. 8) and Sunday (Oct. 9), or sixteen hours in all. No NTSers (except a few TCCers) will be required to "burn the midnight oil," as they would in a real emergency.

This is the third year that NTS has been included actively and intensively in the SET. The first year it was pretty shaky. Last year was a great improvement. This year we hope and confidently expect that NTS will take its rightful place as the principal means of message relay for the other two divisions — AREC and RACES. But it's going to take some doing, and your participation is required. Reserve this weekend for this purpose. If you had other plans, *cancel 'em!*

NTS operation will commence at 1900 GMT in the East and terminate at 0600 GMT in the Pacific. During this period, six complete cycles of NTS operation will have been completed. While the above spread of time is eleven hours, in any one NTS Area the operation will last only eight hours — that is, in Eastern Area it will be 1900-0300, in Central 2000-0400 and in Pacific 2200-0600.

How do we get six cycles into eight hours? Well, it ain't easy, and it means, in effect, continuous operation of all categories of NTS nets down through Section, including TCC, for four hours in each Area.

How do we get that way? Well, the system will operate in overlapping cycles this year. We start with Section nets in the Eastern Area at 1900, then Region nets at 1930 and the Area Net at 2000. While the Area net is meeting, the second cycle starts, with Section nets meeting at 2000. At 2100, a third cycle starts while the first and second cycles are still in operation, and at this time all three cycles are operating simultaneously, although in different parts of the cycle. Each cycle, as it is completed, repeats itself. Thus, at 0100 the second session of the first cycle ends and simultaneous operation of all three cycles no longer exists; only the second and third cycles are still operating. At 0200 the second session of the second cycle ends, and only the third cycle remains in operation. At 0300 this cycle ends and NTS operation ceases in the Eastern Area.

In the Central Area, of course, NTS operation commences an hour later, and in the Pacific Area three hours later, but the same pattern is followed. This procedure is repeated both days of the SET, Oct. 8 and 9.



At the Empire Slow Speed Net picnic held on July 9 at the QTH of W2JMJ, net manager WA2VYS took this photo of some of the crew present. Standing (l. to r.) WB2IFN, W2ANV, WB2QZY, W2THE, W2JMJ, W2LYG. Kneeling (l. to r.) WB2GAL, WA2VYT, WB2HZY.

Confused? We don't blame you. Like most NTS operation, it is basically simple once you get the hang of it, but difficult to explain in words when you are dealing with different time zones and the unfamiliarity of simultaneously-operated cycles of the system. You don't have to understand how it works, although it is helpful if you do, so please give the above another reading. Follows herewith a rundown of the meeting times of all nets at Section level and above in each of the three Areas, for both days; pick your level and your Area and prepare to lend a hand. All times are GMT.

Eastern Area: Section nets at 1900, 2000, 2100, 2130, 2200, 2230, 2300, 2330, 0000, 0030, 0130, 0230. Region nets at 1930, 2030, 2100, 2130, 2200, 2230, 2300, 2330, 0000, 0030, 0100, 0200. Area nets at 2000, 2100, 2200, 2300, 0000, 0100.

Central Area: Section nets at 2000, 2100, 2200, 2230, 2300, 2330, 0000, 0030, 0100, 0130, 0230, 0330. Region nets at 2030, 2130, 2200, 2230, 2300, 2330, 0000, 0030, 0100, 0130, 0200, 0300. Area nets at 2100, 2200, 2300, 0000, 0100, 0200.

Pacific Area: Section nets at 2200, 2300, 0000, 0030, 0100, 0130, 0200, 0230, 0300, 0330, 0430, 0530. Region nets at 2230, 2330, 0000, 0030, 0100, 0130, 0200, 0230, 0300, 0330, 0400, 0500.

Most of you will get this before the SET date, and thus be able to participate effectively and intelligently. A few will not get it until *after* the SET date, in which case it will be an explanation to what went on, in case you were confused. Hope to see all you NTSers in there doing your bit for amateur radio and NTS. — W1NJM.

June report:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN.....	31	1151	.891	37.1	94.6
CAN.....	31	1041	.861	33.5	100
PAN.....	31	1566	1.122	50.5	88.2
1RN.....	62	296	.225	4.8	92.2
2RN.....	59	419	.696	6.8	99.7
3RN.....	62	493	.364	8.0	99.5
4RN.....	59	530	.305	7.3	88.4
RN5.....	62	797	.347	12.8	93.0
RN6.....	62	1593	.968	25.6	100
RN7.....	31	466	.481	15.0	49.6 ¹
SRN.....	62	402	.272	6.5	88.8
9RN.....	31	474	.738	15.3	96.0 ¹
TEN.....	62	766	.566	12.3	69.8
ECN.....	29	85	.172	2.9	65.6 ¹
Sections ²	1868	9832		5.3	
TCC Eastern.....	124 ³	495			
TCC Central.....	93 ³	569			
TCC Pacific.....	124 ³	899			
Summary.....	2542	21,744	PAN 7.8	RN6/CAN 15.2	100
Records.....	1918	20,658	1,267	15.2	

¹ Representation based on one or less sessions per day.

² Section/Local nets reporting (64): OZK (Ark.); ALTA-SSB (Alta.); QFN FMTN WFPN GN (Fla.); CPN (Conn.); Iowa 75; MDDS (Md.-Del.-D.C.); WSN (Wash.); WPA PTTN EPAEPTN (Pa.); VBSN VSENL VN VSN (Va.); QIN (Ind.); NJN NIEPTN (N.J.); BUN (Utah); BN-OSSEB (Ohio); NCN NCNL NCSSEB THEN (N.C.); EMNN (E. Mass.); PHD MOTTN (Mo.); NTPN (Tex.); VTNH (Vt.-N.H.); ILN (Ill.); GBN (Ont.); OQN (Ont.-Que.); PTN SGN (Me.); MSN MJN (Minn.); SCN SVN SoCal 6 (Cal.); LAN (La.); QMN Wolverine (Mich.); TN TPN TSSBN ETPN (Tenn.); AENB AEND AENH AENM AENO AENP(e) AENP(D) AENR AENT (Ala.); WSN (Wis.); RISP (R.I.); NYCLIPN NYCLIVHF NLI NLS (N.Y.C.-L.I.).

³ TCC functions not counted as net sessions.

Well, we have some more new records. Conditions have been fairly good during the summer, except when thunderstorms have plagued the nets. You haven't lived until you try handling a TCC sked on 80 meters when signals are S-5 and the static crashes are S-9.

W9DYG and WA5JOL have produced an interesting CAN bulletin. Well, CAN now has two years of 100% representation. W6VNV submits his first PAN report, noting that summer QRN is taking its toll (the Rate and Average figures sure don't back it up, tho). W1EFW is proud of the IRN crew for the fine representation this month. In between murder stories, which seem to be a regular feature in WA2GQZ's newspaper, Joe continues



WB6BBO was present (with her camera) at the summer meeting of the Eight Ball Traffic Net. From left to right, we have K6MDD, PAM and manager of the 8 Ball net; W6BHG, SCM Los Angeles and WB6JFO, SoCal Six manager.

to run 2RN in fine style. The only problem he is faced with is trying to get 100% reporting of all net sessions. K3MVO is gratified at the new faces appearing on 3RN. Silent W4SHJ seems to be following the Roosevelt philosophy (speak softly and carry a big stick). K5IBZ plans to hold a meeting of RN5 personnel at the North Alabama Hamfest in August. A closed meeting is planned for the morning and a general ARPSC meeting for the afternoon. RN6 is being bolstered by the tremendous amounts of traffic going to and coming from Viet Nam. K7JHA notes that in some respects July was an improvement over June, but the QRN really hurt the rate department. Representation seems to be a serious problem in Montana, VE5 and KL7. W9QLW and others are planning to be at the Muskegon convention on Oct. 21-22 and hope to see lots of traffic men there. W0LGG reports traffic and representation about average despite the warm weather and vacations. VE3BZB made good use of his vacation in VE1, trying to stir up some activity for ECN.

Transcontinental Corps: W3EML had to go back to 1963 to find a month comparable with July. Station D had the highest percentage of failures because of vacations and no replacements. Poor conditions are hurting the Station F schedule according to W4ZJY/9. Dave is still having trouble getting reports, but this should settle down now that he has permanently relocated. W0HXB/4 and WA9NFS were recipients of TCC certificates. W7DZX is having his troubles on the west coast with poor conditions, vacations and some sleepy east coasters who can't keep awake for the late skeds.

July report:

Area	Functions	% Successful	Traffic	Unit-of-Net Traffic
Eastern	124	80.7	1351	495
Central	93	70.9	1183	569
Pacific	124	70.9	1798	899
Summary	341	74.8	4332	1963

TCC roster: Eastern Area (W3EML, Dir.) — W1s BGD EFW NJM, K1ZND, W2s GVH SEL, K2SSX, W12s BLV UPT UPC, W22s AEJ DXM, W3s EML NEM, K3s FHR MVO, W4s DVT ZM, K4LJK, W5s CHT RYP, K5s KMQ NJW QKY, W6HJ, Central Area (W4ZJY/9, Dir.) — W4s OGG ZJY/9, W44s TPB WWT, W5GHP, W9s CXY DYG HRY KQB VAY ZYK, W49s BWY IZR NFS, K9DHN, K6s AEM GSY, W0HXB/4, WA9IAW.

Net reports:

Net	Sessions	Check-ins	Traffic
Interstate SSB	20	478	991
Mich. 6 Tfc.	26		88
Mike Farad	30	474	508
North American SSB	26	530	701
7290	39	1180	643
HBN	31	435	584

QST

Happenings of the Month

CANADIAN CENTENNIAL CALLS

Canadian Amateurs will have the option, in 1967, of using the prefix 3C in place of VE and 3B in place of VO, to call attention to the hundredth anniversary of Canada as a nation. No special application or endorsement of the licenses will be necessary, nor will it be essential to continue using the 3C/3B call throughout the year. Under the scheme, VE3XXX could simply decide to use 3C3XXX during calendar year 1967 and just begin doing so!



Andy Devine, WB6RER, well-known to old radio fans and two generations of movie-goers for his gravel voice, introduces Sandra Watkins, "Miss Orange County" at the Southwestern Division convention, while General Chairman Syd Cullum, WA6NJZ, looks on.

TEMPORARY TRAFFIC WITH 4U1ITU

A third-party message agreement has been renewed by the Department of State with the headquarters of the International Telecommunications Union, permitting the handling of such traffic between U.S. stations and 4U1ITU in Geneva only. The agreement is temporary, and is expected to terminate on March 1, 1967.

Bill Nelson, WA6FQG, right, accepts the Cover Plaque Award from ARRL Southwestern Division Director Howard F. Shepherd, Jr. W6QJW at the division convention in May. The Board of Directors had chosen Bill's article on electrical interference as the best in the April issue.

FAMILY OPERATING PRIVILEGE DENIED

The Federal Communications Commission has denied a petition, RM 972, by Nathan Gold, K1MIA, that the amateur rules be amended to allow operation of an amateur station by unlicensed members of the family. Petitioner had asked that the privilege be restricted to voice operations above 28.5 Mc., 50-watts input or less, crystal controlled and to communications only with the licensee operating mobile.

MORE AMATEUR RADIO WEEKS

California's Governor Edmund G. Brown declared Amateur Radio Week in California to coincide with ARRL's Founders Week commemorating the birthday September 2 of Hiram Percy Maxim. In issuing his statement, the Governor said:

"These citizens perform numerous acts of public service, including the relay of communications during times of emergency — fire, flood and earthquake — until normal public utility services are restored."

Governor William A. Egan of Alaska proclaimed the week of June 20-26, 1966 as Amateur Radio Week in the biggest state. In addition to the emergency facet, the governor touched on amateur fraternalism and everyday public services.

CB REQUEST ON CALLS DENIED

A citizens-band operator in the Bronx a short time ago had petitioned FCC to grant continuity of call signs in the Citizens Radio Service, RM-960. The Commission has denied the request, citing its earlier decision in Docket 14,843. At that time the Commission pointed out that



some 300,000 CB calls had been issued before automatic data processing had been installed. To provide continuity of call, all of these license records would first have to be transferred to the machine, at costs not warranted by the benefits.



We can think of few places better for an amateur radio station than the Space Needle at Seattle, and few places where we'd be more anxious to let others do the climbing. Seattle amateurs have it both ways—they were invited to put an amateur station at the 520-foot level of the Needle, and its manager, a mountain climber named Warren Saunders, volunteered to hitch the antenna to the top of the structure, 607 feet above the ground. The Space Needle Amateur Radio Club has been formed with some thirty members, led by W7GWA, president; K7VCD, vice president; W7HLP, secretary and W7CJL, treasurer. The club meets in the Needle the first Monday of each month at 8:30 P.M.

Dr. Lawrence J. Dunn, W2LP
Charles M. Bove, W0MXC

We are sorry to report this month the deaths of two prominent radio amateurs identified with the League.

Dr. Lawrence J. Dunn W2LP/W2CLA, passed away in July. First licensed in 1912, he was president of the Radio Club of Brooklyn in 1922 and helped establish other clubs in the Metropolitan area. When the ARRL Board of Directors established a new Hudson Division effective January 1, 1925, he was chosen as its first director. He had much to do with the growth of the Army Amateur Radio System, having served as chief radio aide to the Chief Signal Officer in the mid-twenties.

Charles M. Bove, W0MXC, ARRL vice director from the Dakota Division since January 1964, died in August at the age of 66. He was a founding member, past vice president, past secretary and past director of the Minneapolis Radio Club and has been trustee of its station W0CCKF since 1946. He was Section Communications Manager for the state of Minnesota from 1951 to 1957.

FAMILY MEMBERSHIP

For families where two or more members are interested in amateur radio and the League, the ARRL By-laws now provide that, after one individual has become a member of the League at the regular dues rate (\$5 in the U.S., \$5.25 in Canada) additional members of that family may join the League for a special dues rate of \$1, with all rights and privileges appropriate to the grade of membership held, except the receipt of additional copies of *QST*, subject to these conditions:

1. There must be an immediate family relationship — i.e., husband or wife, brother or sister, father or mother, son or daughter.
2. All Family Membership must be concurrent — i.e. expire in the same month.
3. The initial membership fee is the standard \$5 in the U.S., \$5.25 in Canada, plus \$1 for each additional family member.

FCC DENIES POWER REDUCTION

Some time ago Robert H. Mitchell, WA2VAF proposed to FCC in RM-519 that the amateur rules be amended to provide that, effective January 1, 1966, the maximum power input to an amateur transmitter shall be 500 watts; effective January 1, 1968, 250 watts; and effective January 1, 1970, 125 watts. He based his request on "ever-increasing crowding of the amateur bands, and the fact that technological progress has moved beyond the 1 kw. power need. The state of the art will be improved by the necessity of finding better ways to establish and maintain amateur contacts than by sheer power."

The Commission in denying the petition pointed out that the power difference would really have little effect on mutual interference between amateurs.

QST



Roanoke Division amateurs presented P. Lanier Anderson, W4MWH, with a plaque honoring him for his 14 years of service as director of the division. The presentation was made at the Roanoke convention by Joseph Galeski, W4IMP, at left.

I.A.R.U. News



QST continues its series on amateur radio in various countries of the world, with particular reference to regulations. The article on Israel presented here was written by Philip M. Kane, 4X4UQ. Phil, a U.S. amateur holding the calls W6VQM and K2ASP, expects to be operating on 10, 15 and 20 meters from Israel until next summer, when he plans to return to New York.

ISRAELI AMATEUR RADIO

The *Israel Amateur Radio Club*¹ is the organization of amateurs, potential amateurs, and SWLs in Israel. At the present time, there are about 450 licensed amateurs in the country, and approximately 1000 members of the IARC. The Club has a general meeting in May of each year, for the purpose of reviewing the year's events in Amateur Radio in the country, to award prizes for various contests held during the year, and to elect the executive board. This board, composed of seven members, is responsible for the guidance and operation of the club during the year. In addition, the IARC has very recently started a program similar to the ARRL OO Corps to "self-police" the bands. The IARC supports a number of clubs in cooperation with youth groups and the military. A monthly journal (in Hebrew), *HaGal* (the wave) is sent to IARC members.

Licensing

Licensing and regulatory matters are handled by the Frequency, License, and Legislation Section of the Engineering Services, Ministry of Posts. Three classes of amateur license are issued: Grade "C" (Novice), Grade "B" (General), and Grade "A" (Advanced). Each grade requires a code test in International Morse (code groups and English clear text) and a suitable theory and practice examination. The Grade "C" examination is written, while at present the other examinations are conducted orally by a panel of examiners. Each class of license is renewable on a biennial basis, and nominal fees are charged for the operator's certificate, station license, and renewals.

¹ More information on the organization of, and membership in, the IARC may be obtained from the Secretary, IARC, P.O. Box 4099, Tel Aviv, Israel. This address, too, is the correct address for the QSL Bureau.

Call signs are issued to licensees to reflect the grade of the license. Grade "A" and Grade "B" licensees receive the standard "two-letter" call while Grade "C" licensees receive three-letter call signs beginning with N. When they advance in grade, the N is dropped. A call sign once issued is not reissued to anyone else, even if the license is not renewed. True mobile operation ("mobile-in-motion") is denoted by a suffix of /M, maritime mobile by /MM, and portable operation ("fixed-portable" or "mobile-at-rest") by /4. Call signs for club stations are two- or three-letter call signs from the series starting with II or with Q.

In the past, the call signs for Israeli stations were issued from the 4X4 series. At present, this series is exhausted, and new call signs will be issued from Israel's 4Z4 series.

Operation

Grade "C" operators are limited to crystal-controlled c.w. operation, 10-watt maximum plate power input, in portions of the 40-meter and 15-meter bands only.

Grade "B" operators are permitted to operate in all bands with maximum power input of 75 watts (a.m. or c.w.). S.s.b. operation is permitted with maximum output of 200 watts p.e.p.

Grade "A" operators are permitted to operate in all bands with maximum power input of 500 watts (a.m. or c.w.). S.s.b. operation is permitted with maximum output of 1333 watts p.e.p.

In Israel, talking into the microphone of a 'phone station has been considered as "operating the station." This is permitted only to licensed amateurs, of any grade, under the control of the station licensee. The one exception to this rule is the club station, where any bona-fide member of the club may operate the station in the presence of the station trustee.

Third-party traffic is permitted at the present time only with the U.S. Curiously, third-party traffic is prohibited between Israeli stations!

The great bulk of amateurs-in-the-making lies in the clubs. Club stations are set up primarily for training purposes by such organizations as Army units, technical schools, city youth departments, etc. They are, in general, not used for "spare-time-operating" by licensed amateurs (except of course the trustee!).

Reciprocity

Any licensed amateur visiting Israel is eligible to act as "second operator" at an Israeli station under the control of the station licensee. He may,

also, receive a Grade "C" license of his own with no further examination. In addition, for higher grade of licenses, full or partial credit may be given for examinations taken in other countries.

At present, formal reciprocal operating agreements are in effect with the U.S. and with the U.K. U.S. General Class amateurs visiting Israel are eligible to receive a permit for Grade "B" operation for up to three months. If operation beyond that time is desired, the amateur may be required to take a suitable test in radio theory, credit being given for the U.S. code test.

Similarly, U.S. Extra Class amateurs are eligible to receive a permit for Grade "A" operation for up to three months. After that time, they may be required to take a test in radio theory, credit again being given for the U.S. code test.

U.S. Extra Class amateurs and Canadian Advanced amateurs are eligible for Grade "B" privileges without limit to time or examination.

Foreign amateurs intending to apply for operating privileges or a station license here should contact the Ministry of Posts, Engineering Services, P.O. Box 850, Tel Aviv, Israel. The offices are located at the Shalom Tower Building, Tel Aviv.

It is preferred that the applicant contact the Ministry directly rather than work through individual amateurs or groups here, since in any event personal contact is required for the processing of forms and payments.

It may be mentioned here that when a foreign amateur brings radio equipment to the country, (including 100-miliwatt "CB" walkie-talkies), it will be held at Customs until a release from the Ministry is obtained. This will be granted only after the amateur has secured suitable operating permits or a station license.



You might call this, taken at ON4UB, "Presidential Row." Left to right, G2BVN, president, Radio Society of Great Britain; W0NWX, president, ARRL; PA0DD, president, Vereniging voor Experimenteel Radio Onderzoek in Nederland; ON4AK, president, Union Belge des Radioamateurs; F8BO, vice president, Reseau des Emetteurs Francais and DL1QK, president, Deutscher Amateur Radio Club (Photo courtesy of ON4VY)

It should also be noted that amateurs applying for station licenses or permits should be prepared to submit a copy of their "home" license, and at least one copy of the schematic diagram of the transmitter. This should be presented only when the forms are filled out, and should not be sent with preliminary inquiries.

Miscellaneous

Unfortunately, I can't say anything about amateur public service work — there isn't any. The Civil Defense and disaster communications are in Government hands, and amateurs have no part in that. It should be noted that many of the army communications people are themselves hams. Since third-party traffic is forbidden in the country (except as noted above), message traffic is also out.

Amateur radio, then, is a purely personal hobby — except that it provides the trained manpower pool for industry and the military. — 4X4UQ

— ... —

The C.C.I.R. {International Radio Consultative Committee} is a technical-study arm of the International Telecommunications Union. At its XIth Plenary Assembly in Oslo in July, A. Prose Walker, W3BMX/W4CXA, made the following statement on behalf of the U.S. delegation.

I have asked for the floor at this time, Mr. President, to express the sentiments of the United States delegation to you, personally, on a matter which has been most pleasantly received by our delegation, and I am sure, by many other delegations as well. The subject of my remarks is the authorization and establishment of Amateur Radio Station, LAITU, during the period of this XIth Plenary Assembly of the C.C.I.R.

If you will permit me, Sir, I would like to make some observations concerning amateur radio and its relation to the expanding period of technology throughout the world. I venture the opinion that a significant number of delegates here at this conference received their initial exposure in the field of electronics through the medium of amateur radio. Initially, amateurs were influential in opening the possibilities for long distance communication via the high frequencies, after having pioneered in the area of the spectrum which administrations then found too valuable not to utilize for the benefit of all their people.

All of us here know the history of the development of radio communications and the continued experimentation and development by amateurs, which although mostly unheralded, has been of significant value. Countless advances in theory, techniques and equipment have been contributions of either an amateur or those who received their early stimulus and training in that

medium. Today with the vastly more complex science of communications, we still find amateurs keeping abreast of developments and maintaining the pace laid down by large national laboratories and developmental organizations in our respective countries. Even satellite communication does not daunt the amateur, and in the near future Oscar IV will be in orbit enabling amateurs throughout the world again to communicate on v.h.f. by means of an orbiting satellite. A chronicle of all these events and their significance would take entirely too much time.

Allow me to say in a personal vein, that it has been most gratifying to meet face-to-face here in Norway and at this conference, fellow amateurs with whom I have communicated over the past thirty years or more. I learned here that a member of the delegation of Portugal was formerly the licensee of CR5AR on Sao Thome Island, whose QSL card is in the files of my own station; that my good friend Mr. Ivanov of the Soviet delegation was formerly EU9BU and that in many other delegations, active and former amateurs are included amongst them. Through amateur radio at station LA1ITU, many delegates were able to communicate with their families at home, in an informal atmosphere, with gratifying results.

There is, without question, a close correlation between the sponsorship and encouragement of amateur radio in countries of the world, and the technological advancement of those countries. If I might offer a suggestion to all countries represented here at this conference, it is that they encourage to the utmost the participation of their technically inclined students in amateur radio. For I'm sure they would find a bright new zeal and thirst for learning in the communications field, by application of technical knowledge to equipment they build and operate themselves.

Mr. President, amateurs throughout the world will experience a thrill and pride, upon learning that the newly elected Director of the C.C.I.R., Mr. Herbstreit, also is an active radio amateur, WØIN. I am equally certain that in the years to come he will continue his interest and activity, although he will be surrounded by all our problems and their most satisfactory solutions.

Therefore, Mr. President, I tender you personally our thanks and gratitude for your wisdom and appreciation of amateur radio, in your approving the establishment of station LA1ITU. Nearly 2000 contacts have been made with approximately 85 countries, in all continents of the world. Our gratitude also is expressed to the Norwegian Radio Relay League, whose members have spared no effort to facilitate the success of the station in cooperation with your administration, and to make us all feel welcome here in your beautiful country. It was with sadness that we learned of the sudden death of the President of the Norwegian Radio Relay League, Mr. Per Gunderson, who was present in this hall at the opening ceremonies.

Although I speak only on behalf of our Delegation, I know that all delegations and amateurs

everywhere will join me in this salute to you, Sir, and in wishing you the best of life's pleasures and time to enjoy them all.

I would appreciate having my remarks included in the minutes of this session of the Plenary Assembly.

Thank you, Sir.

CHILEAN PRESIDENT THANKS AMATEURS

John Hellyer, CE3OX, several months ago made contact with a number of U.S. stations, seeking a special form of blood plasma to aid a 7-year-old boy suffering from hemophilia and infection. The plasma was found and flown to Chile by Navy jet (additional details and photo, June QST, pages 67 and 69), and at last report the youngster was in fairly good shape.

OM John has received the following message, translated from the Spanish:

Esteemed Friend:

Some time ago, I noted in the press that you, as a radio amateur, had obtained concentrated plasma which a child suffering from hemophilia had needed for an operation.

I want to thank you for this action of yours which has done so much good for a child of our country, and to congratulate you in the most cordial way for such a noble hobby, which can render such useful services to our nations . . .

I beg you to congratulate and thank the radio amateurs of the United States, through whose participation it was possible to obtain this help.

With affectionate regards,

Eduardo Frei,
President,
Republic of Chile

LONDON EXHIBITION

The International Radio Communications Exhibition will be held October 26 to 29 at the Seymour Hall, London, W.1. The Radio Society of Great Britain will hold a reception for foreign visitors at 1930 Friday October 28.

Amateurs expecting to attend the Exhibition should get in touch in advance with R. F. Stevens, president of RSGB, 28 Little Russell Street, London, W.C. 1. The phone number is H0LBurn 7373.

YUGOSLAVIAN ANNIVERSARY AWARD

As part of its 20th Anniversary celebration, the *Savez Radioamatera Jugoslavije (SRJ)* is issuing a Jubilee Award for working YU stations, as below, between January 1 and December 31, 1966. Europeans need 20 contacts, Asians, Africans and North Americans 5 contacts, and South American and Oceanian stations 3 contacts. All bands and modes may be used, but each YU can be counted only once. A list of claimed contacts with log data, certified by two licensed amateurs, should be sent with 5 International Reply Coupons to SRJ Awards Manager, Box 48, Beograd, Yugoslavia. QST



Correspondence From Members -

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

DX CONTEST QUOTAS

☐ I congratulate the decision of the contest committee to eliminate quotas in the c.w. ARRL DX contest. You can't know how delighted I am that quotas have gone the way of outdoor plumbing, iceboxes with real ice and hand-crank starters — I never got the hang of changing hands so I could count to six. I appreciate the courage it took to make such a decision — my heartiest congratulations to your fine staff . . . *Fred Capossela, W2IWC, Baldwin, New York.*

FREELoadERS — PRO AND CON

☐ . . . ARRL should immediately adopt a policy of free service for League members only. No one should be refused aid, but all non-members should be charged a nominal fee of not less than \$3.00 for such services as certificates, answers to technical problems, etc. This action will either result in an increase in League membership or a reduction in the work load of the Headquarters staff. Either way, we win.

It will cause a lot of anguished screaming from the freeloaders and no doubt some of our soft headed members will object, but who cares? Why should the ARRL membership be required to pay the freight for the entire amateur radio fraternity?

Don't let the softies sway you, gentlemen. They will be the first to howl if the League finds it necessary to raise the dues in order to cover the cost of the League's present policy of free service to all radio amateurs. — *Mick Morrow, W6BWF, Loleta, California.*

☐ . . . One possible solution would be to charge \$1.00 for anything they ask from the League except things such as the *Handbook*, *License Manual*, etc. If they were making use of the ARRL by requesting assistance they will soon find out that it does not prove economical, and if they cared anything for the League they would then become members. This policy could hurt those non-members that find it hard to obtain the membership dues, but are the members to suffer because of the non-members putting our organization into financial jeopardy? — *Bill Morris, WA5MUF, El Paso, Texas.*

☐ ARRL and *QST* have, as a result of non-partisan, non-political, helpful, good-for-the-order attitudes in their work, gained a high order of respect and support from all radio amateurs. I have participated in the benefits of "ham radio" for 35 years, not always as a member of ARRL, and not always in agreement with them. The thing that finally won me over as a dues-paying member, however, was its unselfish, honest endeavor to serve the interests of amateur radio generally, not for only those willing (or able) to contribute to the cause. I could see no discrimination in services rendered to paying and non-paying licensees, so long as the state of the art was furthered. It was ARRL's ability to stand above the pecuniary level in its administration and repre-

sentation of the entire amateur fraternity that finally won my admiration and respect. The magnetism of this image did the trick. Also, maintaining this position in view of commercial pressures to the contrary impressed me as quite an accomplishment. But then, isn't "non-commercialism" a basic precept of amateur radio? . . .

It is understandable in present society that such an idea as "freeloading" could come up for mention at a board meeting, but I'm surprised it rated a discussion. I'm of the opinion that a non-discriminatory policy regarding non-members could be one of your best morale and membership boosters. A few non-members may abuse the privilege. It is better they be out than in the organization. I doubt anything much closer to mandatory membership would help. I would like to think that League membership was influenced more by obvious excellence of its work toward its declared purpose than by threats to reduce service standards or to increase the tab. Certainly the stature of ARRL will suffer less with the former. — *Norman S. Allen, W0H0Z, Independence, Missouri.*

☐ . . . The League is a long-time leader in providing help and guidance for any amateur needing it. The League awards are the most worthwhile available — let's keep them off the "market" . . . — *Ren Flagg, WSOQH, Cedarville, Michigan.*

MEMBERSHIP DUES

☐ I read in *QST* that ARRL went for a loss money-wise this year. This problem likely could be solved by increasing dues or getting more members.

Everyone, including the League, should stress to all hams, members or not, that without an organization of some type, amateur radio's future would be very dim. By having all hams possible support an organization, the ham fraternity's voice would be much stronger to all, including FCC and government officials.

I think one of the League's aims should be to recruit new members and get present members to do the same. A strong and active organization will win influence and have more "say-so" without one — nothing. — *William R. Bradford, WA7AUW, St. Murray, Utah.*

[EDITOR'S NOTE: WA7AUW hit the nail on the head in his final paragraph. Right now, the League and local radio clubs are in the middle of HamQuest 67, a campaign to bring in new members on the national and local level. There are prizes for the clubs and their "salesmen," too. If your club hasn't started on the program yet, write to Hq. for a HamQuest 67 kit.]

☐ Most scientific societies are having some difficulty meeting financial obligations due to increased costs. I belong to four societies and all of them (except ARRL) have had to raise their membership fees in the past two years. — *James P. Gillespie, W4LQC/-W8BKK, Nashville, Tennessee.*

A PLEA FOR UNITY

¶ I am writing about an article I read in June 73 Magazine dealing with ARRL . . . This matter is not only childish but becoming rather annoying.

After all, what is amateur radio becoming when radio journals are taking up more and more of the room we pay for to punch below the belt and tear down the opposing magazine instead of what we amateurs are interested in? I can only say that if ARRL wasted some 3½ pages to tear down 73, CQ or any other journal, like 73 did, I would be rather doubtful as to the sincerity of the League — as I am with 73. I am sure all journals and organizations have a few faults, most of them only in the minds of some readers . . . What I am trying to say is that a single copy of a journal made to please all is almost impossible because of the world we live in today we all have different ideas and viewpoints.

. . . If we are to survive, . . . we should work together as one . . . Let's stop tearing down other organizations and weakening amateur radio. As can be proved by past history, nations can not withstand a war nor are they as strong if they are fighting among themselves. This holds true with us in the battle to keep amateur radio good, organized and honorable — let's keep together. — *Devern Dean, W13AIB, APO, New York, New York.*

QZZ

¶ I heartily endorse the suggestion by K9CZV (QST August) that QZZ? be added to the Q-signed list. The abbreviated question: "Is anyone using this frequency?" not only lends an air of courtesy to our hamming but will help reduce unintentional c.w. QRM. QZZ would mean "This frequency is in use."

We need this in c.w. operation. — *David P. Shafer, W4AX, Glen Allen, Virginia.*

¶ The suggestion . . . seems to be a good one, because conditions are such, at times, that signals from the distant station are not too strong and consequently are likely to be overlooked . . . *William G. Gerlach, W6BG, Oakland, California.*

HERTZ VS. CYCLES

¶ Never have I felt more strongly about something as I do about the recent change by some mags to the use of Hertz for cycles. This is the most disgusting thing that has happened in recent years. I have never written to anyone before, but this is too much. May I call upon other amateurs to rally against this change? I am most pleased that QST has not as yet adopted the use of this term.

Long live "cycles per second." — *George Gatliff, K5KOC, Notrees, Texas.*

¶ I agree with the Paul Harris letter, page 48, August QST. Here is one vote for the Federal regulatory agencies, and QST, letting "cycles per second" stand. — *Henry Morrison, Jr., W0BBW, St. Paul, Minnesota.*

¶ Congrats on your "Hurts" stand. Let me add one QRP voice in support. You may have to join 'em, but let's drag our feet as hard as we can. — *Harry E. Adams, W9JX, Spencer, Indiana.*

¶ . . . I have a suggestion for the cycle-Hertz controversy. I am with, I believe, the majority who feel that this was an unnecessary and unbeneficial change. I hope that it will be repealed. But if it is

not, then why not have the ARRL lead the crusade for a new abbreviation for Hertz? kHz is a cumbersome thing to type, so lets use the small letter "c" as the abbreviation for Hertz. Then kiloHertz becomes kc, MegaHertz becomes Mc, etc. Why not? If they can change traditions, why can't we? — *Gary Huff, K9AUB, Springfield, Illinois.*

¶ . . . Why must we in the U.S. and other English-speaking countries, and also in all countries speaking French, Spanish and Portuguese — and all these add up to quite a number of people — obsolete a perfectly good self-explanatory term in favor of something that until very recently was known only in a few continental European countries?

Hertz does not mean a thing to us — it would be about the same to decree, that from now on we will have to call radio "Popov" and television shall be known as "Nipkov," according to the names of their Russian "inventors."

So — why Hertz? — *Ulo Vilms, WB6LNS, Pacoima, California.*

¶ It is difficult to quarrel with the use of the terms "cycle" and "cycles per second" as elaborated by G3GFN, provided one remembers that these are two separate, distinct, technical terms with different meanings.

If we then look farther up the page, we read " . . . drift is less than 3 kilocycles . . .," "Major calibration marks at 1-megacycle intervals," ". . . at every 200 kilocycle point. . ."

This is current jargon and it is just possible that many readers will be unaware that each and every one of these should read cycles *per second*. Or, better still, Hz.

The excellent reasons for using volt, weber, maxwell, and such units are that they are single words that do not translate into other words with other abbreviations and contractions in other languages.

I say the use of Hertz is a worthwhile and long overdue reform. — *Walter H. Anderson, VE3.1AZ, Toronto 12, Ontario.*

RUDENESS

¶ How many amateurs would barge into a room where two people are talking and interrupt them at top voice? Few, I daresay. Yet this sort of consummate rudeness is in evidence every day on the hambands, both phone and c.w. Do some amateurs just ignore common manners when they sit down at their rigs?

As a DX station, for the nonce, I find increasing difficulty in properly finishing even the shortest QSOs without having the station at the other end, who may be only a S3 or S4, smothered by stations calling me without having the decency to wait for either me or the other fellow to finish our QSO. Is life all that short?

This complaint is a common one in this part of the world and certainly is one reason that many stations in this area are less active than they might otherwise be. Sometimes it seems that trying to finish a QSO just "ain't worth the trouble."

Several of us have developed a sort of counteraction: Whenever possible we note the calls of the persistent, long-winded "breakers" so that we may studiously ignore them, even after our hashed-up QSO is finished and we're ready to work another.

This isn't the best answer to the problem, of course. Just a bit of common politeness on the part of all concerned will go a long way toward making our hobby enjoyable to the fullest. — *Robert F. Franklin, 9Q1CZ, APO New York, New York.*

QST

Hamfest Calendar

California—The Fifth Greater Bay Area Hamfest will be held at the Edgewater Hotel off Nimitz Freeway in Oakland, California on October 22 and 23. Write Box 113, Hayward California for details.

Illinois—The Chicago Area Teleprinter Society will hold its twelfth annual "CHI-RTTY" meeting and dinner on Sunday, October 2, in Meeting Room 7 of McCormick Place, Chicago, preceding the National Electronics Conference. No admission is charged for the meeting. Further information may be obtained from Robert Pauculat, W9JBT, 1327 N. Hamlin Ave., Chicago, Ill. 60651.

Indiana—The 5th Annual Hamfest of the Hoosier Hills Ham Club will be held on Sunday October 9 at Spring Mill State Park, Mitchell, Indiana, in the village near the old mill. There will be entertainment for the ladies, playground for the children, picnic area, plenty of parking space, swap shop, eyeball QSOs, free donuts and coffee and many other activities. Bring the family and enjoy the beauty spot of scenic Southern Indiana. S.s.b. dinner at 1900 EST, Saturday night, October 8 at the Spring Mill Inn. Communications will be on 3.910 and 50.4 Mc. For more information write The Hoosier Hills Ham Club, Inc., P.O. Box 375, Bedford, Indiana 47421.

Kentucky—Louisville Ham Kenvention date is October 15. Technical forums, exhibits, banquet and giant indoor trade-o-rama (bring your goodies). Ladies program (advance registration only). Details from P.O. Box 20094, Louisville, Ky. 40220.

New Hampshire—The Manchester Radio Club will hold their Annual Banquet on October 22. For time, place,

etc., and other information, contact WA1DZX at P.O. Box 661, Manchester, New Hampshire 03105.

New York—The Annual Fall Banquet of the Finger Lakes Chapter of the QCWA in central New York will be held on Saturday evening, October 22, at the White Elephant Restaurant in Canastota, N. Y., one mile from Thruway Exit 34. The social hour will commence at 6:30 p.m. and a prime rib roast beef dinner will be served promptly at 7:30 p.m. Ladies are invited. Featured speaker will be F. E. Handy, W1BDI. Tickets are \$5.00 and include meal, gratuities, tax, etc. Reservations are expected and should be made with Donald L. Farrell, WA2WEE, 207 Seneca St., Chittenango, N.Y. 13037.

New York—12th Annual Syracuse V.h.f. Roundup, October 8, at Dellemort's Country Manor, Cleveland, N. Y. Registration \$6.00 in advance, \$7.00 at the door, starts at 10 a.m. Send remittance to James Stewart, K2PKK, 268 Hopper Road, Syracuse, N. Y. 13207. Dellemort's Manor is on the north shore of Oneida Lake.

Pennsylvania—The Tri-State Sideband Dinner, Pittsburgh Area, will be held October 29 at John Garneau's, Smorgasbord, Monroeville, Penna. 7:00 p.m. C. J. Tirk, W3KTP, Turtle Creek, Penna 15145 will supply additional details upon request.

South Carolina—The Rock Hill Hamfest is scheduled for the middle of October.

Texas—The Brownfield Free Swapfest is October 29 and 30 this year.

Washington—The Puget Sound Council of ARCs will hold their Fifth Annual Banquet, October 23 at Waller Road Grange Hall, Tacoma.

ARRL HUDSON DIVISION CONVENTION

Tarrytown, N. Y. October 15-16, 1966

Amateurs in the Northeast will have a unique opportunity this year to enjoy a "big-city" convention without having to put up with all the disadvantages of the city location.

The 1966 ARRL Hudson Division Convention is being held at the Hilton Inn, Tarrytown, N. Y., just south of exit 9 on the New York Thruway near the Tappan Zee Bridge. The site is therefore easy to reach by car, and is served by convenient train schedules both from New York City and from Albany. The World's Fair station, K2US, will provide talk-in on 2, 6, 10 and 75 meters.

ARRL President Robert W. Denniston, W0NWX, will be on hand, along with technical speakers from ARRL Hq. and from industry. Technical displays, manned by men from the top amateur equipment companies, will be open to all from 9:30 A.M. to 6 P.M. on Saturday and 9:30 to 5 on Sunday. Talks and forums will be held on public relations, the Amateur Radio Public Service Corps, Military Affiliate Radio System, DX, s.s.b., traffic, antennas, mobile operations, the YLRL, getting started in amateur radio and an idea exchange for clubs.

Jean Shepherd, K2ORS, famous in the metropolitan area as star performer of WOR-Radio, will headline entertainment at the Saturday Night banquet. Banquet seating is limited, so early reservations are wise.

Advance registrations are \$3.00 and banquet tickets are \$8.00. At the door, registrations will

be \$4.00, and banquet tickets, if any remain, will be \$9.00. Tickets can be obtained from ARRL Convention, Post Office Box 112, Flatbush Station, Brooklyn, N. Y., 11226.

Motel registration requests go direct to the Hilton Inn, 455 South Broadway, Tarrytown, N. Y. (mentioning the amateur convention) or through your local Hilton hostelry. Rates are \$14 single, \$18 double.

GREAT LAKES DIVISION CONVENTION

Muskegon, Michigan October 21-22

The Great Lakes Division ARRL Convention will be held Friday and Saturday, October 21 and 22, at the L. C. Walker Arena, Muskegon, Michigan, under the auspices of the Muskegon Area

(Continued on page 168)

COMING A.R.R.L. CONVENTIONS

October 15-16 — Hudson Division, Tarrytown, New York

October 21-22 — Great Lakes Division, Muskegon, Michigan

January 21-22, 1967 — Florida State, Miami

April 22-23, 1967 — New England Division, Swampscott, Massachusetts

July 1-3, 1967 — ARRL National, Montreal, Quebec

Prospective convention sponsors are urged to check with ARRL Hq. to avoid possible date conflicts.

A Noise-Silencing I.F. Circuit for Superhet Receivers

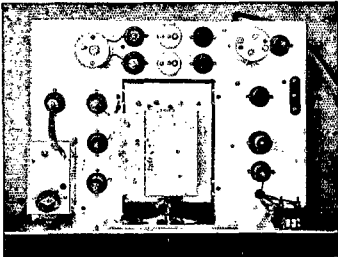
An Effective Method of Coping With Auto Ignition and Other Electrical Interference in C.W. and 'Phone Reception

By James J. Lamb*

Here is another development of Jim Lamb's And don't let us don't think it helpful to the same widespread application in amateur and commercial radio as is now given his "Single-Magnet" development. The new scheme is, without doubt, a second solution to the interference problem we said that we don't see a receiver that has both or at least two moving central-ray tube pinches to establish one and for all that the scheme really works—but it certainly does not!

THE problem of noise interference from electrical equipment in radio reception is one that becomes increasingly acute as we expand our use of the radio spectrum farther in the high and ultra-high frequency and, simultaneously, electrical equipment becomes more widely used. It is not so long ago that the only kind of QRN which really bothered was just plain natural static. But now, at least on our higher frequencies, the interference from atmospheric, as well as from automobile ignition and oil burner systems, domestic and industrial equipment in infinite variety, is really distressing. Admittedly this kind of interference is controllable at the source—provided all the manufacturers and all the users of the offending devices could be persuaded forthwith to take the necessary steps with the individual equipment. This utopian state may come any day, of course. But what about the immediate situation? Is there anything like a generally applicable "shot in the arm" that we can individually can give our receivers to minimize their noise or loss, from the electrical noise epidemic? We now believe that at least several more or less effective solutions are not just possible but, better still, have been developed to the practical stage. These are methods applicable to our present system of communication with amplitude modulated waves

and adaptable as supplements to existing types of receivers, to be used within the receiver itself without compromising its normal characteristics. In addition to the one which is the subject of this article, descriptions of several others will be



TOP VIEW OF THE METAL-TUBE RECEIVER USING THE NEW NOISE-SILENCING I.F. CIRCUIT. The receiver is completely described, except for this feature, in Chapter Seven of the 1936 A.R.R.L. Handbook. From left to right, behind the front panel and in the rear of the second I.F. transformer, are the I.F. amplifier, the noise-silencing I.F. transformer and the noise rectifier.

found in this and recent issues of QST. Truly, we are getting somewhere.

* Technical Editor, QST.
 † Thompson, "Detector Circuit for Hearing Hand Interference," April, 1935, p. 14. ‡ New frequency section of the Ultrahigh Frequency," Nov. and Dec., 1935; Robinson, "Output Limiting," this issue; and Thompson, "Detector Circuit for 'Phone," this issue.

February, 1936

NOISE CHARACTERISTICS AND EFFECTS OF ELECTRICAL INTERFERENCE

From the experience of others, and from our own observations during work on the present

show up on the oscillograph as distinctly separated and more or less uniform pulses, each of extremely short duration (one-thirtieth second or less), before they can be intelligible reception, they may have an amplitude as great as twice that of the desired signal. But more often than not their amplitude runs 20 or more times that of the desired signal, so that they are not only obscured, except for their prefix positive) and cause secondary effects which demand special consideration as will be explained farther on. The main pulses, of short duration may be accompanied by subsidiary "whiskers," as when the spark occurs with excessive force, the main pulse, however, is characteristically clean and relatively free from "whiskers."

The commutator-type interference is considerably more complicated in form. A dc source motor gives prominent pulses of commutation frequency, more or less uniform in amplitude, with an almost solid intervening "whisker" accompaniment of considerably smaller but non-uniform amplitude. A series universal motor operating on a.c. has the commutation-frequency pulses superimposed on a sub-audible frequency component (and the "whiskers" as well, making the pulses still more complex) in both cases, the principal noise component being in the commutation-frequency range, but in with both from the "whiskers."

As compared to the spark type, which has effective value relatively small compared to amplitude, the commutator-type interference is of greater effective value and has greater effective value in proportion to its peak amplitude. Amplitude operated, limit and inherent variations accordingly find it much more difficult to handle. Fortunately interference of this type is considerably less prevalent than the spark-type type; and unlike the spark-type variety, it is effectively disposed of by selective circuits such as the I.F. crystal filter.

Besides these two main types, several others which we have mentioned also might be described. Some have characteristics not unlike natural static—that from a faulty high-tension transformer which was having internal trouble being

one case. Such disturbances are generally non-uniform in amplitude and in duration, although frequently of high amplitude relative to the radio signal, and may result in receiver noise output of a "slinky" character. Still another type of more or less common interference is that peculiar to old and faulty incandescent lamps. But these types usually represent the daily battle of rack equipment and deal chiefly with the designer. The degree to which these miscellaneous interferences can be silenced in the receiver depends on their wave form. If in the form of short-time discrete pulses, then they are most readily handled; if in the form of a more or less steady envelope, they are less tractable. Interference effects of all types, however, have been found reducible by the system described, and adjustment of the receiver to practically total elimination for ignition noise, clicks and similar types.

In view of the characteristically ultra-short duration and relatively large separation of this

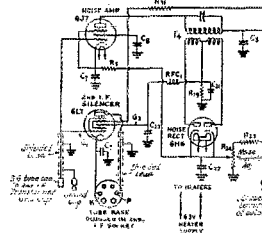
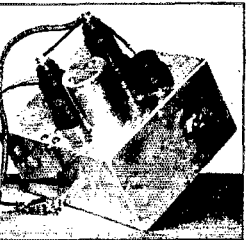


FIG. 2—CIRCUIT OF THE NOISE-SILENCING ADAPTER UNIT. Components are designated in the corresponding designations in Fig. 1, excepting those which are 200,000-ohm non-inductive coupling resistor. Two separate 100,000-ohm resistors may be used, as in Fig. 1.

electrical pulses principally responsible for noise interference, it might be wondered how they can be so devastating in effect. The electrical pulses individually may have less than one-thousandth second duration, as previously mentioned, and in a typical case may occur 120 times per second.



THE NOISE-SILENCING ADAPTER UNIT FOR USE WITH STANDARD SUPERHET RECEIVERS AS DESCRIBED AT THE END OF THIS ARTICLE.

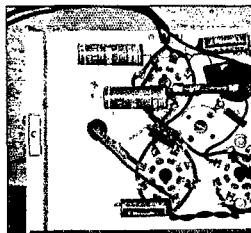
From left to right, grouped around the double coupling transformer, are the 617 noise amplifier, the 6L6 I.F. amplifier and the 616 noise rectifier. The knob on the side controls the threshold adjusting resistor.

But the ear is supposed to be incapable of acoustical impulses so widely separated and of such short duration. Obviously something is occurring to increase the effective length of each pulse before it reaches the ear, so as to give it a character it did not have originally. One element of the receiving system which certainly is capable of accomplishing this change is whatever the selective receiver or loud speaker. If by its nature it responds with a reverberating crack or a howl to the shortest high-amplitude stimulus, vibrating at some natural period of its own issue after the original electrical hit. Then also the pulses can be given appreciably increased electrical duration in audio-frequency areas and even in radio-frequency stages of the receiver. This is especially likely if their amplitude becomes sufficient to drive a grid positive in any of the audio or secondary stages, grid current representing the rectified envelope of the pulse flows through the input return circuit of the affected stage, which in turn represents resistance-capacitance networks of relatively large time constant in addition to the coupling capacitors and bias source, thereby giving rise to secondary effects of cross-modulation and blocking. With r.f. or i.f. circuits of high selectivity and low movement, particularly with a crystal filter, such excitation may be particularly results in prolonged wave trains of relatively small damping. In a typical instance, spark

February, 1936

interference wave trains of approximately a thousandth-second duration with a straight transformer-coupled two-stage i.f. circuit have been

Why not amplify the noise peaks extending above the desired signal amplitude at radio frequency, amplify them and use the resulting voltage to control the gain of a subsequent auto-frequency stage, automatically and instantaneously?

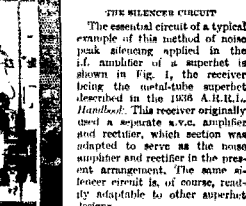


BOTTOM VIEW OF THE ADAPTER UNIT.

To the left of the threshold adjusting resistor are the noise rectifier and I.F. amplifier noise pickup sockets, the noise amplifier socket being above the former. The i.f. filter coils are mounted vertically, each component being placed to give three leads and minimum stray i.f. coupling.

observed to increase to over one-and-a-half second duration with the crystal filter installed. In r.f. reception with the receiver's best oscillator, the same effect on extending in the latter case a conversion of machine-gun rattling to continuous "pinging" and ending at beat-note frequency—from which the signal cannot be distinguished.

With these characteristics and peculiarities of the most common types of electrical interference in mind, it appears extremely reasonable that something in the nature of eliminating their effects should be possible. They are inherently of short duration until produced in effect by some element of the receiving system, they generally cause only objectionable background so long as their amplitude does not exceed the desired signal amplitude at the output of the receiver. Advantage of these characteristics have been taken in devising output limiting circuits of various types, each of which are described elsewhere in this issue, but these can only cut off the peaks of interference which extend above the desired-signal level in amplitude and leave the exact amount of the receiver without protection from the secondary effects of overloading. Why not go farther? Why not try to bring the amplitude of the interference below the desired-signal level, and let the job in an earlier circuit of the receiver before the stage most susceptible to overloading and cross-modulation are reached?



THE NOISE-SILENCING ADAPTER UNIT.

The essential circuit of a typical example of this method of noise silencing is shown in Fig. 1, the receiver being the metal-tube superhet with a 617 noise amplifier, a 6L6 I.F. amplifier and a 616 noise rectifier. This receiver originally used a separate a.v.c. amplifier and rectifier, which section was removed with respect to the installation of these tubes. This has determined the input amplitude at which rectification starts in the diode, being normally set so that action begins for noise peaks extending above the desired signal level. For "clean" reception with automatic volume control, the bias developed in the a.v.c. circuit of the receiver is also applied to the control grid of the noise amplifier, insuring that the first bias developed across the diode automatically maintaining the proper noise threshold level over the range of signal strength normally encountered with fading.

The rectified noise voltage developed across the diode load resistor R_1 is applied to the No. 3 grid of the 617, biasing this grid negative in proportion to the amplitude of the noise pulse which is acting on the rectifier at the i.f. stage for the i.f. components of the same noise pulse on the grid of the i.f. amplifier tube. This object is, in effect, to make the noise current outside the bias grid partly or wholly in a blocking this amplifier during the noise pulse,



How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

One point does stand out over the years in the matter of newcomers to amateur radio — their real exposure and the effective planting of the ham virus comes with a visit to the shack of an already licensed friend or acquaintance. Ham magazines, booklets and promotional pieces seem to have had little direct effect. It is the personal approach which has produced results.

— Editorial, Feb. '66 QST

Our musings here last month touched on FCC regs Part 97, subpart A, 97.1 (e). You know, that chunk about amateur radio's unique position in the promotion of international good will at the personal level. We stressed that no other radio service licenses ordinary folk to sit around the house chewing the short-wave rag with other ordinary folk beyond the seas, just for the fun of it.

That's important: *just for the fun of it*. It's vital because that's why almost every one of us became a ham in the first place; just for the potential *fun* of it. DX hounds aren't originally seized with a zeal to serve humanity as wireless ambassadors of good will, any more than would-be traffic men run down to get their tickets with a burning intention of serving in RACES and NTS. Desire for such service comes later as an amateur matures, a precious distilled by-product of the fun product.

This should be pointed up from time to time because there are some among us who, deeply concerned about hamming's "image", espouse the idea that our chosen avocational pursuit should be painted as some sort of grimly serious nonhobby chock full of nonfun. Nonsense. Let there be no mistake, especially among prospective amateurs. Ham radio — DX, traffic, experimentation or what have you — *is* a hobby and it *is* fun!

That is the image sought by could-be would-be amateurs. We've got to make them say to themselves, "This hamming thing looks like great sport — I want in!" For if this overriding invitational image ever tarnishes to the point of casual unattractiveness we can kiss those other treasured derivative images good-bye.

Consider controversial Citizens Band radio. Most of the CBers we encounter aren't engrossed in it as the wireless tool it was intended to be. They see it instead as a shining example of instant fun. And they will accept the greater challenge of amateur radio only on like appeal.

Hamdom's DXers are advantageously situated to promote a regeneratively healthy amateur radio. Get some of those colorful juicy QSLs back up on the shack walls where they belong,

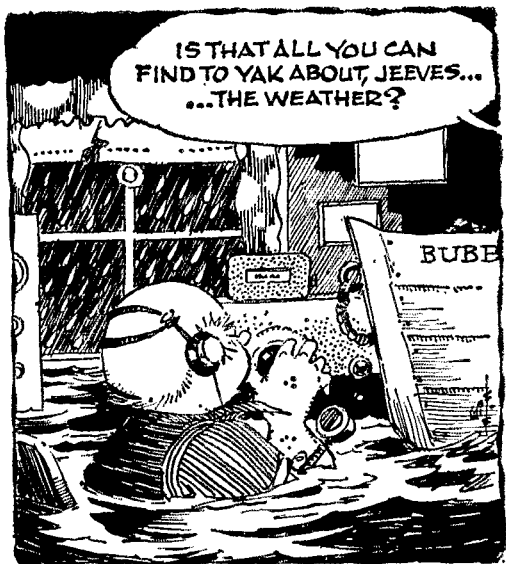
make the place look like a happy ham station again, and invite some prospects over for adventurous chats with the antipodes. Stir in an extra dash of that old ham spirit. You'll soon convince some VIPs, future amateurs, that 27-Mc. Brand-X DX, by comparison, is greasy kid stuff.

What:

How you like our New Sound? Sharp, eh? Lots of lively DX noise all the way up through 28 Mc. as those sunspot numbers creep up and up. True, this will give 160, 80 and 40 meters a more slippery grip on the DX stick but that's the price of propagational progress. Early seasonal returns are fragmentary but the trend is already obvious. For example, take . . .

10 c.w., no longer just a blank spot on a DX man's dial, where WA5 1CUN 2VFA, WB4CAP and G3IDG dig the radiotelegraphs of CRs 6AI 1800 GMT, 6EI 11, 6HH 16, 6JJ 7IZ 10-18, CX1OP 20, EL2D, F9VN/FC 11, GD3TIU, H18XAL, HK3AAE, I1IZ, KV4CI 17, OA4KF, OD5AP, PYs 1CKV 20, 2BGL 18, 5ASN 19-20, 7AKQ 19, UA2KAP, UP2KNS, VK4YP, YO2BM, YV3DM (160) 22, ZB2AM 17, ZC4s GB 16-19, JU 9-17, PC 16, TX, ZDs 7IP 15-16, 7RH 16, 8AR, 4X4HK 17, 7Q7RM 16, 7X2AH 11, 9H1s AB 11, AI 19, 9J2s IE MAI 17, WR 17-19, 9Q5s HD 20 and LJ 17-19. That number in parentheses, incidentally, is kc. above the lower band edge. Ten-meter quantity's still down, of course, but there's some quality in there.

10 phone comes to life for K1ZIA, WA5 2VFA 4QBX 4WIP 9MQI, WB4CAP and G3IDG with GE3JM* (580) 23, GX4DE* 23, FG7XT* 22, G8SJ/CT3 20, HP3RL* 23, KP4CQC* 23, KS6s BO BT, KZ5s BE* 21, GL* 21, JW* (650) 20-23, NH, LU5 1DTL (557), 2DJB* 19, 3AAT 20, 6ACU* 23, 8DAF (600), PY2CDS 20, TG9EP (600), T2CRC, VKs 2ADE* (480) 2, 3AMK (620) 1-2, 3AVY* 3BG (600) 1, 3VL* (480) 1, VP, 2GLE (625), 2KJ 2KQ* 23, 2KR 9FB (625), XE, 1CK (625), 1JP 1JP 3AB, YN4JAB* (665) 22, YVs 1BL (581), 1PF (578), 3KX (600), ZC4s KF 19, MO 19, ZD7RH, 4X4s HF 16, IH 18, 6Y5OF (611) 17, 9J2DT 20 and 9Y4VS* 20, the asterisks blinking for non-s.s.b. signals. Looks as though a DXer should keep some straight-s.m. handy for 10 meters, at least until the sideband set moves in solidly.



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

15 c.w. approaches its prime if the reports of "How's" correspondents Ws ICNU 3JZJ/9, Ks 1ZJA 5VTA, WAs ICUN 3AZI 3GCV 4YDR 4DVV 7BCB 7BOB 8AIGD 9AQE 9M1QI 9NXH 9KLR 9KYB, WBs 2LBJ 2LDX 2UHZ 6KIL and 6NXX are indicative. CEs IRV (20), 2CR (40), 19, CMIAR, CNSs BF BU PB FF 22, CO2BB (50), 19, CP2BH (4), CRs 6AL (5), 18, 6CK 6DX (47), 6EI (30), 9, 6IHH 6LAS 7IZ (80), 17, 9AH, CTIs (E) IX 11, CXIJM, DM4PL (61), EA8s BG (10), 17, ER FF 12-14, EL2s AH AK D (40), 9, PD (70), JK (40), 18, Y, EP2BQ (35), 3, ET3GB/mm, F5EC/FG (30) 22-33, FG7s XQ XT (108), XX (43), FH8CD, FL8MC (10) 2-3, FR7ZD, GC8HFE (10), HA8 4KYB (50) 22, 5DA 4D (40) 22, 5KFR 0HR (25) 21, HGIALF (5) 18, numerous HEs, JA8 1KHP 1PZG 1RKI 1SJO 1THL 1UTQ 1VWF 1WNR 2GNR (45) 20, 2LAU 2YBG 3HCJ 3KVU 4CBA 5AGR 7CUA 8BXC 8QR 9BFW 9YAN, KG6AA 10-12, KV4CX, KZ5GL (65), LU8 1D6N (47), 18, 3EX (50) 21, 5OI, LX2UW (10), LZIs BK (31) 21, BT (21), MP4s BDF (40) 11, BEU (35) 9, OAs NV (42) 22, QN (50), 19, QZ UO, OD5s EE (10), EF (50) 16, 1L, seeds of Os, OK4BL/mm (40) 19, OX3s BS (40) 20, UD 0Ys 2H 2J 3H (30) 17, 4R (50) 18, P3CG 20, PZIs CJ CP, a dozen or more PYs, many SPs, SUIDL, SV1CX (20), TFR2WIS 22, TL8SW, TTRAF (25) 12, UAs 9WS 0KZB (50) 22, UB5Es (62) 18, UC2OM (50) 18, UL7FV, UM8IE (80) 20, UO2s HQ KCT (27), UW3DR (40) 18, VK9s CJ 4, GM, VPs 1LP 19, 1VS 2AR (60) 18, 2AZ (30) 18, 6AK (30), 6BX 6PJ (20) 20, 9BP (28) 22, VQ9HB (36) 18, VRs 2DK (10) 9, 6TC (60) 21-22, VSs 6FK (30) 12, 9AJC (90) 12, 9ATH, VU2s JA (35) 3-16, 1Z, WP4CPL (160) 23, XE1AAG 20, YQ3WV (50) 21, YUs 2RAK (30) 21, 3NP (55) 20, YV5s AAG (50) 20, BHI (49) 22, ZB2s A 23, AM (11), ZC4s PC (80) 18, TX (65) 19, ZDs:

EL2R (377) 21, ET3s GB/m (350) 18, RB 15, WH (390) 20, FB8WV (350) 11-12, FG7XL (365), FH8CD, FK8AB (330) 4, FL8MC 15-18, FO8BR* 0, FR7ZD (385) 13, GCs 2XU (350) 18, 81TF (350) 20, GD8RFF, HA5DU (415) 21, HC3s 2JN* 28, 8FN (400), HIs 4ARL (390) 22, 8NZI 18, 8NZT (368) 0, 8XJG (370) 20, HK0A1 (365) 21, HRs 1JMF (390) 15, 1MN (390) 22, 5LB 2, HZ1AB (385) 16, JAs 6CAM (394) 14, 9JX, Ks 2DET/KV4 (344), 5HWV/VPS (356) 19, 6ERU/KP6 (385) 4, KG4s AN (400), BQ (410) 22, CX (380) 0, KR6s CP 11-12, DO 17, KS4s CB (402) 12, CG (400) 1, KV4s CX (352) 12, ES (395) 0, KX26EA, KZ5s CD (390), CJ (410), EX LI (400) 21, RW (410), SO (385), LU2s AV* JV* 22-1, MP4s BBA* (187) 18, TBM 14-15, OAs 4, 4UO* 21, 5AO 19-21, 5AQ (356), 5C 7Z 22, OD5s BZ (395) 20, EE, PYS 1CJF (390) 20, 2JF (375) 0, SV0WU (420) 21, TGOOP (390) 22, TIZ8 JH (360), RO (373) 19, TL8SW 12, TU2AN, VKs 1JL 6XX 6, VPs 2AP (388), 2DC (300) 17, 2GLE (348) 20, 2KLD (350) 0, 2LS* 0, 2NS 2, 3YG (380) 21-22, 5AR 14, 5RS 0, 6AQ (300) 2, VQ9EF (420) 17, VR6TC (400) 22, VS9s AJC (395) 13, OC 10, W8TNC/KW6 (400) 1, XEs 1H8M 3ME 1, XW8s AL 16, BJ 12, YN1s JAD 1-2, RE* 22, RAs 23, YO9CN (345) 20, YS1s DSE (400) 22, GEC (373), JAV (385) 1, THM (355), YVs 1BL (400), 5BUP* 5CEY (380), ZC4s CJ CN (370) 18, ZDs 7R8 (340) 16-19, 8J (320), 8SKT 21, 8WZ (361), ZL2s ASJ* BE 23, TB, ZPs 5DH (370) 0, 9AY (370), ZS8L (403) 15-17, 4UUs ITU (410) 22, SU (383) 18, 5A1TI (385) 23, 5H3JR (420) 20, 5N2s AAW (383) 17, AAX (340) 17, 5R8As (380) 16, 5Z4WV (365) 22, 6O1s AU 18, GB (350) 18, PF (366) 20, 6Y5BB 21, 7Q7Ps (361) 18-19, 9G1s PL FR RW 17, 9H1A 21, 9J2GR, 9M8 2GJ 16-17, 2LO (410) 16, 2OV (380) 14, 1MT 16, 6AP (400) 16, 6MQ 12, 9Q5s CZ 21, DL 19, FM 18, FV (360) 19, RC, 9U81P (358) 20, 9V1s CN 13, DO (350) 14, MX (396) 16, MY (400) 18, NM 14, 9X5s AV (415) 21-22 and WM 18, the stars for rare non-s.s.b.ers.

15 Novice action intensifies. WNs 2UIY 2UVD 5NTT 68AZ and 7FLR gobble up CMIAR (100) 23-0, GOS 2EJ 6AH, CXIJM (100) 1-2, FGXT (115) 20-21, FO8BJ (126) 0-1, Gs 5JYP 6AH, HA1SD, HR1s JAP (140) 20-21, SAP, I1Z, JAs 1IDV 1LPZ (129) 20-21, 1PLF IRKW 6BZI 7BMT 7CDU 7CDV 9BDY, K0RAX/KL7 on Shemya, KA2DJ, KH6s FQY FST, KL7s AIZ FPX, KX6BQ (102) 0, KZ5s CBN EX (115) 22-23, IKN (120) 22-23, OWN (130) 23-0, LUs 5OI (101) 23-0, 8OI, PYS ICGU ICLG 2BBO (115) 21-22, 2BVL 2PU (120) 22-23, 2SO, 5ASN 5AUC (131) 23-0, 5M1BNX, SP3AJ, VKs 2EW 3ABA 3APJ, VR2DK (126) 0-1, NEs 1AAG 1ZY 3HN, YVs 2HO/1 5BOA, WB3PXX/VP9, WP4CPG (120) 22-23, WV4EY, ZD8WK, ZLs 2R0 3FX 3JO and 6Y5JB.

40 Novice doings in the DX line are the snappiest in months. WNs 2UVD 68AZ and 7FLR ducked those SWBC slopbuckets to the tune of KH6s BRA FQY (172) 8-9, FRI (170) 4, KL7FJK (170) 5, KP4AQL (164) 10-11, KS4CC (161) 8-9, WH6s FQW (171) 7-8, FST (171) 7-8, GAE (174) 8-9, GBC (178) 10-11, GBQ (171) 8-11, WL7s FNV (172) 10-11, FOT (160) 7-8, FPG (176) 8-9, FPX (155) 7-8, WN7FHZ/KL7 (170) 5, WP4COZ (167), XE2s COS LF (181) 21-22, LLP (170) 19-20, PYW and, last but hardly least, VK3APN (175) 7-10.

40 c.w. sport among five-year licensees takes the upbeat again. W7AYC, Ks 1ZJA 3FKU, WAs 8GGN 0FRM, WBs 2LDX 2TGA 6NXX and s.w.l. C. Durnavich listing the presence of CE0AC (10) 7, CO2BB (5) 4, CR6EI (10) 5-6, DM2ANG, EA8EY (7) 7, HAKYV (4), HI7NRC (20) 5, HI9DL (4) 5-6, HEs 3ASJ (5) 6, 1EX (5) 6, HR5LB (11) 6, ITIAGA, KL7EWY (100) 2, LUIS HDZ (11) 6, ZG, LZ2s AW (31), KHN, OA4VE (2) 11, OH1XX, OKs 1NB (8) 3, 3CEG (1), PYS 1NEW 7AEW, SP5XA (10) 3, UF6LA (20) 4, UL7s AP (10) 5, MD (5) 22, UT5PX, VKs 78M (14) 8, 9GC (W) 10-11, 9SAI (100) 6, VPs 5FI (2) 3, 6AK (12) 20, 7EA (14) 6, 9BP (4) 7, 9BP (20) 8, 9WB (30) 7, VR2DK (14) 8, XE2TW (170) 22, YO6AW, YS2OB, YV2AH, ZB2AR/mm (20) 2, ZDs 7IP (5) 8, 8J (14) 8, ZL2BW (14) 7, ZS5AAC (10) 6, 5R8AL (6) 11, 9G1FY (6) 0, 9Y4s AR 8 and LT 7. On 10 phone WAsGGN and friends account for GM3RFR 12, H8XAL, KH6FQG, KJ6HZ (20) 4, PY4ND (15) 22, Vks 2AVA (40) 21, 21D 2UG 3AVA, UW9AF (45) 22, ZLs 2WX 3RV and 9M2DW, all monosidebanders.

80 c.w. starts the season conservatively, feeding GO2BO, GM3TNT, DL1RK, VR4ED, ZL4LE and 6Y5BB to K1ZJA and WASMCO. H8SLC 23, YV5s BFJ and BT5 hold the fort on 75 phone. Retreating static levels should reveal plenty of sideband DX ready for another bang-up season just off the low edge of our U.S. phone segment.

160 is a big question mark at this stage of the solar cycle but WIBB and I.8-Mc. associates are optimistic. Stew says, "Conditions probably won't be as good as last year but there should be some excellent DX worked. Remember, there was DX on 160 during the last sunspot maximum!" WIBB underscores this opinion by reporting contact with the 000-watter of CX3BII in June



VP2AC's 521 contacts in the '66 ARRL DX Contest won him the Anguilla radiotelephone championship. Gerald is a writer-photog for the Antigua Star when not busy chasing rare ones. (Photo via W1YYM)

BJ (80), J (82) 21, RH SKI (40) 18, WY (20) 22, ZEs 1AA 1AS (45) 17-18, 8JV (50) 9, ZLs 11Z IRK 31s (15) 4UHTU 16, 4X4s HK NWP, 5H3JJ (45) 12, 5Z4JD (100) 20, 6O6BV (30) 20, 6Y5BB (80) 22, 7O7LG (50) 15-16, 7X2WV (18) 16, 9G1s FQ FY, 9H1AL (60) 19, 9J2s GJ (45) 19, IE (90) 18, JC 16, WR (85) 18, 9LITL, 9Q5s JR (40) 16, LJ (30) 14-17, LP (50) 18, QR (50) 21, 9V1s LK (72) 13, LP (150) 18, MIT (11) 17, MX (30) 19, NT and 9Y4VU.

15 phone is almost S.R.O. again. Ws 2DY 8YGR, K1ZJA, WAs 4QBX 4WIP 4YDR 6DVV 8GGN 8MGD 0KYB, WBs 2LBJ 2LDX 6KIL 6NXX and listener P. Kilroy huddling with CEs LDD 6EZ (410), CO7JB* 20, CNSFR (350), CPs 1AG (405), 1EG 1FK 1EN 18, 1EO (410) 4, 8AB 0, 8BC (358), GRs 5CA (115) 10, 6BX (345) 17, 6H6 (350) 12-17, 7GF (375) 14, CTIs (E)* 0, JJ (350) 18, KT (375) 18, CXs 1BS 0, 2AAW (395) 0, SAAW (410), DU1s AP 11-12, FR 14, EP2BQ 15-17,

for what looks like the U.S.A.-Uruguay topband first. Eastern W/K/VE/VOs worked Europe sporadically through midsummer on 1.8 Mc., so keep those long-wires taut, OMs.

No space for 20 this month but next "How's" we'll check 14-Mc. DX developments described by (phone) Ws 1BGD 2DY 3HNK 3LE 8QXQ 8YGR. K1ZJA, WAs 3GGV 4QBX 4YDR 6BSO/1 8GGN, WBS 2LDX 2UFN 4AYD and Mr. Kilroy, (c.w.) Ws 1APU 1BGD 1CNU 3HNK 8QXQ 8YGR, Ks 1ZJA 5VTA 8OQL 8DEQ, WAs 1CYT 3GGV 4YDR 5EQA 6BSO/1 6SLU 7BOA 7BOB 8GGN 9MQI 9NXH, WBS 2LDX 2NLH 2UHZ 4AYD 6MTB 6NXX, VE2DCW and tuner R. Wilcox, plus additional correspondents still due to report Jeevesward. Your turn to feed kitty?

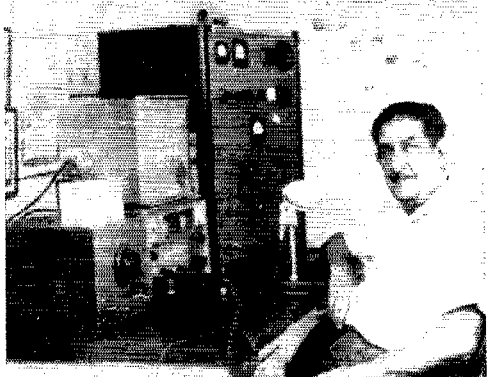
Where:

EUROPE — W3LE, LA5HE and VERON'S DXpress point out prefix changes in Norway's farflung outposts. LA/p stations on Jan Alayen becomes JXs, suffixes remaining the same. Recent activities include JXs 2IK 4WH 5AK 5CI and 6XF. Spitzbergen takes the JW label, so former LA3NI now is JW3NI. Norwegian antarctic possessions, Bouvet isle, etc., adopt the 3Y prefix — W3LE also notes that those ONSU-signals come from Yanks in Belgium — W2GHIK, in the Long Island DX Association organ, reports that DXpedition of the Month QSLing for DJ6QT/LX. LA1EE/p and 3A0EB got under way in August. — DL5LN supplies a revised Yanks-in-Germany bureau address: DL4/DL5 QSL Bureau, % MARS Radio Sta., Hq. 93rd Sig. Bn., APO, New York, N.Y., 08175 — FRA's OY7AIL says OYs 2G 3BB and 7U are not legit. New OYs include 2YL 3H 7J 8YL and 9IM, the YLs being just that — DL7FT's Balearics EA6AR QSOs other dates should be confirmed through the regular licensee — SVIBA complains about unauthorized use of his call and other pirate activity over Athens way.

HEREABOUTS — All hail our QSLers of the Month: CN8FF, CR6DX, C7ILL, CXs 1JM 2CN, EA8EN, FG7XX, FP8CK, FY7YG, Gs 30IZ 6KQ, GCs 5ACH/W6KG 8HT, GD5ACH/W6KG, HA5DQ, HC8FN, H8WSR, HK3RQ, HI9TH, HM56G, ITIAGA, KG6s AIG IF IJ, KS4CC, OD5EE, ON5DS, PY5ASN, SV8s WF WU, UA0LS, UW0s 1K 1X, VE1AS/1, VKs 2PX 3AXK 3TL 6RS 9CJ, VP8 1LP 2KJ 2LS, VQ8AX, VRs 2BR 4CR 6TC, W5VWU/KS6, WA4EJU/KSA, XE1FFU, XW8AZ, YU1NH, ZL2AWT, 5A3TX, 5H3JR, 5N2AA, 5W1AZ, 9G1FU, 9H1AK and 9Y4LT, as well as QSL aides Ws 2CTN 2SNM 3KT 4ECI 4TAJ 6KTE 6UNP and WA4KXC, all nominated by "How's" reporters Ws 1CSP 4VZD 8QXQ 8YGR, Ks 1AFC 1ZJA 9WDY, WAs 2HIU 4QBX 4YDR 7BOA 7BOB 8GGN 8NXH, WBS 2NLH and 6NXX for outstanding QSL promptitude. Anyone omitted from this accolade? — Epl DL7FT needs assistance toward QSLs from CR9AI, VP6s GT HR, VQ8BS; W4WRG hunts hints on EL8X, FK8AT, LU8DQ, VP6BW, ZB2BB, ZD8AR; W8CQU is stumped over CR3AD, 62ZZZ; W8QQU needs nudging on CE3RE '55, 5A2TZ '58; and K8OQL will settle for scoop on VP8CQ and ZD8SH pasteborders. Any word on these birds? — W3HNK and WB2LDX offer QSL managerial assistance to any overseas DXer(s) in bona-fide need of such help — "Those wishing QSLs for QSOs with OX5BA on July 12-17, 1966, should apply to my home address," advises K4HAV. "Unless s.a.s.e. — self-addressed envelopes with stamps — are supplied I'll QSL via bureaus." — "QSLs for HH9DL QSOs made by visitors Ws LUZ and LXU on July 7-10, 1966, should be sent to P.O. Box 13, Dayton, Ohio, 45359," declare W8LUZ and WAsCGN — WA9HFU has some back-issue *Callbooks* he'd like to deliver to overseas stations yearning for same. Any candidates? — XE1NE-XE1PNE points out that when a Mexican amateur changes QTH his mail is not automatically forwarded. This is rough on DXers at both ends.

ASIA — "I have the logs for BV1USA and will soon have those of BV1USF," notifies K7KPAI. "I've made arrangements to continue receiving mail at [the address in the listings to follow] until I leave Taiwan, probably next March. After that I will have to ship the records to someone in the States. Self-addressed stamped envelopes are appreciated." — "Finally got some QSLs to take care of my 600-QSO backlog," cheers KA7AB, mailing out the first 450. — WB2MFX learns, "As of mid-July NP4BBU was some 2000 cards behind but Alec says he does intend to QSL 100 per cent. Says he just spends too much time on the air." Don't knock off, OC — perhaps some W/K/VE could help solve that pasteborder problem.

AFRICA — "I'm QSL manager for ZD8SKI for QSOs after May 23, 1966," states WAsKGW. "For earlier contacts cards should be sent to Al Klapezky, RCA/MTF, Ascension Island, Box 4036, Patrick AFB, Fla., 32925, s.a.s.e. required for direct reply." — K6CYG says



COBRA, assisted by a fellow DX bug, worked 552 W/K/VE/VO radiophones in ARRL's 1966 DX Competition. Rod, licensed since 1935, uses a homespun 140-watt and HQ-110 in Santiago. (Photo via W1YYM)

QSLs for CT3AR and 3A0DX work by WB6CIY were to hit the mails by mid-September. — LIDXA's DX Bulletin has it that printshop delay held up FB8ZZ QSLs via manager FR7ZD, also that W1BPM holds logs for TLESW's TT8 travels.

OCEANIA — VK6MI's QSL tender, G. Johnston, 3 Inglis St., Newton, Hobart, Tasmania, writes W1WPO of ARRL's DXCC Desk: "To keep things moving here we usually hold outbound cards only for a month or so after QSOs, replying direct to the month elapses the remainder, usually a hundred or so, go out via the bureaus route, QSLing is 100 per cent for sure. Col's successor on Macquarie, due in December, may retain the VK6MI call and I may continue as QSL manager." — K3SWW/KG6 now QSLs stateside stations only on receipt of their cards, s.a.s.e. appreciated. Conrad regrets this policy became necessary in financial self-defense after he passed the 4000-QSL mark. He urges W/K/VEs to keep self-addressed stamped envelopes on file with their local ARRL QSL Managers — ZL2AON, formerly VR2EL, records, "I operated from Tarawa atoll, Gilbert & Ellice group, as VR1L on June 3-8, 1964. All QSLs received have been answered but there are about 250 on hand waiting to be claimed. I'd like to clear my files — s.a.s.e. appreciated." — "Due to my transfer to Honolulu, the Wake Islands QSL bureau is taken over by KW6EJ," declares KH6COY via W1ECH.

SOUTH AMERICA — 9Y4LT tells W1ECH, "Cards S for all 9Ys/VPs will be accepted at my address." Les's latest QTH appears in the rundown upcoming. — W1LVQ learns that the LU2CN-LU6GN Gang handles QSLing for LUs ZA, So. Orkneys, and ZC, Decoction isle, dispatching via bureaus in the absence of IRcs — FG7XL will be back at the task of handling FY7YL's QSLs this month after a vacation in France. The Tendrons write W1WPO, "This will not be an easy job because records are damaged, FG7XL QSLing also was delayed by our homeland visit." — Here we go with the month's itemized suggestions, cautioning that the specifications are necessarily neither "official", complete nor accurate. . . .

ex-BV1s USA USEF, H. Epley (K7KPM), % Taiwan A.R.C., Box 8, USARSCAT, APO, San Francisco, Calif., 96263

GT3AR (via K6CYG)
DJ0PC (to K8ITH)
DL4BF (via WA4WKL)
EA8FE, A. Jimenez, Box 800, Las Palmas, Canary Islands
EL2AT (via W4NJF)
F0BU (to HB9UD)
F0CH/FC (via HB9TL)
FK8AC, F. Franchette, Box 104, Noumea, New Caledonia
FY7YM, P.O. Box 63, Laurent, French Guiana
G3OIZ (via WA4KXC)
G3TYL/W9, D. Kerstake, RR.5, Oriole Dr., Melody Acres, Warsaw, Ind., 46580
GC3s POI/p SHZ/p (via W2CTN)
GM3FZW/m (to G3FZW)
GW3DZJ (via W3HNK)
HB6AGH (to HB9AGH)
HB9UP (to HB9UP)
HB9XC/m (via DL4/DL5 QSL Bureau; see preceding text)
HC1CV, A. Cajajo, P.O. Box 289, Quito, Ecuador

IH9DL (see preceding text)
 HL1NM/mm/FR8-W6NMC/mm (via K1N1ZU)
 ILARI/MI (via ILZJG)
 IIAV/MI (to IIAV)
 IIGRO/MI (to QN5GA)
 IDIIDA (via I18MIN)
 IP1a GSG GAI (to I1CSG, ITIGAD)
 JX5HE (to LA5HE; see preceding text)
 K3SBF/KP4 (via WA4WKL)
 K7NKN/KM6, Dr. C. Bruch, Box 15, USNAVSTA, FPO,
 San Francisco, Calif., 96640
 KA8HC, Box 120, APO, San Francisco, Calif., 96519
 KC6CK, Koror, Palau, W.C.I., 96910
 KG6QA, P.O. Box 445, Agaña, Guam
 KH6GH/KW6, Y. Arakaki, Box 365, Wake Islands
 KJ6DB (via KH6EOQ)
 LA1EE/p (via W3GHEK)
 LU1HDZ, L. Tosiani, Box 574, Cordoba, Argentina
 LU1s ZA ZC (see preceding text)
 LU5HG, CC-17, Villa Dolores, Cordoba, Argentina
 LX3NF (to DL9NF)
 MP4BEU, A. Cairncross, P.O. Box 138, Bahrain, Bahrain
 Islands (or via R5GB)
 MP4BGA (via VE1AKZ)
 OK4BI/mm (via CAV, attn. OK1BD)
 OX5BA (to K4HAV; see preceding text)
 PA6AA (via VERON)
 PA9CU (to P1PCU)
 PA6COE (via W3HNK)
 PX1s IE JS (to F9s IE JS)
 PY3BTO, R. Sayago, 60 Andradas St., Livramento, RS,
 Brazil
 PY0XA (via W4ECD)
 ST2BSD, P.O. Box 303, Khartoum, Sudan
 TI1s 2RO 8BJH/2 (via W14KXC)
 UA9OH, V. Simonov, Box 183, Novosibirsk, U.S.S.R.
 VE8NO (via WA4KXC)
 VK8HA, H. Andersson, P.O. Box 1418, Darwin, Australia
 VK9JK, Fr. J. Knoebel, Fatima College, Banz, W.H.D.,
 P.N.G.
 ex-VR1L-VR2EL, Sgt. Harding, AGF (ZL2AON), %
 Sgts. Mess, RNZAF Base, Ohakea, N. Z.
 VR1S, P. Dunbar, P.O. Box 288, General P.O., Suva, Fiji
 VR2DK (via W2CTN)
 W5VWU/KS6 (via W5HJ)
 W8DGP/KL7, E. Cunningham, % Gen. Elec. Co., APO,
 Seattle, Wash., 98736
 W9OQR/MI (to W9OQR)
 WA1GIV/OA4 (via W1MD)
 XE1AAG, A. Melcarejo, Box 518, Vera Cruz, Ver., Mexico
 XE1EEI, R. Corcuera, Box 197, Guadalajara, Jal., Mexico
 XE1s NE PNE, A Calleja, P.O. Box 2807, Mexico 1, D.F.,
 Mexico
 XE3PI, P.O. Box 329, Merida, Yuc., Mexico
 YA1DAN, E. Daniel, USAID, APO, New York, N. Y.,
 09668
 YS1HKE, Box 726, San Salvador, El Salvador
 YS1VST, P.O. Box 585, San Salvador, El Salvador
 YS2DJE, Rev. D. McLeod, M. M., Aptido, 173, Santa
 Ana, El Salvador
 YS2JS, J. Guerra, Box 125, Santa Ana, El Salvador
 YV5BJ (via WA4KXC)
 YV5BZJ/6, Box 73, Puerto Ordaz, Venezuela
 ZB2AX, Yasme Foundation, P.O. Box 2025, Castro Valley,
 Calif.
 ZD8CNQ (via K8CNQ)
 ZD8SKI (via WA5KGW; see preceding text)



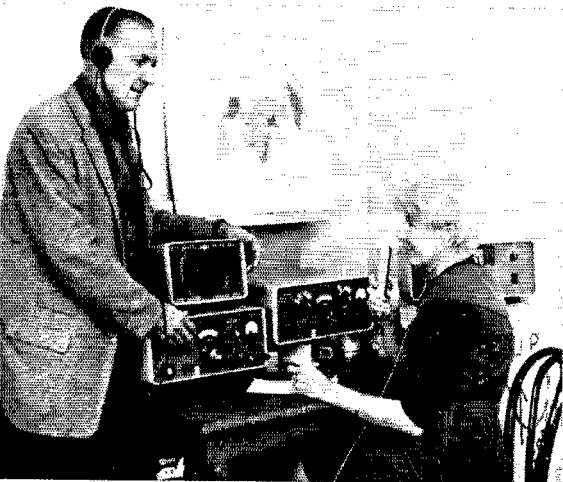
4X4HT/p, operated in one of Israel's rarer biblical re-
 gions, was a springtime DXcuriatory enterprise by (left
 to right) 4X4s MZ on 7 Mc., MT on 144 Mc., and SK on
 3.5 Mc. The area, ancient site of the Macedonian city of
 Marissa (now Tel Mareash), is not only bleak and weather-
 beaten but is frequented by extremely unfriendly tribes.
 (Photo via W2IWP)

ZF1GG (via VE4DQ)
 3A0DX (via K6CYC)
 3A0EB (via W2GHEK)
 4X4XL (to K8TTH)
 5A3TP, D. Hutchin, 58th Air Rescue Sqdn., Box 213,
 APO, New York, N. Y., 03231
 ex-5As 3TK 5TR (via W3HNK)
 6Y5GH, Box 100, Kingston 10, Jamaica
 6Y5VV, 2c Highland Dr., Kingston 8, Jamaica
 7X0AI (via ARA)
 9O5RH, APO, New York, N. Y., 09662
 9X5SA, A. Staley, B.P. 28, Kigali, Rwanda
 9X5WM, Box 302, Kigali, Rwanda
 9Y4LT, L. Thomas, Los-Iros Rd., Erin, So., Trinidad,
 W. I.
 The preceding is offered by donors WS 1APU 1BGD 1CNU
 1GSP 1ECH 1LVQ 1MD 1WPO 1YYM 2APIH 2DY
 3LE 7UVR 8QKQ, Ks 5VTA 8DEQ, Was 1CYT 2YBR
 4QBX 4YDR 6BSO/1 6DVV 7BOA 7BOB 8GGN, WBS
 2MFX 2NLII 2UFV 6NXX, WN7FLR, P. Kilroy, Colum-
 bus Amateur Radio Association *CARAscope* (W8ZCQ),
 IARC's *DX-MB* (DLs IEP 3RK), DX Club of Puerto
 Rico *D Ver* (KP4RK), Far East Auxiliary Radio League
News (KA2LL), Florida DX Club *DX Report* (W4MVB),
 FRA *Frontier Radio Amatur* (OYTAL), Japan DX
 Radio Club *Bulletin* (JA1DM), Long Island DX Associa-
 tion *DX Bulletin* (WB2LXD), Newark News Radio Club
Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N. Y.),
 North Eastern DX Association *DX Bulletin* (K1IMP),
 Northern California DX Club *D Ver* (Box 608, Menlo
 Park, Calif., 94025) and VERON's *D Xpress* (PA6s FX
 LOU TO VDV WWP). Good goin', gang!

Whence:

ASIA — ARSI (India) and RSC (Ceylon) invite your par-
 ticipation in the 3rd VU2/487 DX Contest to be held
 (c.w.) from 0600 GMT October 15th to 0600 the 16th,
 and (phone) October 29th-30th, same times. The cus-
 tomary RS- or RST001, RST002, etc., serials will be ex-
 changed, everybody working everybody. Non-VU2/487s
 earn 2 points for each QSO with a VU2/487 per band, 1
 point per contact per band with stations in the rest of
 the world. Logs showing date, GMT, calls of stations worked,
 band, serials swapped (separate tabulations for each band)
 accompanied by a summary sheet indicating your own call,
 name, address, equipment description, total score and a
 signed declaration that rules and regulations were observed,
 must be mailed no later than November 30, 1966, to ARSI
 Contest Committee, P.O. Box 531, New Delhi 1, India,
 to qualify for possible certification of meritorious perfor-
 mance. Single-band categories will also be acknowledged.

W6KG and WB6QEP, those revolv' Colvins, now follow
 Pacific and European DXpeditionary stops with a DXten-
 sive African tour. In the past year Lloyd and Iris, under
 Yasme Foundation auspices, have scored more than 30,000
 QSOs as KG6SZ, KC6SZ, KG6SZ/KC6, W6KG/KG6,
 KX6SZ, VR1Z, GD5ACH/W6KG, GD5ACI/WB6QEP,
 GC5ACH/W6KG, GC5ACI/WB6QEP and ZB2AX.
 (Photo by M. Kelly via G2DC)



Good long-haulin'! "The Chinese (Taiwan) government has prohibited amateur operation by foreign nationals," notifies K7KPM on the scene. "This includes Americans, so BV1US-stations are now nonexistent." Temporarily, we hope W0MIX's newest transworld tour included reciprocal operation as EP2BF/W0MIX plus visits with EP3AM, JA1s CO YL and other prominent Asian amateurs WA6SBO/ says Kabul's YA1JG is hard to hear on 20 sideband due to antenna difficulties W3LE ran into ex-JT1s AA and YL at the Czech embassy in Washington. They're OK's KW and KX back home ARRL's W1YYM credits UA9OH with naming his new son in the ham tradition; Maxim Oriental addenda via aforementioned clubs and groups; MP4TBO may be back from his U.K. furlough by now. FEARL hears that YLs run about one in ten among Russia's 15,000 amateurs. JAs now can run up to 500 watts of c.w. on 1907.5-1912.5 kc., an extension of their old 160-meter spot frequency allocation.

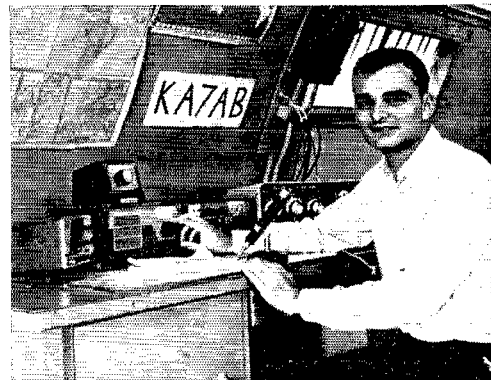
AFRICA — W6NMC, one of amateur radio's original DX-peditionary wanderers, joins the trek to Africa. WA8GGN finds Myron warming up as 9L1NML/TR8 with intentions of hitting more rare regions out that way CR0CK tells K8OQL he hunts North Americans on 14,004 kc. at 2030-2330 GMT 9X5SA's KW1-2 and dipole pep up the low c.w. edge of 20 around 2000 GMT. His antenna is only ten feet high but that 9X5 pretx means an automatic 45 db. of usable gain K6CYG says WB6CIY collected 1827 QSOs as CT3AR in July, followed by 1421 contacts as 3A0DX ZD8SKI haunts 21,375 kc. or so at 2000-2400 GMT but WA5KGW says Ski's work schedule makes for irregular on-the-air days CR6s GO and GQ feel that VK2ADY/VK0 (W9WNV) paid insufficient attention to Africa's DXers from Heard. Sure is hard to satisfy everybody Ex-5A3TX visited W3HMK in July and now signs W3-YL/4 at Langley APB African oddments courtesy the clubs press; G5AAM/WA6ZIQ may hit the Azores and/or Madeira shortly. W4BPD hints at an early Indian Ocean encore. CR7GF and VQ9HB likewise. VQ9s BC and TC intend more island-hoppin' thereabouts, too.

OCEANIA notes via VK9JK (K3SSA): "Plenty of New Guinea activity on 20 s.s.b. by VK9s AG BW GN GW JK MK and NT. VK9LF uses straight a.m. and VK9TG may be back early next year. Some 40-meter activity Sunday mornings but I'm busy at that time. There soon should be more New Guinea stations active. VK9s BM and BN will help DJ dispense Papua QSOs. VK9s DR and XI continue very active on Christmas isle. VK9RH is heard occasionally from Norfolk island but Cocos-Keeling and Nauru are quiet." W9GTA, in Indonesia, was licensed as W9GTA/8F4 for European QSOs in August, a healthy DX sign, indeed W3LE understands that PWR8C will leave Wallis by late January KB6s CY and CZ keep Canton comin'. The former likes c.w. while the latter fires s.s.b. on 20, 15 and 10 meters. KB6CZ also gives 21-Mc. Novices a c.w. treat at 0300-0430 GMT now and then 9M8RS reports, "Little activity from Sarawak in general but I'm frequently available at 1200-1400 GMT on 14,010-14,060-ke. c.w. or 14,180-14,220-ke. single-sideband with an SB-100 driving homebrew grounded-grid 813s, an 888A receiver and ground-plane." VE3DU tells W1BDI of Hq. that London (Ont.) A.R.C.'s summer auction resulted in an HR-160 being shipped to 9M8RY of Kuching. Ex-9M8EB helped carry the ball on this play ZL2AON says W/Ks still roll into New Zealand on 75-meter sideband. Watch for George's replies at 0500-0800 GMT off the low edge K3SWW/KG6, noting much improved 14-Mc. conditions Statesward, still seeks Vt. and Wyo. on s.s.b. and/or c.w. U.S. Sixes really thunder into Macquarie island, according to VK0MIL. High-pressure VK0-hunters hold down Col's own DXCC total but that's the price of being rare WA8GGN finds ex-KR6AIM about to turn on W3HEO/9 in Ft. Leavenworth Don't forget NZART's gale VK/ZL-Oceania DX Test on the first two week ends of this month as detailed last QST.

EUROPE — Italian hams, apparently seized with DX-peditionary fevers, swarm all over the Adriatic. ID1IDA, for example, was operated by the Radio Club of Ravenna atop an offshore oil tower in late June for 1200 QSOs on 3.5 through 432 Mc., c.w., a.m. and s.s.b. Regarding our June reciprocity salute, G3TYL/W9 points out that G18XX/W2 couldn't work G18XX under present British rules because the licensee has to be at the home station when it's on the air. (Quick, Jeeves, think of something.) [Okay, Boss — Mrs. McFavish becomes G18XYL. — Jeeves] Mr. V. Terehov, 14B, Apt. 25, Enthusiasts St., Chelyabinsk 22, U.S.S.R., desires correspondence with a fellow radio engineer on our side of the curtain. You'll have to read Russian, though, at least to start with October 22nd-23rd will be Wales Activity Week End, according to GW3DZJ and K1Y2W. GW sidewinders are to congregate on 14,120, 14,230, 21,390, 21,420 and 28,550 kc., QSLs guaranteed Reminder: There's

the International OK DX Contest slated for the 13th of next month, a c.w.-only affair, specs due in November QST WB2JWB says DM2CZL, QRT for completion of army service, is eager to get back to his newly homebrewed triband s.s.b. transceiver. Sig formerly signed DM1-YPL G3s POI SHZ and colleagues lugged a large layout to the Channels for DX-peditionary work as G3Cs POI/p and SHZ/p in August and September. QSOs from 1.8 through 1296 Mc. were planned, according to WA2YBR WA2HIU says a Warren county contact would give ITLGA Worked All New Jersey credentials. Gius scans 7- through 28-Mc. c.w. ranges at 1300-1600 and 2200-0200 GMT PA6AA was an August outing installation fostered by Holland's VB6RON Cheek with I1PEG for data on a Carta MORGANA certification sponsored by Reggio (Calabria) 11s.

HEREABOUTS — Ks ZLRE 3GAT 50Z1, WAs 2NPV and 4KJR help keep the Voice of Adak. KL7AIZ, loud and clear in the foggy Aleutians. Club prez K2LRE writes, "KL7AIZ has been club station of the U.S. Naval Communication Station since 1951. Amateur radio is extremely important to morale up here where there is no civilian population and plenty of bad weather." KL7AIZ's prime activity, of course, is traffic work on 20 phone Old "How's" hand W8QXQ makes a DX comeback after a nine-year layoff split between college and Navy duties Our Gripe of the Month comes from WA8GGN who suggests fifty jabs of the Wouff Hong for the DXer who calls stations or CQs 20 or 30 times, signs his own call twice or thrice, listens for a few seconds, then starts all over. Yeesh! K9WDY hears it's awfully easy to slip into the CQ-DX habit so he's offering a ten-buck reward to anyone who ever catches him at it. That should do it WA6SLU, while refueling with K6s TBW and YZd at a local Chinese-style eatery, dug this tip



KA7AB, in this year's ARRL DX Test, turned in the second highest phone score among Yanks in Japan. You'll find John equally adept at c.w., especially favoring 20 and 15 meters. (Photo via W1YYM)

out of his fortune cookie: "A message from a distance is soon to be received." George wonders if this clinches his VS5JC QSL. [For you, Boss, it would be a pinkie from Grand Island. — Jeeves]. (You're terribly yakky this month, Jeeves.) W9NN bounces back from vacation travels eager to swell his 40-meter countries total, now a substantial 231 There's an almost unused NCX-5, NCL-2000 and Telrex beam at Camp TBA, near Greenland's Thule APB, ready to go as OX5BA. K4HAV dropped in and ran off a flock of 14-Mc. c.w. and s.s.b. QSOs in mid-July, receiving many "First OX!" comments Now localisms, more or less, via the club grapevine: W9WNV and K1IMP rooked St. Peter and Paul as PV0XA in August with other rare stops in store. Don's Heard appearance in July as VK2ADY/VK0 capped up the NCLXC meeting in San Bruno. Took only seconds to read the minutes. VP8s AA and HY, So. Georgia, and IQ, Falklands, keep the 20-c.w. gang gasping. W4MYB, in Florida DX Club's *DY Report*, re-emphasizes that DX-peditioners should be sure that their operating permission comes from proper authorities (see p. 9, June '66 QST) Ex-CO2QH, now signs WB4DLA. W8ZCQ resumes duties as DX columnist aboard Columbus A.R.A.'s *CARscope*. Watch for Northern California DX Club's W6TI radiating DX bulletins on 14,002 kc. at 1600 GMT Sundays, 0100 Mondays. W6RGG as emcee, NCDXC's top DX hounds in order: W6s AM GFB CY V KEV LDD HOC BSY, K6VVA, W6s UJ and WX; on phone it's W6s AM LCF, K6s VVA EYR, W6s BSY UMI WX VUW, K6s OHJ and DXM.



CONDUCTED BY SAM HARRIS,* W1FZJ

VK3ATN-K6MYC Moonbounce

RAY, VK3ATN, reports the August moon-bounce skeds with K6MYC were almost a duplicate of the July efforts. Signals from K6MYC were slightly down on the average although the peaks were somewhat higher. No reception by K6MYC so far. In an effort to facilitate finding his signals, VK3ATN will in the future answer on the frequency where he hears signals. For example, if (when) he hears K6MYC he will zero beat the frequency he is receiving the signals on. This will, of course, be Mike's original frequency plus the doppler shift. (With the moon rising and only 4 degrees above the horizon, the doppler shift would be around 400 cycles at VK3ATN's end of the path.)

VK3ATN's signals as received by K6MYC will be coming from a "leaving" moon and will be shifted down in frequency. This narrows the searching area down to less than a 200 cycle slice just above the original transmitting frequency, which is available for calibration purposes. Hopefully this technique will produce results during the September 7 to 11 schedules and future tests.

Overseas V.H.F.

It has been a good month for us in that we have received a number of reports from DX stations concerning their rigs and activities. Hiroshi Kato, JA4AKL writes: "I am running very small transmitter on 50 Mc. because of TVI. The final is a 6BA6 running 2.5 watts with output about 1 watt. Antenna is 8-meters high folded dipole. We experience E skip around 1100 to 1200 JST, 1700 to 1800 JST and 2300 JST. When Sporadic-E layer conditions are good we can work many distant stations in JA. JA1s and JA0s are about 600 kilometers from Kuse Town and I worked 24 of them during June. In 1962 I worked JASRY (1200 kilometers) with this same rig on a.m." Many thanks OM for the fine report.

JA4AKL also tells us that many mobile stations are active on 51-Mc. f.m. and 144.48-Mc. f.m. both frequencies being JA net frequencies. JA4YAM, a club station is operating 435-Mc. TV and is Japan's first amateur-TV station. V.h.f. records in Japan stand as follows:

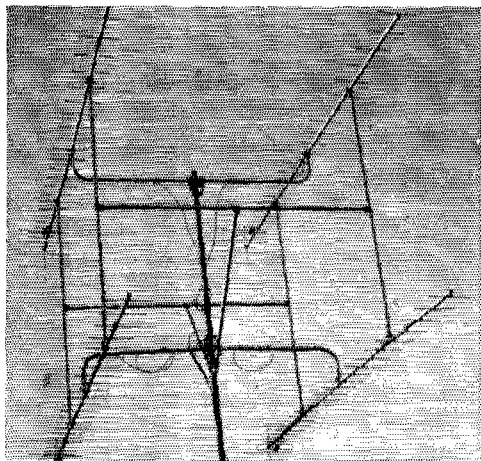
50 Mc. JA6FR to PY3BW 1958-3-23 19810 kilometers

144 Mc. JA2QY/2 to JA5YAW/5 1962-9-2 463 kilometers

435 Mc. JA1DGF to JA1FEE 1966-5-8 52 kilometers

A report from SV1AB in Greece relates that he began meteor-scatter work on 144 Mc. in August of 1965 running 120 watts in and a 13-element Yagi. Contacts were made with OK2WCG, HG2RD, DM2BEL, UP2ON and UA1DZ (2520 km.). In

* P.O. Box 1738, Arecibo, Puerto Rico 00613



This 96-element array on 432.6 Mc. is operated by EI2W at his QTH, Sandford Co., Dublin. Harry also operates on two meters and holds the present European record on this band with a 1387-mile QSO with the University of Belgrade amateur radio station, YU1EXY. EI2W worked 37 States during the 1957-58 openings on 50 Mc.

January 1966 he raised power to 650 watts and has since worked OE6AP and SP2RO. Future projects are 432-Mc. moonbounce, with a 16-foot dish, polar mount and a pair of 4X250Bs which he hopes to have on the air by the end of the summer.

ZB2VHF writes that he is operating 144 Mc. from the top of Gibraltar (1400 feet above sea level!) using a Heath HW20, 10 watts into a J-beam 8 X 8 slot. He is definitely on the air on Tuesday and Friday evenings from 2000 to 2300Z and other evenings when v.h.f. conditions are good. Frequency is 144.091 Mc. on a.m. or c.w. When not in QSO the beam will be north and the auto keyer will be on c.w. calling "CQ de ZB2VHF", transmitting the 2nd, 4th and 6th ten-minute intervals after the hour and listening the 1st, 3rd and 5th ten-minute intervals. Skeds are welcome. Al is also licensed to work 50 and 70 Mc. To date stations worked on 144 Mc. from ZB2VHF include three in Spain, one in Portugal and six in Morocco. A final note from Al sez that he is listening on 14.1 Mc. for ZB2AP calls and hopes to make v.h.f. skeds via that band.

Word received from HG2RD tells us that he has worked 18 countries in Europe on 144 Mc. and would like to work some American stations via moonbounce. Transmitter runs 1.5-kw. input; receiver is a parametric amplifier and 417A converter and antenna is an 11-element quad Yagi. Anyone interested in 144-Mc. moonbounce skeds with Andy should write Andrew Koroknay, P.O. Box 147, Veszprem, Hungary.

From Brazil, PY2CSS writes that he is an engineering student and operates 50.1 Mc. with 50 watts and a 4-element Yagi. "The 432-Mc. antenna is

2 × 16 elements with reflector, receptor uses 3-6AM4RF, 6C4—intermediate frequencies, and two 6J6 oscillators." Ricardo also runs 400 watts input on 144 Mc. and is interested in moonbounce work.

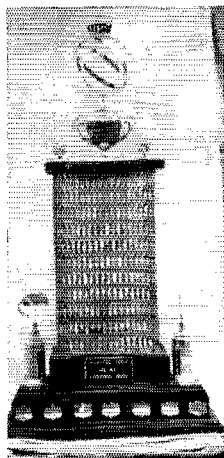
The following is from a letter written by KL7FAV to W5WAX: "The gear here on 50 Mc. consists of a homebrew transmitter, circa 1956 ARRL *Handbook*, modified to pi output. This uses 2-5763s and a 6146 in the final, running 630 volts and 210 ma. The receiver consists of an RME VF-152-A converter into a 7 Mc. ARC 5. The beam is 6 elements about 24 feet long and it sure works. It is only 15 feet high and is right down in the big trees. I'm the only one in Ketchikan on six meters and stick to c.w. on that band. I operate on 146.76-Mc. f.m. most of the time."

Syracuse V.H.F. Roundup

Don't miss it! For chills, thrills and excitement you just can't miss the v.h.f. "Do" of the year at Syracuse, New York on October 8. The chills appear when you start talking about those large antennas you are going to build out in the snow this winter. The thrills make their appearance when you discover the things that have happened and those yet to come on the v.h.f. bands, as recounted by W1HDQ, W2IMU and W3SDZ. The excitement shows up just as soon as the first two v.h.f.ers make their appearance on the scene.

Ontario 420-Mc. Trophy

To stimulate interest in 420-Mc. work in the Province of Ontario, VE3MR has provided a handsome trophy to be awarded to the high-scoring 420-Mc. operator in Ontario, in each of the three ARRL v.h.f. contests. Rules governing the competition are as follows:



The Ontario 420-Mc. Trophy

It is open to any Ontario licensed amateur. There is no power limit except that prescribed in the amateur license. Only two-way contacts in the 420-Mc. band will count (no cross-band). Work must be by a single operator (no multiple-operator category). Logs listing contacts made in the 420-Mc. band (and these contacts only) should be sent to Martin Rosenthal, VE3MR, Electro Sonic Ltd., 543 Yonge Street, Toronto 5, Ontario, and must be postmarked no later than two weeks following the conclusion of the particular contest involved. The winner will receive the trophy, with his call en-

graved on it, as soon as possible after the contest, and will be allowed to keep it until one week prior to the next contest, when it must be returned to the donor.

OES Note of the Month

K5IQL's OES reports for June, July and August supplemented by two interim "letter reports" spin a tale of 144-Mc. tropo, Es and m.s. activity of considerable interest as follows: "First I caught some Es on 144 Mc. on June 21st. Around 2130 GMT the m.u.f. was getting high and f.m. radio stations in New Jersey were coming in on 100 Mc. I called CQ from time to time and around 2200 I heard an a.m. station in QSO. He signed with what I understood as 'WA2EXK this is K2MWN.' At 2221 I heard W3RUE but did not get the call. After a QRZ by both of us I got through to him that I was K5IQL. He came back with: 'Is that New Mexico?'. (Seems all of the boys still associate the call sign with rare DX!) When I told him I was in Oklahoma he replied that he needed to one also. Reports were Q3 to Q4 with peaks to S7 or 8. After several minutes of short transmissions and listening, I lost him completely. At 2230 W8KAY was heard 5-7-9 calling CQ WSW. After about 30 seconds of short calls he came back to me on phone with a report of Q3 to 4 with peaks around 7 or 8. QSB on this contact was less pronounced but he faded down and out at about 2235 GMT.

"About 10 days earlier the conditions were as good or better to the Carolinas but no amateur signals were heard. These contacts on the 21st were of a surprisingly short distance considering that 100-Mc. skip was in from New Jersey. No doubt that signals from New England would have been much more solid. It was not surprising that the first station heard was the K2.

"I enjoyed a trip to California and the V.H.F. Conference at Santa Barbara. The antenna measuring party had few surprises. There was but one commercially-built array there, and it was brought mainly for the purpose of checking the matching system." The Ed Tilton Yagi proved to be the hottest single item! One by Don Roberts, W6PUZ, measured about 12.5 db. gain. Another by W6BUR was somewhat less, due, I believe, to an improperly made balun."

144 Mc. and Up

K1YON, K6HIJ and WA9HUV are all enthusiastic members of the 1220-Mc. band and each one doubles on another of the v.h.f. bands. Ted, K1YON, works continuously on attempts to extend his range on 1220 Mc. and doubles on 220 Mc. with an 11-element Yagi at 60 feet. Contacts with WB2CNK on 220 have produced good results. Dick, K6HIJ, has designed a new solid-state converter for 1296 Mc. and fabrication of the cavities has been started. Second band for Dick is 144 Mc. where a net has been organized on 145.54 Mc. in hopes of encouraging v.h.f. activity. WA9HUV, Norm, reports lots of activity on 1296 in his area, and recently increased his own output power to three watts and added a 7768 preamp with intentions of replacing the preamp (come winter) with a paramp. A 7-foot dish at 50 feet is the present project at WA9HUV with hopes running high for contacts with Toledo and Sandusky on 1296 Mc. 432 Mc. is the other band operated by Norm and he sez the opening of July 17 was noteworthy for him because of his contact via s.s.b. with K2LGF. VE3AIB, VE3EYC and VE3DSE were also worked at that time.

Recently we received a copy of just one page from the log of W2RHQ (Syracuse, N.Y.) for 432-Mc. operation. It makes interesting reading. 17 stations were worked and not one of them in the U.S.A., all being either VE2 or VE3 with the nearest station more than 75 miles and the farthest about 225 miles. Charlie runs 25 watts output n.b.f.m. and c.w. to a 64-element collinear and is using a 6AM4 converter. Frequency is 431.998 and he'd like skeds south from Syracuse.

"Fantastic opening on 432 to Virginia and northern New Jersey on July 7," so sez K4SUM in Alexandria, Virginia. Joe heard the following stations with stronger than Q5 S9 reports: W2BLV, W3CGV, WA2EMB, WB2EGZ, W3MMV and WB2IOE. In his own area W3RE, W4UBY, W3NG, W4API and K4SUM were active during this opening. July 24 and 25 also proved good on 432 Mc. when Joe worked W1AJR in Rhode Island via a.m.

Encouraging results reported by K7ICW re his skeds with California stations on 432 Mc. On July 10 signals were heard from W6DQJ (400 watts into a 16-element collinear 25 feet high). Signals were 10 db. below the noise level but call signs were definitely identified. On the 17th, signals from K7ICW (20 watts to a 44-element quad Yagi) were heard by K6HAA who was using a 32-element collinear on the ground at a 5800-foot elevation.

On the 31st, W6QUK (25 watts) was heard by K7ICW. OES report from W8CVQ also mentions good conditions on 432 Mc. on July 10 when good signals were heard from 125 to 200 miles. Walt also sez that extended tropo signals were heard on 144 Mc. during July particularly on July 10 and 13.

Up in Minnesota, W0TCK has raised his 32-element extended colinear up to 60 feet for 432 Mc. and is beamed on South Dakota with high hopes for a contact with W0BJV. From recent reports we understand that the number of converts to amateur TV is still slowly growing. Among the new addicts are WB2RVE, W6ORS, W0YMG and WA0DEA.

Regular skeds are held between K8ZES and K8TKC on 220 Mc. on Monday, Thursday and Saturday nights at 2130 EST. K8TKC in Detroit runs 2½ watts out from a converted 522 and his signals are always readable in Galion. All comers are welcome to call in on this sked. W9OVL tells us that there are about 75 stations in the Chicago area with 220-Mc. equipment. Signals are monitored on Monday, Wednesday and Friday nights at 8:00 p.m. EST. Ben also sez that phone DX east to Cleveland and Cincinnati and west to Omaha and Kansas City has been worked in openings.

The Perseids meteor shower, Aug. 10-14, maintained its reputation as the top shower of the year for 2-meter DX men. Contacts reported to date are listed below, with heard reports identified as such. Where an asterisk is shown a new state for the reporting operator was involved.

W1AZK, *Chichester, N.H.* — WA0FDY, St. Paul,* and W0LER, Minneapolis, Minn.; W0NXXF, Lincoln, Neb.*; W9MAL, Peoria, Ill. Heard W5RCI, W0BFB, W5UGO.

K1BKK, *Barre, Vt.* — W4WNH, Germantown, Ky.; W4AWS, Orlando, and W4CKB, Lake Placid, Fla.; W9WDD, East Alton, Ill.

W1JSM, *Waltham, Mass.* — W0LER, W9IFA, Carrollton, Ill.

W4CKB, *Lake Placid, Fla.* — W1MEH, Easton, Conn.; W8QOH, Cincinnati, Ohio;* K9UIF, Hobart,* and W9BRN, Liberty Center, Indiana; K1BKK, *Barre, Vt.**; W4ZCM, Rock Hill, S.C.; W2AZL, Holmdel, N.J.*

K5TQP, *Tijeras, N. Mex.* — W6GDO, Rio Linda, and K6HAA, Redlands, Cal.; W0EOZ, Jamestown, N. Dak.*; W0NXXF. Heard W0BFB, W4TLV, W5UGO

W0NXXF, *Lincoln, Neb.* — W1AZK, K2HLA, Cutchogue, L.I.; W6GDO, W4WNH, W0WYZ, Denver, and W0EYE, Boulder, Colo. (tropo); W2AZL, K5TQP.

K1ABR, *Cranston, R.I.* — W4NOS, Cary, N.C. W0BFXB, *White Plains, N.Y.* — W4WNH,* W4AWS,* W9MAL,* K9UIF,* and W0BFB, Mitchellville, Iowa.*

W4FJ, *Richmond, Va.* — W0LER.*

K4IXC, *Melbourne, Fla.* — WA0FDY,* W0EMS. Omaha, Neb.* and K1WHT, K1WHIS and K1HTV, all Connecticut.*

We hear from Marty, K1OYB, that he has moved to a new QTH near San Francisco, California, and that Joe, K1MTJ (also of Maine), is now working in New Jersey. This means that for those who need Maine on 144 Mc. it might turn out to be difficult. However, Marty suggests that if anyone would like to make m.s. skeds with Maine they can let him know, through his callbook address, and he might be able to have K1RQE or others run his rig during his absence.

Good conditions on 144 Mc. seem to have been the thing during July. K1FJM noted same on a number of occasions during the month with July 22, 23 and 24 bringing in excellent signals from the entire area of 2 land and a few from 3 land. Pete worked W3BSV on the 22nd making his state total now 10. W2QMP and WN2UVB brought their states worked up to 9 during July and Gene (WN2UVB) worked all nine during July with 5 watts and 11 elements up at 30 feet. K2HLA and K4SUM both report exceptionally good conditions on 144 Mc. on July 23 and 24 from Maine to South Carolina. Dick worked W4VHH (South Carolina) for a new state. Practically all 144-Mc. OES reports for the month of July noted very good conditions throughout the month with exceptionally good conditions on several occasions. WA2ZPD, W8FZ, W8PT, W9FBC, and WA9JFM picked July 17 as being the best night on 144 Mc. with many states and call areas being heard and worked. W8PT gave us the only report of aurora during July having heard it on the 7th and 8th. Jack had visitors, was unable to get on the air. On twelve different evenings during the month of July W9FBC noted good conditions on 144 during which he worked Illinois, Michigan, Indiana, Wisconsin, Ohio, and Minnesota, and heard New York and Kentucky. "A pretty good month", sez Maury. The band broke loose for WA9JFM on July 18 when stations in New York, Ohio, Pennsylvania and Kentucky were getting into Wisconsin loud and clear. Culmination of activity that evening ended with a contact between WA9JFM and W0NXXF in Nebraska.

K7NII also caught Nebraska (W0NXXF) for a new state on two meters on July 28 during the Aquarids meteor shower. "The nights of July 14 and 15 could have produced some nice contacts on two meters if anyone had been around"; so sez WA0HMZ who heard only one station in St. Louis.

From California, WB6KAP brings his states worked total up to 8. On July 27 Vie had a 144-Mc. contact with K6QKL/a.m. enroute to Honolulu, a distance of 1440 miles. It's an interesting long-haul contact but aeronautical mobile contacts are not admissible for distance or states-worked claims. The contact between W0ENC and WB6KAP last August is still the only known 144-Mc. contact between California and South Dakota.

Although W9GJJ has been on two meters for only a short time he has already had his taste of hearing DX on that band. Jack sez that Michigan, Indiana and Illinois are heard regularly at his QTH in Milwaukee but he was surprised to find that W0DQ1 is also heard regularly. On July 18 Missouri, Iowa and Minnesota were heard and on the 19th New York State was "in" for more than an hour according to Jack's report. He is using a "Sidewinder" and 8 elements at 12 feet so hasn't worked too much, but it probably won't be long now.

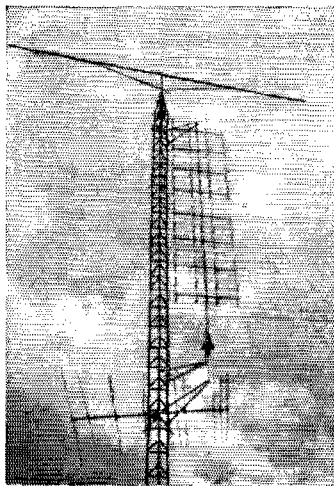
K0EMO upped his states worked during July and is now in the "box" with 15 states worked on 144 Mc. Gene runs 60-watts s.s.b. and c.w. to 17 elements up at 40 feet. K5IQL writes us that every night at 0315 GMT K5WXZ calls CQ NE for five minutes on 144 Mc. At 0320 GMT W8QOH calls CQ SW for three minutes. On August 3 Frank (K5IQL) received W8QOH solid 5-3-9 for more than two minutes with the signal very steady except for a few loud pings.

50 Mc.

Another report of trans-Pacific contact on 50 Mc. has been received. WA8NBN tells us that on June 6 of this year he worked K6ODV/KH6 in Honolulu at 50.23 Mc. Rod was using a TX 62 with 60 watts and an NC300, with a six-element beam at 60 feet. The KH6 was using a home-brew 4-1000 at a kw. and 6 elements and an SP600. Reports were 5/9 in Ohio and 30 over 9 in Hawaii. On that same date, Rod worked a number of stations in California and on June 25 worked CO2GS.

Comments concerning the six-meter band have certainly been varied and give us a glimpse as to just how changeable the band is in different areas. "July could have been a lot better," from WB2PYZ who caught four openings. "Six-meter band very quiet this past month," from K3LLR with two openings. "Six meters showed a decrease in the number of sporadic-E openings but an increase of good groundwave," from WA3BKP. "Some band openings on six meters," from WA8KRH. Next in line is Tennessee and K4KYL who caught six openings during which 11 states were heard or worked. On the other hand K8AQA sez: "Skip conditions occurred throughout the entire month with five call areas heard." "During the month of July sporadic E was very good once again with the band open every day throughout the month," WA8FTA. (Both of these 8s are in Michigan.) "This time of year six-meter openings are too numerous to mention," from K0JWN. Out in California WB6IZF noted ten days of sporadic E with nine states heard including such fair ones as Montana, Utah, New Mexico and Idaho.

K7ICW reports: "Six meters was open for E_s for a total of 18 days during July and on six of these days it was open for double hop. KP4BCN was heard ragchewing with another KP4 on the 9th. Heard VP7DD on three separate openings on the 9th working California. Only one opening noted to the first call area on the 13th when I worked K1PBD." WA8JYR (W. Va.) and W8CVQ (Michigan) agree that "Six meters has continued to be open almost every day." Pete (WA8JYR) sez that by the 4th of July he had already heard all call areas that month; and Walt (W8CVQ) sez that for him the openings were chiefly to the east and gulf coast states and the near mountain states to the west. Other reports received from California, Illinois, Louisiana, Michigan, Nebraska and Pennsylvania reveal that many OES stations observed from one to four openings during the month of July.



The antennas in use by Rex, W5RC1. On top is the 144-Mc. 23½-foot long Yagi. Stretched out below is the new 128-element collinear 432-Mc. antenna.

It looks as though the place to have been during July 1966 might have been Cicero, Illinois. That is the QTH of WA9FIH and he noted 21 days of Sporadic E during July and either heard or worked 27 States plus VE2, VE3 and VP7.

Ed Tilton, W1HDQ, reports that six meters was open several times during the first ten days of August, "winding up what surely must be one of the best E_s seasons on record. Openings have often been of long duration with areas affected being geographically very large. Seems to have been an unusual amount of double hop reported also." W1HOY/KP4 has ringed July 21 in red to mark her first contact with VP7DD, after several years of trying from Medfield, Mass. with no luck.

An interesting report received from VE2AIO: "The six metre E_s openings are on the wane here, although I got back on the band on June 12, the nine-day cycle with peak openings on consecutive 27 days has been running true to form. There have been many more of the type of openings this year where the 800 to 1200 mile QRM is low and even spotty but double hop is evident. On July 13 there was a path possibility into the northern part of South America from here, but no signals, since Illinois and Minnesota were better copy at times on a due south-beam heading. That is about at right angles to the great circle heading. However, no 4- or 5-land signals were heard during this period."

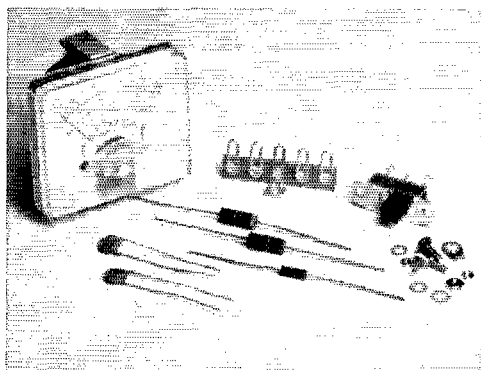
"It would seem that the curse of practical jokers or pirates has appeared on six. On July 25 at 2312 GMT an a.m. phone appeared at 50.013 calling CQ and signing DU1MY, beam here at 280 true, signal about 4 by 4. Called him to no avail. He moved up into the American phone band later and built up to S9. Eventually he worked a W3 and stated the QTH as Manila P.I. He faded out at about 0020 GMT. Now I have had my share of pirates on the lower bands but can't help but wonder about this one. It may be wishful thinking, but he did not have the same general QSB pattern as the Illinois signals heard via one hop E_s at the time." Signing DU1MY on 5.388 Mc. Anyone else hear or work him? The W3 was W3BWU, Pittsburgh, who logged the station. He was suspicious of the nature of the station also.

• New Apparatus

Omega Multirange Panel-Meter Kit

THE Omega MX-10 is a multirange panel-meter kit specifically designed for amateur transmitter applications. MX-10 consists of a 0-1 milliammeter, a d.p.d.t. slide switch, a 5-contact terminal strip, three resistors, two disk-ceramic bypass capacitors, assorted hardware and an instruction sheet. Meter sensitivity is 1000 ohms per volt and the internal resistance of the meter is 1500 ohms. A 1-megohm multiplier resistor, included in the kit, provides a 0- to 1000-volt range for measuring plate or screen voltage. Scales of 0 to 200 ma. and 0 to 500 ma. are made available, respectively, by 7.5-ohm and 3-ohm shunt resistors. The d.p.d.t. switch, contained in the MX-10, limits operation of the meter to two of the three ranges mentioned above. The instruction sheet lists multiplier and shunt resistors for additional current and voltage ranges; of course, for this purpose more resistors and a multiposition switch must be obtained. Details are given in the instruction sheet for installing the meter and several sample circuits are shown.

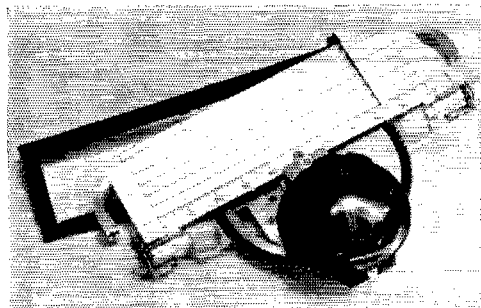
The meter must be mounted on a nonmagnetic panel or chassis; a $2\frac{1}{2}$ -inch hole is required. No screw



holes are necessary as the meter is held in place with a U-shaped bracket. Three scales are painted on the meter face: a 0- to 1000-volt range in black and 0- to 200-ma and 0- to 500-ma. ranges in blue. Meter accuracy is plus and minus 5 per cent of full scale.

Meter kit MX-10 is in the \$10.00 price class and is available from Omega Electronics Company, 10463 Roselle Street, San Diego, California 92121.

— W1YDS



Millen No-String Illuminated Slide-Rule Dial

THE James Millen No. 10037 dial assembly shown in the photograph incorporates many innovations in dial construction. Instead of moving the pointer with a string, which is the usual practice, the pointer is driven by a flexible but non-elastic molded gear-driven rack constrained within a multislot extruded aluminum channel. This method of construction, along with an anti-parallax shaped pointer, permits the dial to be accurately read and reset. The rack is driven by a plastic gear which is molded around the outer edge of a friction drive mechanism. Zero backlash is achieved between the gear and the rack by employing a very slightly different pitch on the driving gear than on the driven rack. This is made possible because of the flexibility of the teeth on the molded rack. Teflon bearings are used throughout the unit, eliminating the need for any lubrication. Zero-set is accomplished by moving the plastic dial face to the left or the right by the adjustment of a screw head that has an off-center shaft.

The drive mechanism has an 11 to 1 reduction ratio; it takes $5\frac{1}{2}$ turns of the $2\frac{3}{4}$ -inch black tuning knob to turn the $\frac{1}{4}$ -inch diameter output shaft 180 degrees. Tuning is rather stiff, but this can be an advantage. Once the dial is set, it stays put. Little care is necessary in selecting a free-turning capacitor to be used with the dial, as the tuning mechanism is capable of handling almost any torque requirement likely to be encountered.

The dial face has five scales; one scale is marked from 0 to 100 and the other four are blank. $6\frac{1}{2}$ inches of pointer travel cover the calibrated dial area. Six 6-32 tapped holes as well as six No. 25 holes are provided on the back plate of the dial mechanism for mounting whatever is to be driven by the dial. Five 6-32 tapped holes are available on the front of the assembly for attaching the dial to a panel; however, only three holes need be employed for secure mounting, the user having his choice. Behind-the-panel space measuring $8\frac{3}{4} \times 6 \times 1\frac{1}{2}$ inches is necessary for the installation. Three No. 25 holes must be drilled in the panel to mate with the dial mounting holes, along with a $\frac{3}{8}$ -inch hole to clear the tuning shaft and a $2\frac{1}{2}$ inch by $7\frac{1}{2}$ inch cutout to expose the dial face. A black bezel with a clear plastic window is furnished to fill the cutout. The escutcheon is held in place by bending its 7 flexible tabs over the edge of the hole. Outside dimensions of the bezel are 8 by $2\frac{5}{8}$ inches.

Two lampholders with mating translucent pilot lights are included with the dial as well as drilling templates and instructions for mounting the mechanism. Also provided are a flexible coupling for the output shaft and three 6-32 mounting screws. The model 10037 dial is in the \$11.00 price class and it is available from the James Millen Manufacturing Company, Inc., 150 Exchange Street, Malden, Massachusetts 02148.

— W1YDS



YL news and views

CONDUCTED BY JEAN PEACOR,* KHJV

"The Lady That's Known as Lou"

ON many occasions you have read news of Louise Ramsey Moreau, WB6BBO-W3WRE on *QST*'s pages. Her outstanding contributions to the amateur radio world have been many. It is indeed a pleasure to now introduce Louise to all as the new YL Editor for *QST*.

August 1953 was the memorable month in which Louise and her OM, Bill, WB6BBL/W3WRC first became licensed as Novices in Philadelphia. Amateur radio was to be Bill's hobby at the start, but Lou soon joined him in learning code for she had suddenly discovered that all the women heard on their receivers were not "just wives," but licensed operators. Lou joined Bill in studying, and both passed the exams.

Traffic hounds everywhere know of Lou's capabilities in this field. As W3WRE she was active on the Western Penn. Net, 3rd Region Net, Eastern Area Net, and Transcontinental Corps. She also served the area as Emergency Coordinator for Cambria County, later as Section Emergency Coordinator (AREC) West. Penn. Section, and as State Net Control for Penn. State c.w. RACES Net.

Since moving to California in 1962, Lou has been active on the Southern Calif. Net (SCN), Pacific Area Net, S Ball Traffic Net (v.h.f.), Salvation Army Disaster Communications Net, and has served as manager of the 6th Region Net since 1963.

Lou's official appointments include Official Relay Station, Official Phone Station, Route Manager, National Traffic System Manager. She was awarded ARRL's Public Service Award for her assistance during the Alaskan Earthquake emergency, is an A-1 Operator, and has earned the Traffic Bronze Medallion (it's rare when the BPL listing does not include her call).

Her antique collection of telegraph keys and equipment is also well known as she now has over one hundred keys in the collection. The earliest dates back to 1850.

For the past three years, Lou has been working with W4MLE on the about to be published *The Radio Amateur's Operating Manual* (see Sept. 1966 *QST*, page 10). She has also contributed several articles to *QST* in the past, and received Honorable Mention for her ARRL Golden Anniversary Essay Contest article.

Lou was a member of the Conemaugh Valley

* YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena Calif. 91001



QST's new YL Editor—Louise Ramsey Moreau, WB6BBO/W3WRE.

Amateur Radio Club in Johnstown, Penn., and is presently affiliated with ARRL, YLRL, LA-YLRC, Ramona Radio Club, Grand Chapter Morse Telegraph Club, Antique Wireless Association, De Forest Pioneers and is a graduate of the University of Pittsburgh. Her OM, Bill, WB6BBL is now employed at California's Institute of Technology's Jet Propulsion Laboratory.

The new YL Editor's first column will appear in the November issue. May it prove as rewarding an experience to her as it has been for me. I'm sure all amateurs join me in wishing her the greatest success.

Mary Lou Stockstill—WN6SSZ

Impossible? Nothing is! The amazing story of Mary Lou Stockstill, WN6SSZ, of Canoga Park, California well bears out this theory. With physical handicaps quite similar to those of Helen Keller to conquer, Mary Lou, handicapped by the loss of both sight and hearing, has recently taken and passed the FCC Novice examination. She is the first such woman to achieve this distinction.

While attending Earlham College in Richmond, Indiana, Mary Lou won the admiration of a young University of Indiana engineering student, Charles Stockstill, and they were married in November 1954. Born in Marion, Indiana, Mary Lou lost her sight at the age of ten as a result of a combination of childhood diseases. When she was considered well enough, she entered the Indiana School for the Blind where she studied both piano and organ. While a student in high school, she earned the Kiwanis award for the best all around student in the senior class.

Charles and Mary Lou now have two pre-teenaged daughters. A year after the birth of their second child, Mary Lou discovered that she was losing her sense of hearing. Doctor after doctor advised her that not much could be done about a nerve type loss of hearing. In 1961, the Stockstills left Indiana and headed west for a new start in California. Charles went to work for the Rocketdyne Company in Canoga Park, and Mary Lou attended the Braille Institute of America, Inc. at Los Angeles for weekly classes in knitting and mosaic tile.



Mary Lou Stockstill, WN6SSZ (Photo courtesy of Braille Institute of America)

Mary Lou's interest in amateur radio came about quite by accident. During a demonstration of a device known as the "Tactile Speech Indicator" tested in September 1965 in a project which was sponsored by the San Fernando Valley State College, she learned the value of signals by code. In a Leadership Training Program in the Area of the Deaf, Dr. Ray L. Jones, Project Director, and Mr. Hugh L. Moore, an Electronics Specialist for the Los Angeles City Schools tested the device with three highly intelligent deaf-blind men. Results indicated that persons handicapped by the loss of sight and hearing were able to communicate by telephone by use of "yes" and "no" signals. It was also discovered that one familiar with the Morse Code was able to carry on quite a conversation. Realizing that the Braille Institute also sponsored a class in amateur radio, Mary Lou decided to enter a third class of instruction.

Although unable to make intelligence out of any type of conversation involving the spoken word, mother nature has provided Mary Lou with the ability to hear high-pitched tones which fall in a narrow region above and below the frequency of one thousand cycles. The normal frequency of tones emitted by the human voice ranges from just below three hundred cycles to the upper limits of around three thousand. Therefore, the spoken word is just a jumble of sounds, but radio signals from amateur or commercial radio stations using the International Code for transmission of messages can be picked up by Mary Lou. In turn, she, by use of the telegraph key for communication, may now spend many happy hours chatting with friends via the air waves.

In addition to radio code, there are several ways that others may communicate with Mary Lou. She reads Braille and uses either a standard typewriter or Braille to correspond with friends. Another method is to take her finger and using it as one would use a pen or pencil, print letters across the palm of one's hand as though printing one letter on top of the previous one. Radio operators can tap out messages in code on her arm or wrist.

Ray Meyers, W6MLZ, recently featured Mary Lou during his weekly radio program, "Calling CQ," over station KPFFK-FM. He also kindly sent the information which has made it possible to tell radio amateurs everywhere the amazing story of Mary Lou Stockstill. Ray sponsors an organization open to sightless amateur radio operators the world over called the International Handicapped Net. This net provides a common meeting place for the members. Further details will gladly be furnished by contacting Ray Meyers, W6MLZ.

Arizona's Flora Straud

Happiness is building a piece of ham gear, seeing no smoke during the smoke test, and having everything work perfectly as per instructions. The end result is not only a better informed ham, but a happy one. Flora Straud, K7TFA, will attest to that.

Flora's OM Ken, K7TEZ, has been active in amateur radio for many years. Ken was first licensed as 3BUX

in 1921. Flora's interest to also become licensed was quickly nurtured, and has resulted in another outstanding XYL amateur.

It isn't often that an XYL builds her own complete station. The equipment shown in Flora's shack (see photo) is the product of her capabilities. In addition, she also built her receiver as well as various testing equipment. Her latest undertaking is the building of a Heathkit electronic keyer.

Flora is active mostly on 80, 40, and 20 meters, both on c.w. and phone. To QSO her would be more than just contacting an Arizona XYL, which in itself is a rarity. You would also be talking with a "real" ham.

YL Club News

YLRC of Los Angeles recently installed the following new officers for the coming year: Pres., WA6ISY; V. Pres., WA6LWE; Rec. Sec., WA6ZTW; Cor. Sec., W6JCA; Treas., WA6UBU.

The San Diego YLRC announces their new officers as follows: Pres., WA6SKT; V. Pres., K6VRH; Treas., WA6CQS; Rec. Sec., WA6ATB; Cor. Sec., K6YIT; Cert. Custodian, WA6ATB.



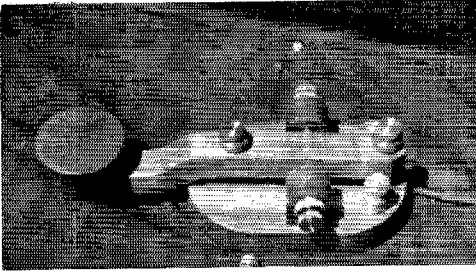
Flora Straud, K7TFA

The Ontario Trilliums, VE3TOT, announce another first for their newly formed club in being the first Canadian YL group to participate in Field Day activities. There is also the only report received from any YL group who may have participated. Transmitters were set up in the Caledon Hills area where they operated c.w. on 40 and 20 meters; phone on 2 meters. This being their first year, they operated to gain experience. Jean Evans, VE3DGG, and Doris Cody, VE3BBO, were their Field Day Coordinators. QST

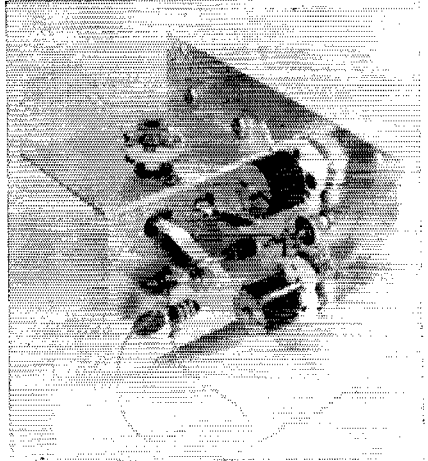
It is with deep regret that *QST* announces the departure of Jean Peacor, K1IJV, from the *QST* staff of contributing editors. Fairness to the demands of a growing family makes it impractical for her to continue as YL Editor. The column has grown and prospered under Jean's capable hands and we will miss her informative, delightful, humorous, column "leads." Readers and Hq. staff say "well done," Jean. "Good luck and 73!"



Strays



When the president of the Satellite ARC calls the meeting to order it isn't with the customary gavel. That large key in the photograph (the knob is three inches in diameter!) is connected to an audio oscillator that does the job of getting everyone's attention. The key is the creation of Ed Cary, W6DYQ, and it measures five-inches wide by twelve-inches long. It would be a real attention-getter in any shack.



Got the habit of thinking of 28 Mc. as a "dead" band, good only for local work? If so, it's time to shake off that illusion and take a look at "10." CRPL predictions for October show that the band is expected to be open for long-distance communication for a large part of the daylight hours, much of the time with almost ideal ionospheric conditions for intercontinental work.

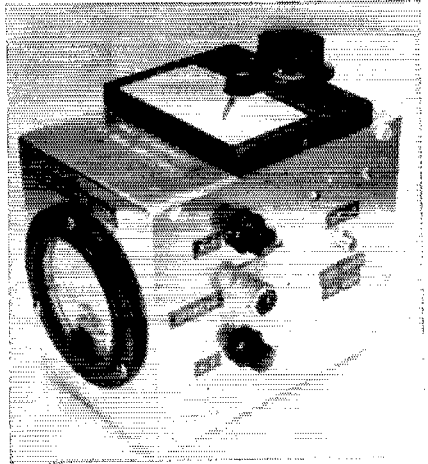
Hams in the St. Louis area, do you know a fellow radio amateur who you think is deserving of the "Amateur of the Year Award"? If you do, nominate him for the award which will be presented at the St. Louis ARC Fourth Annual Amateur of the Year Award Meeting that will be held in St. Louis, November 11, at the C.D. Control Center, Route 340, Chesterfield, Missouri, at 8:00 P.M. Guest speaker will be Sumner Foster, ARRL Midwest Director. Mail your nomination to Horace K. Hudson, 9431 Crestwood Manor Dr., St. Louis, Mo. 63126. All hams in the St. Louis area are invited to the meeting and to participate in the nominations.

Stolen Equipment

The following equipment was stolen from my car on July 27: Swan 175 Transceiver, serial No. 111212, Webster Top-Sider antenna with 75-meter coil, and a Clegg microphone. Judith Epstein, K8TWW, 12908 Talbot Lane, Huntington Woods, Michigan.

I would like to get in touch with . . .

. . . anyone in any country with old ham-call license plates. F. Allan Herridge, G3LDG, 96 George Street, Basingstoke, Hampshire, England.
 . . . Alcoholics Anonymous hams interested in schedules on 20 meters. W7FNE, 506 13th Avenue East, Seattle, Wash.
 . . . any stations in the following states who work 160 meters, especially c.w.: New Hampshire, Louisiana, Delaware, and Idaho. W0DIB, 313 Elm Ave., Mitchellville, Iowa 50169.
 . . . those interested in forming a chess net. W8GGQ, 35668 Fernwood Dr., Wayne, Mich. 48184.



The photos shown above of the modified Handbook impedance bridge, described by K4ZZV in "Technical Correspondence" in September QST, unfortunately were received after the issue had been buttoned up and so could not be run along with the letter. They show how the two extra variable capacitors are fitted into the assembly in previously-unused space on the panel wall. K4ZZV also writes that although the construction of his bridge follows the Handbook layout (chapter on measurements) the circuit he uses is the one originally given in the August 1955 article. This uses a balanced signal source, permitting one side of the standard resistor to be grounded. In turn, this allows both rotors of his added reactance-compensating capacitors to be grounded, which simplifies things electrically and mechanically.



Operating News



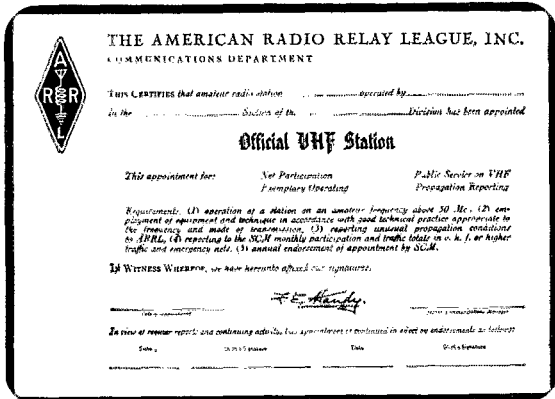
F. E. HANDY, WIBDI, Communications Mgr.

LILLIAN M. SALTER, WIZJE, Administrative Aide GEORGE HART, WINJM, National Emergency Coordinator
ROBERT L. WHITE, WIWPO, DXCC Awards ELLEN WHITE, WIYYM, Asst. Communications Mgr.
GERALD PINARD, Club Training Aids PETER CHAMALIAN, WIBGD, Communications Asst.

OES Becomes OVS. Effective with the publication of this announcement in *QST*, the SCM-post in the ARRL field organization known as Official Experimental Station becomes the League's *Official VHF Station* (OVS) Appointment. Some 600 dedicated and devoted v.h.f. operators, many of them constantly reporting items on their test projects and operating records for their SCM's reports in *QST* and "The World Above 50 Mc." will receive (currently)

There's no substantive change in the several *appointment objectives* that will continue to be set forth in ARRL literature and which appear on the certificate. There's just the change in designation to OVS. The new name will broaden the understanding and appeal of the certification to additional numbers of amateurs — which may include all, the Technician, General Class, Novice, Extra Class, Advanced licensees and Canadian counterparts. For appointment the big thing to have is the strong consistent v.h.f. interest and activity in line with any or all the objectives or purposes identified with this ARRL-VHF recognition.

Official VHF Station Provisions. The Rules and Regulations of the Communications Department concerning Station and Observer Appointments have been amended or changed only as much as necessary to effectuate the name change and clarify the description. The following language replaces in its entirety that part of par. 17 about the "Official Experimental Station." The new text follows:



New ARRL Certificates for VHF Workers

the handsome blue-bordered certificates, such as here shown. Many of this group participate in emergency and public service v.h.f. nets, and assist SCMs, PAMs, and Emergency Coordinators by their preparedness for any call in handling important communications in their areas in case disaster strikes. We're delighted to recognize their performance with these new certificates.

Official VHF Station (OVS) appointees shall be appointed by SCMs from among those members active in developing successful communications systems and equipment applications and collecting propagation data in any or all amateur frequency bands above 50 Mc. RTTY operators using a.f.s.k., make-and-break, etc., are eligible. Participation in nets that provide communications facilities for the public and fellow amateurs is a way to earn and maintain OVS appointment, such to be available only to members operating stations above 50 Mc.

(a) Applicants shall indicate the operational and experimental projects and groups in the field of their v.h.f. interest. (b) Appointees shall report monthly, their contacts, observations and progress on the specific

33rd ARRL Sweepstakes—Nov. 12-14 (phone), 19-21 (c.w.) All W/VE Amateurs Invited To Participate

The highlight of Fall activity, the 33rd ARRL Sweepstakes, will soon be here. As is our usual custom, this early announcement is for the benefit of those amateurs in remote ARRL sections who may not receive their November issues in time for the test. The contest period will run a full 30 hours from 2100 GMT Saturday night until 0300 GMT Monday morning on each of the weekends. Only 24 hours of participation will be permitted, however. Time-out periods may not be taken in less than half-hour increments. This will permit a *maximum* of twelve off periods of a half hour apiece or six off-periods of one hour, etc. See the rules in November 1965 *QST* concerning the message exchange which will be worth a stock 1000 points. Convenient reporting forms are now ready for your request. Write early to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

San Francisco OO W6GQA has a record of well over 50 consecutive FMTs behind him. Al has been active since 1932 (previously W9KDD) and holds Extra Class as well as commercial class tickets. In addition to his OO activity, he is an active Intruder Watcher.

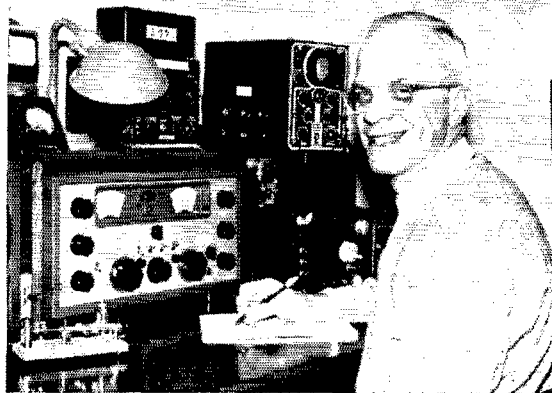
problems and communications justifying this appointment recognition. (c) Stabilized signals, non-radiating receivers and the like, shall be used as appropriate to the frequency and mode of emission in accord with the general progress of development in the designated bands. (d) When handling traffic on v.h.f., standard ARRL procedure and message form will be followed, and contacts with the nationally integrated NTS maintained, as feasible.

As the publication *Operating an Amateur Radio Station* comes up for reprinting the corresponding text on page 9 will cover the new broader title. Plans to give more forceful portrayal of our objectives by renaming this post were mentioned earlier (Mar. '63 *QST*) and we're glad now to follow through with the new certificate issue.

OVS Applications Welcomed. It's of top interest that Section Communications Managers (address page 6, *QST*) are now issuing new certificates to these six hundred appointees. With the expansion of amateur interest in all phases of work in the v.h.f.s, SCMs will welcome applications for Official VHF Station Appointment from any truly active v.h.f. member operator, not now holding the appointment, who subscribes to these objectives. Whether you are a Tech., Novice, Extra Class or hold an in-between grade amateur ticket you can be part of the v.h.f. operating picture! We'll be proud to add your station, if active on v.h.f.'s (in two- or six-meter bands or higher frequency bands) to the roster of accredited workers. You may specialize in v.h.f. links as part of the Public Service Corps (AREC EC-RO groups) or be eligible because of your v.h.f. experimentation and propagation reporting, or as one who reports his v.h.f. netting, under EC, VHF-PAM or other auspices.

Look into this won't you, by asking ARRL Hq. (or your SCM) for OVS application forms. Those appointed will rate this special recognition for their efforts . . . and they will receive advance v.h.f. information from time to time, in addition to our quarterly CD Bulletins.

"Licensing Classes" and Clubs. This is that time of year when almost every club gets back into high gear, decides on its program and activity scheduling for the next few months and struts its stuff. Last month in this space we stressed to amateurs in general, and prospective amateurs especially, *Join a Club*. We repeat this. We want to mention some of the things a club may do that make joining it worthwhile. Most successful clubs have working committees that come up with programs, talks, dinners and get togethers, auctions, transmitter hunts, etc. There's the Field Day and planning to be started. Each club, we think, should suggest to SCMs the calls of those in its membership capa-



ble of holding down Official Station posts, and men suited to any ARRL leadership post in which there is inactivity or a vacancy. But most of all, as a service to its members, and to bring new activities to the club, every club needs to schedule, recurrently, some Code and Theory Classes.

As one example of what we mean, the *Mariana Amateur Radio Club* (Torrence, Calif.) last season made application for the use of public classroom facilities from the local education authority (district offices). The club was given two rooms for four nights a week (Mon. thru Thurs. 7-to-10 P.M.) and was able to offer specialized amateur radio study in public quarters under the *Adult Education Program*. Several clubs reported using this same approach. We hope this AEP pattern will be more widely followed all around the nation this year. If you can report a minimum number to enroll and help find an instructor this approach is good. It's worth asking about. A club's own senior members can often help instruct or recommend knowledgeable instructors for such a course where necessary.

Clubs do not have to set up groups in precisely this way, of course, advantageous as the plan is where it can be followed. A great many clubs just follow the ARRL outline, and put on Q-A and lectures and serious study sessions on their own home grounds. But more than a one-time class really is needed. We believe clubs need recurrent classes best to serve their own interest and the desires of their club members. *All prospective¹ amateurs* will please note that wherever there's a club, it is in the best position to help you as an individual through its planned program. This is especially true in the field of discussions of technique, guided instruction, operating enterprises and in promoting the fraternal aspects.

Use Those SEC Addresses. Our annual listing of the addresses of all the ARRL Section Emergency Coordinators appears in this issue of *QST*. This is the month ECs and SECs should

¹ Prospective amateurs also are invited to drop a line to ARRL for the Reference Guide (CD-7) which summarizes a lot of information on getting started. Also we'll send the W1AW over-the-air code practice schedule and a compilation of other stations' practice periods (CD-139) free on request.

make drives to secure new Amateur Radio Emergency Corps (AREC) members. All continuing members should ask their EC or SEC having jurisdiction to re-register them and update their station and personal information. The SEC can furnish the address of *your* EC if needed and provide forms for your AREC registration. In large communities or counties having no EC yet appointed to carry out local-amateur leadership, clubs or any amateur should recommend suitable candidates to the SCM or SEC, so that such leadership appointments can be made.

Wanted: Code Practice Schedules: Periodically we revise our lithographed sheet (CD-139) listings of amateur code practice transmissions. This provides information on a group of amateur CP stations and gives also some press, weather, and MARS schedules that cover stated speed ranges. We welcome additional listings and solicit latest information on the days, times, frequency and code speed range and your station call, and address. This can be sent us in a letter or on our

CD-62 form. Such schedules are set up and printed for wide distribution, so we feel that a schedule should run for a minimum of six months or longer to make the listing worthwhile. Our Training Aids section will be glad to send any information helpful for the conduct of a code practice routine (CD-130 and CD-158) on request.

— F.E.H.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525-146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5,
CST -6, MDST -6, MST -7, PDST -7, PST -8,
Hawaiian -10, Central Alaska -10.

A convenient GMT conversion card is available, free of charge, from the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.



DX CENTURY CLUB AWARDS



From July 1 through July 31, 1966, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

New Members

WB6OOP...305	W7TLG...139	K8ELE...109	YU3DQ...105	DL3WC...102	K6CAA...100
W6JRI...232	SM4GUR...135	Z54UX...109	OK1PT...104	K8FHU...102	K7QXG...100
JA1CIB...231	W8MCR...134	JA1ITX...108	WA2VWI...104	OK1H...102	OE3HOW...100
W7UZA...225	K5SSZ...129	W8AHFN...108	W8BBA...104	OK1JD...102	SM1ACKS...100
DJ5AA...222	WA6OUU...125	JA1BYL...107	K7QMK...103	W1DYT...102	W1AGP...100
W8DGP...217	W4ZFE...113	JA8AJM...107	K7SPK...103	W4RJL...102	WB2QJL...100
K8MVP...182	4X4QA...112	W31OP...107	OE3SJW...103	WB6FED...102	WA4IDC...100
K6AAV...169	K1OBT...111	EY1PEL...106	WA1EIN...103	JA6PN...101	Y0RU4...100
E18H...162	K1UTC...111	OD5EL...105	W6ETR...103	W9OPD...101	Y08DD...100
JA1ZZ...160		OZ8JD...105		KA1FC...100	

Radiotelephone

YV5BPJ...269	WA2RIB...161	H18XMT...119	K4GRD...109	I1PAT...104	K8YRN...101
W8ARH...265	K1BPJ...146	P9LE...118	W8AHFN...108	K7YDO...104	WB2FWE...101
W2NUT...259	W6PBD...136	W8DGP...116	P8SA...108	W8VAH...104	WB2NIC...101
JA3UL...186	G3PBD...134	W8DGP...116	XB1XS...106	WB2HZG...103	WB6EM/DUI...101
K8MVP...182	11JT...124	ZS6BIN...111	WA0UUM...105	N1FYG...103	WB2JJP...100
W7UZA...165	W6UJ...120	JA1CIB...110	DJ3GY...104	W8GVD...102	W6ORC...100
11ROD...161				W9UX...102	W9FO...100

Endorsements

Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but show only that the participant has reached the endorsement group indicated.

330	W5V8Q	LA5YE	W1GDQ	W3MSR	K4GRD	180	W1HNI	OZ4FF	WB2OAE	JA2XI
G4MJ	W8YCP	W2FXE	W1WQC	W3PVZ	K8TVO	K5STL	WA4FDR	PY2BJH	W6SUD	K40A
320	280	W5UVR	W2PXR	W4JDM	OH2VZ	K8DTZ	W5EGS	SM6CAV	WA8JCD	KA2RJ
G3HDA	K4TWK	W8ARH	220	W6EUF	W6AAV	160	140	W3FKL	WA9LZA	VE3CZC
W8PHZ	KP4YT	ZL3IS	DJ1QP	W7WLL	W5DJI	LA8LG	DJ9SB	VE7NA	W9NCK	WB2JJP
W8ZCQ	VE7CE	240	DJ5IM	W8RCM	W5LJT	W7MH	OH3QC	K2YPC	W2TKG	WA4TLI
300	260	K5GOT	LA5Q	200	W7MH	W5LJT	LA8LG	K2YPC	W2TKG	120
W2GKZ	K7CHT	ON5ZO	LA5Q	JA1CR	ZL1AMO	SM6AEK	K9WDY	WB2JYN	I1BOL	WB8JCD
			PY2BGL			SM7CXH	OK2BCI			WA9KQS

Radiotelephone

280	240	W2FXE	220	200	W1KID	180	140	VE2WH	K3RSW
G3HDA	K1UDP	W2GHK	DJ5AA	K7CHT	W1WKO	WA5LOB	HP1JC	VV3KV	OE3KI
W8EVZ	K5GOT	W5JWM	VE2ANK	K6RDO	W3PN	VE3DYB	W8YD		PY2BGL
	SM5CZY	W6WX	WA5KBK	SP7HX	W9DNE	160	WA2CGD	120	W6SUD
260	W1WQC		W1BPY		ZL30Y	VF6AAV	WA5IEV	100	W6BNE
LA5YE						W5EGS		100	WA6OUU
									W9PUY

JULY CD PARTIES

Highlights? Perhaps the biggest one was the terrible state of the bands on the Sunday of the c.w. weekend! Those who waited for a grand-slam appearance on 80 late that night experienced a rude shock! Yet, and in spite of band conditions, the following list illustrates good pickings for the sharp-eared and patient amongst the CD gang. This month we're adding a new figure to the following list, the time of operation (to the nearest hour). For instance, seeing a W4KFC-100-K in 5 hours, well, you just know c.w. conditions were punk. Phone conditions, on the other hand, appeared good. K2EIU/5 topped both modes for another sterling performance with a phone score of close to 82-K, not far from his January 1966 record performance. A number of familiar c.w. CD regulars showed up on phone this time heralding a great party, perhaps, in October.

The following are high-claimed scores, numbers of QSOs, sections and operating times, with final corrected results to appear in the *October CD Bulletin*.

— W1YYM

C.W.	K4BVD	177,800-501-70-17
K2EIU/5	K5OCX	174,720-510-64-19
W1BGD	W8LT (WA8AJZ, opr.)	174,535-514-67-14
W9EWC (W9AQW, opr.)	W4YGY	165,330-494-66-20
K4BAI	W3EIS	161,840-470-68-19
K8MFO/8	W0TDR	161,525-450-71-17
WA8CFJ	K4RIN/5	160,130-474-67-17
K1WJD	K1YKT	155,295-487-63-15
K9DHN	W6TYM	152,950-482-70-20
	K4SXD	150,765-431-69-19

W1ARR/3	144,210-430-66-10
W1AW (WA1FFS, opr.)	143,325-437-65-19
KZ5FX	136,945-442-61-18
W6WX	136,345-400-67-17
W3MSR	133,440-410-64-10
K7RAJ	131,655-393-67-17
W1FJJ	125,440-386-64-12
K4RAD/2	119,680-369-64-19
W8FAW	117,650-356-65-12
W9QQQ	110,825-334-65-10
W4MLE	109,440-336-64-10
K4HXG	108,580-351-61-15
K2SSX	108,270-394-54-18
K8HGT/9	107,575-328-65-18
K4ITY	104,725-350-59-16
W1DYE	103,840-347-59-10
W9EBT	102,480-331-61-17
W1ECH	101,760-311-64-6
W4KFC	101,700-311-64-5
W6RW (4 oprs.)	283,645-792-71-19
W9YT (K9s LBQ, ZMS)	183,940-534-68-20
K3HKK (6 oprs.)	107,840-337-64-15

W1AW (WA1CYT, opr.)	39,925-158-49-10
W1EJJ	36,520-160-44-9
K4BVD	29,400-133-42-9
W1SWX	29,110-135-41-9
K2SSX	22,595-136-33-11
W8LT (WA8AJZ, opr.)	31,090-104-38-4
K0YIP	21,090-104-38-11
W6DGH	21,060-101-39-10
K4TTN	20,085-103-39-9
K9IVG	19,600-96-40-9
W1BGD/1	19,270-87-41-3
WB2XL	18,900-101-36-8
W9NPF	18,430-91-38-7
K0DHN	17,170-96-34-6
W9PJV	16,720-83-38-8
W2ZVW	16,450-87-35-4
W3EIS	14,025-79-33-5
W9AUM	13,050-81-30-4
K1DAP	12,705-77-33-8
W5PFI	12,070-67-34-6
W1YYM	11,315-66-31-4
K4IXG	10,725-60-33-5
W9EQQ	10,720-60-32-3
W3KJJ	10,695-63-31-4
W8PVC	10,695-62-31-6
K0JPI	10,500-65-30-4
W0BJK	10,220-73-28-15
KZ5FX	10,200-61-30-4
K3QDD	10,125-69-27-3
W9YT (K9s LBQ, LMS)	71,225-252-55-20

PHONE

K2EIU/5	81,750-285-59-19
WB2KTO	45,770-199-46-19
W9DOB	41,650-170-49-18

A.R.R.L. ACTIVITIES CALENDAR

(Dates are shown in GMT)

- Oct. 7: CP Qualifying Run — W6OWP
- Oct. 8-9: Simulated Emergency Test
- Oct. 15: CP Qualifying Run — W1AW
- Oct. 15-17: CD Party (phone)
- Oct. 22-24: CD Party (c.w.)
- Nov. 3: CP Qualifying Run — W6OWP
- Nov. 12-14: Sweepstakes Contest (phone)
- Nov. 15: CP Qualifying Run — W1AW
- Nov. 19-21: Sweepstakes Contest (c.w.)

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

- Oct. 1-2: WADM Contest (p. 93, last issue).
- Oct. 1-2, 8-9: VK/ZL Test, NZART (p. 92, last issue).
- Oct. 1-3: Massachusetts QSO Party, M.I.T. Radio Society (p. 120, last issue).
- Oct. 15-16: California QSO Party (p. 146, this issue).
- Oct. 15-16, 29-30: VU2/487 DX Contest, ARSI (p. 102, this issue).
- Oct. 19-20, Nov. 2-3: YL/AP, YLRL (p. 88, last issue).
- Oct. 22-24: Sixth World-Wide RTTY Sweepstakes, RTTY Inc. (p. 98, this issue).
- Oct. 29-31: Connecticut QSO Party, Candlewood Amateur Radio Assn. (p. 124, this issue).
- Oct. 29-31: Maryland-D.C. QSO Party (p. 118, this issue).
- Oct. 29-31: West Virginia QSO Party, Kanawha Radio Club (p. 138, this issue).
- Nov. 5-7: Delaware QSO Party, Delaware Amateur Radio Club (p. 117, this issue).
- Nov. 13: International OK DX Contest, CCRC (next issue).

ELECTION NOTICE

To all ARRL members in the Sections listed below:

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

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

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

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

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

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

Communications Manager, ARRL [Place and date]
225 Main St., Newington, Conn. 06111

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

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. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Maritime.....	Oct. 10, 1966	D. E. Weeks.....	June 11, 1966
Santa Barbara.....	Oct. 10, 1966	Cecil D. Hinson.....	Aug. 10, 1966
Maryland-D.C.....	Oct. 10, 1966	Bruce Boyd.....	Dec. 10, 1966
Southern Texas.....	Oct. 10, 1966	G. D. Jerry Sears.....	Dec. 10, 1966
Delaware.....	Oct. 10, 1966	Roy A. Belair.....	Dec. 10, 1966
Mississippi.....	Oct. 10, 1966	S. H. Hairston.....	Dec. 15, 1966
Alabama.....	Oct. 10, 1966	William S. Crafts.....	Dec. 26, 1966
Alaska.....	Nov. 10, 1966	K. E. Koestler.....	Apr. 10, 1967
Colorado.....	Dec. 9, 1966	D. Ray Crumpton.....	Feb. 14, 1967
Sacramento Valley.....	Dec. 9, 1966	John K. Minke, III.....	Feb. 25, 1967
Eastern Florida.....	Dec. 9, 1966	Albert L. Hamel.....	Feb. 25, 1967
Orange.....	Dec. 9, 1966	Roy R. Maxson.....	Mar. 1, 1967
North Dakota.....	Dec. 9, 1966	Harold L. Sheets.....	Mar. 8, 1967
Missouri.....	Jan. 10, 1967	A. E. Schwaneke.....	Mar. 11, 1967
Maine.....	Jan. 10, 1967	Herbert A. Davis.....	Mar. 12, 1967
Minnesota.....	Jan. 10, 1967	H. R. Kopischke, Jr.....	Mar. 15, 1967

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Oct. 15 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Oct. 7 at 0400 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION!** Note that since the dates are given in Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT Oct. 15 becomes 2130 EDT Oct. 14.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5 7/8, 10, 13, 20 and 25 w.p.m. on Sun, Mon, Wed, Fri. from 0130 to 0235; 15, 20, 25, 30, 35 w.p.m. on Tues, Thurs, Sat. from 0130 to 0220; 10, 13 and 15 w.p.m. daily from 2330 to 2400 GMT. [All days are in GMT.]

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130 to 0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending in step with W1AW and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130 to 0220 GMT practice on those dates.

Date Subject of Practice Text from August QST

Oct. 3: *It Seems to Us*, p. 9

Oct. 11: *The TR-2 Transceiver*, p. 11

Oct. 14: *A Simple Two-Tone Test Generator*, p. 26

Oct. 20: *Emergency Preparedness in Non-Metropolitan Areas*, p. 49

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Oct. 26: *Image Frequencies*, p. 53

Oct. 31: *Double Conversion*, p. 54

Brass Pounders League Box on page 162

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.

Montana Joseph A. D'Arcy, W7TYN Sept. 9, 1966
Santa Clara Valley Jean A. Gimelin, W6ZRJ Oct. 15, 1966

In the Arizona Section of the Southwestern Division, Mr. Floyd C. Colyar, W7FKK, and Mr. Bill L. Young, W7RVY, were nominated. Mr. Colyar received 175 votes and Mr. Young received 125 votes. Mr. Colyar's term of office began July 14, 1966.

In the Ontario Section of the Canadian Division, Mr. Richard W. Roberts, VE3NG, and Mr. Bert Titmarsh, VE3FPJ, were nominated. Mr. Roberts received 417 votes and Mr. Titmarsh received 252 votes. Mr. Roberts' term of office began Aug. 20, 1966.

In the San Joaquin Valley Section of the Pacific Division, Mr. Ralph Saroyan, W6JPU, and Mr. Stanley R. Babcock, WB6HVA, were nominated. Mr. Saroyan received 126 votes and Mr. Babcock received 113 votes. Mr. Saroyan's term of office began Aug. 20, 1966.

W1AW SCHEDULE, OCTOBER 1966

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 p.m.-1 a.m. EDT, Saturday 7 p.m.-2:30 a.m. EDT and Sunday 3 p.m.-10:30 p.m. EDT. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000		CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0020-0100 ⁴			3.555 ⁶	14.1	14.1	7.08 ⁶	14.1
0100		Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0105-0130 ⁴		145.6	3.945	145.6	50.7	1.82	21.41
0130		Code Practice Daily ¹ 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.					
0230-0300 ⁴			3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS ³		RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³
0310-0330 ⁴			3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS ²		Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0335-0400 ⁴			7.255	3.945	7.255	3.945	7.255
0400	CW-OBS ¹		CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0420-0500 ⁴			3.555 ⁶	7.08	3.945	7.08 ⁶	3.555
1700-1800		21/28 ⁵		21/28 ⁵	21/28 ⁵	21/28 ⁵	
1900-2000		14.28	7.255	14.28	7.255	14.28	
2000-2100		14.1	14.28	14.095	21/28 ⁵	7.08	
2200-2300		21/28 ⁵	21.075 ⁶	14.1	7.255	14.28	
2330		Code Practice Daily 10, 13 and 15 w.p.m.					

¹ CW, OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.

² Phone OBS (bulletins) on 1.82, 3.945 and code practice on 14.28, 21.41, 50.7 and 145.6 Mc.

³ RTTY OBS (bulletins) on 3.625, 7.045 and 14.095 Mc. 170/850 cycle shift optional in RTTY general operation.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.

⁶ W1AW will listen in the Novice segments for Novices on band indicated before looking for other contacts.

Maintenance Staff: Wis QIS WPR NPG. *Times/days in GMT. General operating frequencies are approximate.

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG, RM: W3EBE.

Net	Freq.	Local Time	Day
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2000	Wed.
KCCN	3905 kc.	1300	Sun.

New appointment: WA3CRU as ORS. Renewals: W3-EEB as RM and ORS. WA3DYG has a new Swan 350. WA3CRU is on s.s.b. with 90 watts and has a new homebrew 2-meter transmitter. W3EEB vacated in Vermont without a ham rig along! WA3DUM's dad is a new Tech. Class licensee with WA3OUH as his call. K3NYG is preparing for the Oct. 8 and 9 SET. The First State Amateur Radio Club won the K3GKF Field Day trophy for the second straight year. Traffic: W3EEB 78, WA3DUM 6, WA3DYG 4, K3NYG 3, W3IYE 1.

DELAWARE QSO PARTY

November 5-7

The Delaware Amateur Radio Club of Wilmington announces its 11th Delaware QSO Party and invites all amateurs to participate. Delaware hams are urged to work as many out-of-state stations as possible, so that those interested can earn credit toward WAS and the W-DEL certificate. Here are the details:

- (1) Time: 30-hour period from 2300 GMT Nov. 5 to 0500 GMT Nov. 7.
- (2) No time limit and no power restrictions.
- (3) Scoring: *Delaware stations*: 1 point per contact and multiply total by the number of states, Canadian provinces and foreign countries worked during the contest period. *Outside stations*: 5 points for each Delaware station worked and multiply total by the number of counties in Delaware worked during the contest period.
- (4) Credit for contacts with the same station on other band will be given.
- (5) A certificate will be awarded to the highest-scoring station in each state, Canadian Province and foreign country (with 3 or more contacts) and to the highest-scoring station in each Delaware county. In addition, a W-DEL certificate will be sent to any station working all 3 Delaware counties. Party logs showing required data will be accepted in lieu of QSLs.
- (6) *Suggested freqs.*: A.m. 3825, 7225, 14,225, 21,325, 29,000 kc. C.w.: 3525, 7025, 14,025, 21,025, 28,025 kc. S.s.b.: 3975, 7275, 14,325, 21,425, 28,650 kc. V.h.f. 50, 50.4 and 144 Mc.
- (7) General call: "CD DEL." Delaware c.w. stations should identify themselves by signing *de (call) DEL* K. Phones say, "Delaware calling."
- (8) Contact information required: Delaware stations send number of QSO, RS(1) and county (New Castle, Kent or Sussex). All others send number of QSO, RS(T) report, and state, province, or county.
- (9) Logs and scores must be postmarked not later than Dec. 5, 1966, and should be sent to the Delaware Amateur Radio Club, c/o J. F. McCarley, K3NMY, P.O. Box 201, Newark, Delaware. Applications for the W-DEL certificate should also be addressed there.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: K3YVG, K3MVO, W3CBH, W3EML. PAMs: W3FGQ, W3SAO, EPA C.W. Net meets on 3610 kc. at 2330Z nightly. had QNI of 223 and QTC 161. The PTN Training Net meets nightly on 3610 kc. at 2230Z, had QNI 284 and QTC 174. E. Pa. E.P. & T. Phone Net meets nightly on 3917 kc. at 2200Z, had QNI 651 and QTC 164. We welcome W3CBH as a new RM and manager of the Pennsylvania Training and Traffic Net. K3YVG replaces W3EML as E. Pa. net manager and asks your indulgence and assistance in getting EPA back in shape. K3MHD is stationed at Great Lakes Naval Training Center. WN3FSU, a blind operator, acquired his ticket via the assistance of K3-NOX, Milton ARC. K3FLT, offers a nice certificate for working club members. For details contact WA3RBL. W3FGQ passes local traffic via 2 and 6 meters and is working on a 220- and 432-Mc. setup. K3YVG was QNT because of burned antenna coils in the hearing-aid. W3CUL was guest speaker at the Philmont ARC, Franklin Institute in Philadelphia. Vacationers: W3-MPX and family camping out; WA3CFU had a trip through W7- and W0-Land. WA3FWT/8 reports low 6-meter activity in the Lansing, Mich., area. WA3EQ is becoming active again. The Posttown ARA has been activated and club officers are K3NUM, pres.; W3ZVY, secy.; K3AOL, treas. The first Novice trained by the club is WN3GES. New Gear Dept: WA3BSV a t.r. switch for traffic work. K3KCN is on s.s.b. with a 20A. K3LZS added a Valiant. K3PVM added a Model 19 and 14 RTTY gear. K3FSV erected an 80-meter vertical. WA3AJT added an SR-160. W3BIP added a 60-ft. tower. WA3DBC added a new jr. operator (no call yet). Your editor erected a 40-ft. mast painted red, white and blue—the tallest barber pole in the state. The Simulated Emergency Test is coming off Oct. 8-9. This year we will stress harder on local and county level traffic-handling. All ECs are urged to get their nets operating. Traffic: W3CUL 3680, W3EML 726, W3VR 627, K3MVO 331, K3MYS 268, K3PIE 141, K3FSV 140, WA3ATQ 128, K3YVG 118, W3FGQ 114, W3ZRQ 108, W3AIZ 103, WA3AJT 94, W3PAF 89, K3ZSK 60, W3VAP 56, K3TNL 54, K3WAJ 52, W3AFQ 47, WA3AFI 39, W3KJJ 39, W3-AXA 38, WA3CTP 35, K3MDD 32, WA3BYH 29, W3ELI 26, W3MPX 25, WA3CKA 22, WA3BLZ 21, W3RV 19, W3CBH 18, W3ACCC 17, K3WEU 17, WA3CFU 15, K3PIE 12, W3OY 9, WA3BBI 5, W3BUR 5, K3HKW 5, K3NZD 4, W3BKF 3, K3PVM 3, K3KTH 2, K3NOX 1.

MARYLAND—DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CWE. RMs: K3JYZ, W3-PRC, W3UE, W3ZNV. PAMs: W3JZY, K3LFD.

Net	Freq.	Time	Days	Sess.	QTC	Ave.
MDD	3643	0000Z	Daily	31	260	8.4
MEPN	3820	2200Z	M-W-F	20	25	1.2
MEPN	3820	1700Z	S-S			
MDDS	3643	0130Z	Daily	31	33	1.1

New QTHs: W3QCW, Silver Spring, to England; W2-NIY to Silver Spring; W3TMZ to an apartment; W3-QA to an apartment; W3BNNL to an antenna farm in St. Mary's County; W3CFK to a new home in Hagerstown in Oct.; WA3AOK to Florida. *New Gear*: K3LFD is on s.s.b. with an HW-12. WN3EOP has a new IIT-40 and SX-140 combination. K3LLR has his station ready for winter operating on all bands. *New tickets*: WA3-EEQ has a new Extra Class ticket and WN3ELA is working on a General. *Operating*: K3QDD found the recent CD Party a new low. K3GZK had receiver and antenna troubles nipping at his traffic total. K3OAE spent most of July in Ft. Lauderdale on a business trip but managed to pass some traffic too. W3WTW is organizing AREC nets. W3MSR is active on 2 meters again. *Silent Keys*: We are saddened to report the passing of W3FVK and W3OLK. *Special*: If this report seems a little more brief than usual, blame it on moving day at W3QA. Traffic: (July) WA3CKF 147, K3JYZ 128, WA3BTA 101, W3TN 100, K3LFD 68, K3OAE 68, K3UXY 61, WA3CVM 35, WA3EEO 32, W3PRC 30, K3OFG 28, K3UW 24, K3ODD 23, W3ACEK 19, K3-GZK 19, W3WTW 17, WA3BN 16, W3EOV 14, W3MCG 13, W3ZNV 12, W3CQS 9, WN3EOP 2, K3NCM 2, WA3DWF 1, K3LLR 1. (June) K3JYZ 80, K3LFD 53, K3OAE 39, W3PRC 34, WA3CVM 24, W3QCW 18.

MARYLAND-D.C. QSO PARTY

October 29-31

All amateurs are invited to participate in the first MD-DC QSO Party, information forwarded by the MD-DC, SCM, W3QA.

Rules: 1) The party begins at 2300 GMT October 29 and ends at 0100 GMT October 31. 2) A station may be contacted only once on each band and mode (i.e. c.w.-phone-RTTY). Separate logs must be submitted for each mode. 3) Exchange: MD-D.C. stations send QSO number, RS(T), city and county. (Independent cities such as Baltimore and Washington only send city, no county) All others send QSO number, RS(T), city and ARRL section or country as applicable. 4) Scoring: MD-D.C. stations score one point for each number sent and one for each received, multiplied by each different city contacted, multiplied by each different ARRL section or country. All others score one point for each number sent and one point for each number received, multiplied by each different MD-D.C. city, multiplied by each different Maryland county. 5) Certificates will be awarded the highest scoring station in each ARRL section and country. 6) A readable copy of the log showing contest station call and location, QSO numbers sent and received, times, date, stations contacted, RS(T) sent and received, city, county and/or ARRL section or country should be mailed to C. E. Andersen K3JYZ, 14601 Claude Lane, Silver Spring, Maryland, 20904 (postmarked before Nov. 21, 1966). Each entry must include a signed statement that the operator has observed all the regulations of his country and that the decisions of the contest committee will be accepted as final. No logs will be returned. Enclose an s.a.s.e. if the contest summary is desired. 7) Suggested frequencies: 3575 3875 7075 7275 14,075 14,275 21,075 21,325; 50.1 and 145.1 Novices 3735 7175 and 21,110.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—SEC: W2BZJ. RM: WA2BLV. PAM: W2ZL. SEC W2BZJ reports a total of 18 AREC members in the section. W2LVW is the new EC for Gloucester Co. Walt is looking for appointees in Cape May, Atlantic, Burlington, Camden and Cumberland Counties. NJN reports 31 sessions and 268 traffic total. The N.J. Emergency Phone & Tlc. Net reports 31 sessions, QNI 723. 250 traffic. WB2MNM is a new NJPN member. W2ZQ is now using the 6100 B & W rig on the Sunday net skeds. Field Day messages were received from K2AA and W2MBC. WA2KIP and WA2UPC copied the Armed Forces Day message correctly. W2UVB is a new station in Moorestown. W2ORS resigned from the League. WA2UPC made BPL for the 3rd time in succession. He also received his TCC certificate and is NCS on 2RN Thurs. WB2YCI is a new station in Cape May and recently joined NJN. W2ZI is having trouble with the local 10-kw. BC station which just moved near him on 1300 kc. (3rd harmonic of 3900, the Jersey Phone Net freq!) OO reports were received from K4RAD, 2 and W2ELF. A v.h.f. activity report was received from WB2RVE. W2YPZ has a new antenna away up in his high trees. W2BZJ is back on NJN with a new rig. K2ARY reports transmitting all Official Bulletins, as does WB2SBD, both newly appointed. W2WFS is a new station in Cologne, N.J. (Atl. Co.) WB2FR has a new SB-100. WA2KIP is in Navy MARS. NJN's June report shows 30 sessions and 239 traffic. WA2BLV's XYL is in the hospital. WA2DVU has a new linear amplifier. Traffic: (July) WA2UPC 505, WA2KIP 128, W2ZI 42, W2EWR 15, W2BZJ 14, WB2SBD 12, W2ORS 4, W2YPZ 4, (June) W2YPZ 24, WA2BLV 13, WA2DVU 11, K2SHE 10, K2CPR 6, K2JJC 5.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RM: W2EZB and W2FEB. NYS C.W. Net meets on 3670 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 2300 GMT. NYS C.D. on 3510.5 and 3992 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 0045 and 2345 GMT. NYS County Net on 3510 kc. Sun. at 1000 and 2400 GMT on Mon. WB2KTB was appointed OBS. K2KNV was endorsed as OO and ORS. The Syracuse V.H.F. Roundup will be held Oct. 8 at Three Rivers Inn. Speakers will be W2SDZ, W2IMU and W1HDQ. Don't miss it. WB2NGH will be maritime mobile aboard the USS *Truckee*. Gary is in the Navy and would like the Buffalo gang to look out for him.

New officers of Penn-York Hamfest Assn. are WA2TPS, pres.; K2JST, vice-pres.; Arlene Lightfoot, secy.; WA2LWF, treas. The Western New York F.M. Picnic was held at the QTH of K2ISO at Eagle, N.Y. All those on 146.94 were invited. W2RUF is starting a training net on c.w. for all interested AREC members. Traffic-handling procedures will be stressed. Watch for further announcements. One of our real old-timers and a fine fellow, K2EE, disposed of all his ham gear and moved into an apartment. The RAGS will have a bigger and better exhibit at the N.Y. State Exposition including Ham TV, traffic, etc. WB2RHJ will go s.s.b. with a Globe 300A and SB-10. WB2FPG is an EE Sophomore at Worcester Tech. The Chemung County AREC assisted the Elmira Soaring Society for the Eastern Open Soaring competition. Stations were set up to take altitude sightings. Participants were K2DNN, WA2s FJJ, HFL, TCZ, YPY and WB2s ABK and HSR. WB2-CFG got married. GRAM speakers for the coming season include W2SAW, W2ZIA, K2HUK, W2PZI, W2ICE, W2AKU and K2LCT. Most of the information for this column is gleaned from club bulletins and newsletters. If you or your group would like to be represented here please send information to K2HUK, Warner Gulf Road, Holland, N.Y., 14080. Traffic: W2SEI 276, W2RUF 163, K2SSX 125, W2BGL 124, WA2UFI 82, W2GVH 74, W2FEB 73, K2DNN 72, WB2RHJ 60, K2JBX 48, WB2SIA 39, WB2TAG 31, K2IMI 25, K2MQN 21, W2-RQF 20, W2MITA 17, WB2OAY 17, K2OFV 16, W2FCG 14, W2UYE 13, K1REF, 2 11, WB2JDL 10, W2HYM 6, WB2NZA 4, WB2OYE 4, W2PNW 4, WB2ERK 3, WB2-FPG 3, W2PVI 3, WA2GLA 2, WB2NNA 1.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W2-NEM. RM: W3KUN, W3MFP, K3SOH, W3UHN, PAM (V.H.F.): K3VPL. Traffic nets: WPA, 0000 GMT and KSSN, 2330 GMT on 3585 kc. K3SOH, RM and KSSN Net Manager, advises that KSSN reactivates Oct. 3 at 2330 GMT. This column records with regret the passing of K3KLW. The Bruzeshooters new slate of officers is K3UTG, pres.; K3OTY, treas.; WA3AIP, checker; W3WGS, K3EED and W3TZW, wind gaugers. K3CFA visited ARRL Hq. and W1AW while on vacation. WA3DJI completed a new v.o. for 6 and 2 and a new 2-meter portable beam with a built-in s.w.r. bridge. K3HJQ is having fun with a new Twoour in his auto. W3QBU has moved to Cleveland. W3NGFJ attends the Capitol Institute of Technology in Washington, D.C. K3UIK had a "ball" working 3-meter portable while on vacation. If you are interested in AREC work contact the SEC, K3KMO at State College. WA6PNS/8 returned to his California QTH. K3NOU took upon herself a husband, WB6VB visited the Connellsville area. K3-PLQ has completed his hitch in the Army. W3TTY received a recognition award in communications from the Governor of Rhode Island. W3JW is in Mexico signing XE0JW while on vacation. WA3DGI reports that he operated Field Day in June but forgot to send in his log. K3FFJ installed a new SR-160 in his auto for mobile work. WA3FGC is a newcomer to the Cumberland Valley area. This is my last section write-up. I again want to thank all individual hams and clubs which supported me while I was SCM for the section. It indeed was a pleasure to serve one and all. New appointees: W3LOD, EC for Venango County; K3HFK, Nittany ARC station as ORS. Endorsements: K3PYS, W3OFO, W3SAY, W3KNQ as ORS; W3KUN as RM; W3RSB and W3WFR as OPS. K3PYS has resumed his schooling at Carnegie Tech. W3RTB enjoys sideband activity on 14 Mc. W3RHF has installed a new tower and beam. Now's the time to do it—check the expiration date on your "ticket." Traffic: (July) W3NEA 160, W3KUN 93, W3BLZ 63, K3PYS 61, W3LOS 49, WA3AKB 27, K3-SMB 24, WA3AKH 21, W3GJY 21, W3LOD 16, W3RUL 13, WA3EPQ 7, W3ELZ 6, K3TEZ 5, W3YA 5, WA3DGI 2, K3SOH 2, W3UHN 2. (June) K3PYS 62, K3SOH 21, K2SMB 10, W3KNQ 5.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: WA8GUM. PAM: W9VWJ, WA9-CCP and W9KLB (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	Traffic
IBN	3940	1400Z	Sun.	No Report
ILN	3760	0000Z	Daily	217
NCPN	3915	1300Z	Mon.-Sat.	208
NCPN	3915	1800Z	Mon.-Sat.	280
Ill. PON	3925	1700	Mon.-Fri.	312
Ill. PON	50.28	Temporarily discontinued		
Ill. PON	145.5	2000	M-W-F	118

The Shawnee Area Radio Association held its Annual Picnic at DuQuoin Aug. 7. K9PPX has been appointed as OO. W9TOY has a new TX-62. The Ninth Regional

Net traffic count for July was 474. K9QPJ recently acquired an XYL and his QTH is Elmwood Park. K9MDO, WA9NJB, W9RSV and WA9NP were elected officers of the Worth Township Amateur Radio Club. The Midwest Amateur Radio Club, Inc., is now affiliated with ARRL. Amateur Radio Clubs are asked to write to League Headquarters for information regarding Ham-QUEST 67. This program will be initiated soon after Labor Day to increase club membership. K9IDQ has a home-brew 4-1000 rig on the air and the first contact was IICL. This column's sympathy is extended to the family and friends of W9LKL, who has joined the ranks of Silent Keys. WA9EXP worked at WJJD A.M. and F.M. during the summer vacation. K9DEV has built a new linear. WA9QXT is now a General Class licensee. K9TVN, Donita Price, the daughter of K9PDT and K9TRP, and WAØBIR, Dennis Shaw, were married during the month of July. WA9CCP has a Model 19 RTTY on all bands. W9LNQ reports that the winds damaged his antenna setup but everything is back in FB shape. WA9NFS reports that lightning struck his station and the only damage was a burnt-out new Heathkit keyer. WA9MRB has joined the ranks of s.s.b. operators by acquiring a SBE SB-34 transceiver. WA9GUM requests that all amateurs interested in traffic please check in nightly in the ILN at 0000Z. WA9MLX has returned from vacation operating in the Rocky Mountain and Grand Teton National Parks. WA9CCP is the only BPL certificate recipient this month. WA9NFS was a late entry for May BPL awards. Traffic: (July) WA9CCP 729, W9SMD 430, WA9GUM 304, W9LEL 238, K9CYZ 230, WA9NFS 223, W9JXV 183, W9EJV 168, K9AVQ 117, W9NXG 80, WA9KPW 77, WA9PDI 73, W9AXR 65, K9RTE 53, K9WMP 49, W9HOT 47, WA9SEO 35, W9SKR 16, W9IDY 15, K9AUD 12, W9LNQ 10, W9PRN 10, W9ELM 8, K9HSK 6, WA9RGS 6, WA9AJF 5, WA9FHI 4, W9UHD 3, K9RAS 2, W9SXL 1. (June) W9UHD 30, W9KJ 26, WA9EXP 2.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	Freq.	Time	July t/c.	Mgr.
IFN	3910	1330Z daily, 2300Z M-F	233	K9IVG
ISN	3910	0000Z daily, 2130Z M-S	501	K9CRS
QIN	3656	0000Z daily	179	WA9BWW

K9GLL, PAM of Hoosier v.h.f. nets, reports July traffic of 87. K9EFY, mgr. of PON, reports July traffic of 74 and WA9JZR, mgr. of RFN, reports July traffic of 62. W9QLW, RM of 9RN, reports Indiana was represented 100% in July. QIN Honor Roll: K9HYV 29, K9VHY 22, W9HRY 19, W9QLW 17, K9RLW 17, K9VWJ 16, W9ZYK 15, WA9ROA, Earlham College ARC, has been quite active snagging DX with a vertical antenna and 60 watts c.w. W9DNQ was awarded the 1966 Outstanding Amateur Award for Indiana for his work with the Indiana State School for the Blind. Congratulations, Bob. W9HRY, is the new RM for QIN. WA9NDN moved to Louisiana Sept. 1. W9LRT is vacationing in W. Va. Congratulations to WA9EZF on receiving the A-1 Operator Award. WA9QAH and WA9AG are both enjoying new s.s.b. equipment. Congratulations to WA9OVO on receiving his Gen. Class license. Good luck to all those leaving for school this month. We will miss you. *Amateur radio exists because of the service it renders.* A BPL certificate went to K9IVG. Traffic: (July) K9IVG 774, W9QLW 332, W9ZYK 185, W9HRY 165, K9HYV 165, WA9IZR 145, W9UB 134, WA9BWW 122, W9PIN/0 105, W9NIM 86, WA9LQ 72, K9DHN 71, WA9JHH 69, WA9FDQ 60, K9CRS 58, WA9OYI 57, K9VHY 53, K9FZX/9 45, W9DKR 43, W9SNQ 38, K9RWQ 37, WA1DAG/9 32, W9FWE 31, K9ZLB 28, K9RIW 27, K9EFY 19, W9CC 17, WA9KAG 17, W9YYX 17, W9CLF 16, K9EOH 16, WA9GJZ 15, K9GBR 13, K9JDK 13, WA9BZI 12, WA9CWF 12, W9DQZ 12, K9ILK 11, WA9RBQ/9 11, W9DZC 10, K9OXA 10, W9BDP 7, W9RTH 7, WA9BNX 6, WA9NGN 6, WA9AXF 5, K9BSL 5, WA9CHY 4, WA9QAH 4, K9YFT 3, WA9ABI 1. (June) WA9OYI 30, K9RLW 15, W9DZC 3, WA9QW 1.

WISCONSIN—SCM, Kenneth A. Ebnetter, K9GSC—SEC: K9ZPP. PAMs: K9IMR, K9HJS and W9NRP. RM: WA9MIO.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
BBN	3985 kc.	1200Z	Mon.-Sat.	25	147	34	W9NRP
BBN	3985 kc.	1700Z	Daily	31	541	134	K9HJS
W9BN	3985 kc.	2125Z	Daily	31	889	232	K9IMR
WIN	3662 kc	0015Z	Daily	30	268	83	WA9MIO
SWRN	50.4 Mc.	0200Z	Mon.-Sat.				W9CTU

Net certificates went to K9JMF and WA9QNI for W9BN. New appointments: WA9LHJ as EC for Adams County, K9FHI as EC for Dodge County, W9BCH as EC for Winnebago County. Renewed appointments: W9ZB, K9GSC, W9MWQ, W9STZ, K9GDF and W9CXY as ORSs; K9GSC as OO; WA9LWJ as OPS; K9IMR as PAM; W9FBC as OES; W9QLW and K9KJT as ECS. K9OSC led the OOs with 26 notices in July. WA9QMP and

WA9RYO have received their General Class licenses. WA9LWJ is in the service. The Annual WNA Picnic was a huge success with everyone enjoying himself. W9KQB is active in traffic again. The FLARC assisted with the bicycle races in Madison. W9GGN has moved to Stevens Point. K9PKP was interviewed over radio station WRDB. W9DYG reports that CAN has completed 2 years of 100% representation. W9SUF was NCS for the day in the Old Milwaukee Parade. WA9NDV put his antenna back up 5 minutes after it blew down. A BPL certificate went to WA9GJU for July and WA9MIO for June traffic. Traffic: (July) W9KQB 328, K9IMR 184, WA9NPB 176, WA9GJU 160, W9DYG 138, WA9NDV 104, W9CXY 76, W9CBE 58, W9NRP 43, W9SUF 48, W9AYK 35, K9HJS 31, WA9NVY 28, WA9NFG 26, W9AOW 23, W9MWO 23, W9RTP 22, WA9QKP 20, W9IFS 15, K9FHI 10, K9GSC 10, W9QHT 4, W9YT 3, K9ZMS 2, WA9EZU 1. (June) WA9MIO 507, WA9QNP 2.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke Jr., WØTCK—SEC: WAØIEF. RMs: WØISJ, WAØEPC, PAMs: KØQBI, WAØJKT, WØEBN, WAØDWM. MSN meets daily on 3595 kc. at 0300Z. M/N meets M-S on 3595 kc. at 0100Z. Noon MSPN meets M-S on 3820 kc. at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 kc. at 2400Z. MSTN meets M-F on 50.4 Mc. at 0430Z and Sat. at 0200Z. Co. Hunters WX Net meets Sat. on 3820 kc. at 1500Z. PO Net meets Sun. on 3812 kc. at 1830Z. During DST the nets meet one hour earlier by GMT. Same local time. New appointments: WAØIEF as SEC and WAØIAW as OO. Renewals: WØLUP and WAØIAW as ECS; KØFLT and WAØIEF as OPSs. WAØIEF has taken over the SEC duties. ECS: Please note that your reports now go to Gary Hanson, 719 N. 18th Ave. E., Duluth 55812. Let's flood him with reports! Our thanks to WAØBZG, who faithfully served as SEC since 1964. Ace has moved to a new home outside Grand Rapids. It is with deep regret that we report that Richard Power, the son of WØTUS and WØVPO, was killed in action in Viet Nam. The picnics at Grand Rapids, Lake City, New Prague and Mankato were all well attended. Area hams operated from the MSA 1 c.d. trailer at the Dodge and Olmsted Co. Fairs. WØPHD visited the Bureau of Standards and several hams while vacationing in Colorado. The c.w. nets are considering moving to a different frequency. Watch for an announcement after the members vote on this. WAØCEL and WAØIEF both had the misfortune of having SB-34s taken from their cars, while WAØBJY lost his beam to a recent wind storm. WAØKFJ has a new two-element quad for 20.15 and 10 meters on a 40-ft. tower. WØMFV has a new 80-meter antenna. WAØILX is operating an Eico 753. WAØIDB and XYL WAØIDA are moving to a better hamming location in Winnebago. The Mankato ARC provided communication for the Indian Days Parade at Tionka, Iowa. BPL awards go to WAØIAW and WAØJKT. Traffic: WAØIAW 566, WAØJKT 296, WAØKQ 83, WAØEPC 66, WØISJ 66, WAØALF 60, WAØKRF 49, KØRZD 47, WAØDVH 37, WØTCK 33, WAØEDN 30, KØICG 28, KØQBI 22, KØFLT 21, WAØMMV 20, WØUMX 19, WØBUO 13, KØHJC 11, KØIGZ 11, WØATO 10, WØRYK 10, WAØJPR 9, KØSXQ 9, WAØEQZ 7, WØKLG 6, WAØIEF 5, WAØLOH 5, WAØHRM 4, WAØIUT 4, KØAQT/Ø 3, WAØDFT 3, WØSZJ 3.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. The International Hamfest held at the International Peace Garden July 16 and 17 was a decided success with 100 registered hams and their families, of which about one-half were from VE-Land. WØHUD and VE4EG were elected to co-chair the next one to be held in 1967. KØOVE won the hidden transmitter hunt and won the clock with the help of KØHXL's super-duper sniffer. WØBUO, ARRL Director, and WØDM were there. Congratulations to WØHUD and his many helpers of the Minot Amateur Radio Club who put this successful event on. KØLRO had a service patrol of Boy Scouts there. WØDM had an eyeball QSO with KØGRM, who headquarters in Minot. Murph has a new T-4X and an R-4 with a dipole strung up at the Motel. The Minot Radio Club has a nice paper, the *Ham-Bone*. It has been running some nice 2-meter articles by WØHYA, W5LZU, from down Arkansas way, was a visitor during fair week in Grand Forks. He runs a concession with Midway Shows. He uses a Swan 350 as a portable from the Ford Motor Home. WØKON/Ø has moved to Finley from Hoople. He is active in TEN, CAN and TCC. WØDM has been on with a Ranger while getting the SR-150 reigned. WAØOAT moved to Bismarck. Lyle Beebe, an ex-North Dakotan, now WA4VKE, is Engineer in Charge for the FCC in Norfolk, Va. His XYL, Lillian, is WA4VKG and a c.w. operator. They work 20, 40, 80 c.w. and s.s.b. W7CLN spent a month's vacation in Grand Forks. Traffic: (July) KØITP 79, WØDM 5. (June) WØKON 15.

SOUTH DAKOTA—SCM, Seward P. Holt, K0TXW—SEC: W0STC. New calls from Sioux Falls: WN0PJF and WN0PJF. New calls from Brookings: WA00MK, WN00ML, WA00SK, WN00TZ. K0ZTV has successfully been working DX since getting a new receiver. WA0BWF, Rapid City, headed the call for mobile assistance at the forest fire near Newcastle, Wyo., on July 11. Installing his Swan in the car and traveling 75 miles to the scene in 1½ hours, he was able to give the needed assistance. With K7MGM as net control station and relay stations from Wyoming, Colorado, Nebraska and Idaho the fire was brought under control. Traffic: K0GSY 582, K0VY 77, W0SCT 63, WA0LLG 20, W0B0S 9, W0IGG 6, K0TNI 3, WA0BZD 2, WA0DNG 2, W0ZAL 2, WA0BAG 1, K0JGM 1.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—Asst. SCM: Lyle F. Shaw, W5GZP. SEC: WA5KTX. PAM: WA5GPO. RM: K5TYW. NAs: WA5IIS, K5LPS, WA5HNN, W5MJO. It was my pleasure to attend the Calico Rock meeting at which, I feel, much progress was made in correlating the emergency plan with the state civil defense plan. It was nice to visit with state CD Radio Officer K5YTR and Army MARS state director W5LXC. Several have passed along suggestions and ideas and I am informed that the Fort Smith and Boone County clubs have put some of these ideas into effect such as listing the officers of the club with the local chamber of commerce, erecting highway signs at the city's entrance calling attention to the local amateur club and what frequencies are normally monitored, holding code and instruction classes for novices. Net reports for July:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Time
RN	3815 kc.	0001Z	Daily	51	27	648	526 minutes
AFN	3885 kc.	1200Z	Mon.-Sat.	26	29	875	1625 minutes
OZK	3790 kc.	0100Z	Daily	31	28	138	491 minutes
AFON	3825 kc.	2130Z	Mon.-Fri.	20	57	279	600 minutes

June report for the Arkansas Single Sideband Razorback Net:
 RN 3815 kc. 0001Z Daily 28 75 544 638 minutes
 Traffic: W5NND 202, W5MJO 106, WA5KUD 4, K5AKS 1, K5TYW 1.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: K5KQG. RM: W5CEZ. V.H.F. PAMs: W5UQR, WA5DXA.

Net	Freq.	Days	Time	Sess.	QNI	QTC
LAN	3615	Daily	0030	31	9.8	171
Delta 75	3900	Sun.	1330	5	16.5	3
LAPON	3870	Sun.	1300			

Please take notice of the change in time of LAN. In addition a late session meets nightly at 0400. Net Mgr. is WA5FNB. The League is putting on a combined ARRL-Club membership drive. WA5JVL is working on antennas. The CENLAARC had a bang-up two-day hamfest in July. Among those present was DL5GG/K5-BGG, from Ramstein, Germany. The Air Command Wing from England AF Base put on a very nice exhibition of its latest gear. W5AXU is in Buena Vista, Colo., and is operating from his trailer around 7230. WA5KQN is back on 80 and 40 with an inverted Vee. W5OAR, whose call was used by the gang from the Ozone Radio Club, worked slightly over 500 contacts. The Lafayette Radio Club now mails its very fine bulletin prior to club meetings. K5UYL is the big DX gun from the Lafayette area. W5BSR, up Washington State way for the summer, keeps weekly skeds with his son at home. W5MXQ reports he is busy with e.d., RACES and the Jefferson Club is planning to hook up with these activities. K5OKR reports a new TB500 beam is up and she is looking for DX. WA5HGX reports that K5MWG and WA50XK will be starting in as freshman at LSU this fall. W5IOG soon will be running a kw. WA5EID plans to modify a 74A-4 and with a 15-meter beam going DXing. WA5DXA reports WA5ORV, WA5GGT, WA5-DRK, WA5NNB, WA5DUX, WA5CYO and WA5ORY are active on 6 meters! Elwin, our new V.H.F. PAM, would like to know if anybody has 2-meter f.m. going in S. La. or the GNO area. W5QEG/5 closed down operation at BSA Camp Edgewood. W5KC requests that associate members for LAPON contact Vince, if interested. W5CEZ is recovering nicely from a mild heart attack. W5PDN, the son of W5CEZ, did a great operating job from BSA camp. WA5KLF and W5PRM are trying to rebuild the Monroe Radio Club. W5CEW and his XYL have been visiting out Seattle way. The Baton Rouge Radio Club had a station at Sears Roebuck and Co. the week of the Fundra activities in Baton Rouge. W5DUS led the drive to put over this public attention-getter for ham radio. Traffic: (July) W5-QRG/5 121, W5CEZ 119, K5OKR 103, W5KRX 78, W5-MXQ 71, W5MBC 67, WA5FN 61, W55PDN 49, WA5-

LQZ 16, WA5NYY 13, WA5DRP 10, WA5HGX 7, WA5DXA 6, W5EA 6, K5FYI 6, WA5JVL 6, W5KC 6, WA5KLF 6, WA5EID 2. (June) WA5EID 32.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Congratulations to the Jackson Club for a fine hamfest. W5OFE and his committees did a fine job and W5MUG as always was a fine MC. WA5JWD is the new net mgr. for the Miss. Sideband Net with K5JCT/W5ODV as assistant. WA5JTB now is mobile for the first time with NCX-5 fixed station handling much overseas and maritime mobile traffic on 20 and 15 meters. Mississippi needs active ECs. W5N5PU is an active Novice in Meridian. W5TAB has a fine 75-meter transceiver for an inexperienced amateur to build. WA5JWD, W5ODV, WA5-IXC, K5BWW, K5SSZ and K5RUP are really working to make more use of v.h.f., especially 2 meters, and want other v.h.f. boys to check with them. Sorry to lose K5-VAN. New appointment: WA5OKI as OBS and OPS. The Meridian ARC reactivated the local net Sun. on 3818 kc. at 1300 CST. The Columbia ARC Net meets Tue. at 2000 CST on 3835. Traffic: W5WZ 134, W5JDF 88, WA5OKI 45, W5EMM 19, WA5JWD 15, WA5JTB 7.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: K4RCT. RM: K4GWH. PAMs: WA4EWW, W4PFP.

Net	Freq.	Days	Time	Sess.	QNI	QTC
ETPN	3980 kc.	M-Fri.	1140Z	21	434	44
TN	3635 kc.	Daily	0100Z	62	57	221
			0203Z			
TPN	3980 kc.	M.-Sat.	1245Z	31	1247	198
		Sun.	1400Z			
TSSB	3980 kc.	Tue.-Sun.	0030Z	23	1015	76

K4SXD ran his DX to 152/129 before departing for the Army. The traffic nets will miss Ted, W4DIY is a new ORS. W4HHK reports on the July solar noise of 3.8 db. high point and June was 4.0 db. New ECs are W4RMI for Henry County and K4VZI for Knox. We need others. Contact K4RCT or W4UVP for information. The Tenn. Ham deadline is the 20th of the preceding month. WA4WHN would appreciate news from every club in state. New officers of the Tenn. Council are W4TYV, chairman; WA4-GJW, secy.-treas.; W4PRY, vice-chairman. Traffic: W4-OGG 264, K4UWH 135, W4SQE 116, W4PQP 100, WA4IBZ 79, K4SXD 49, W4RUW 47, W4WBEK 45, WA4YDT 44, W4TZB 40, WA4CUI 36, WA4YEAJ 36, WA4CKP 35, W4-UVP 35, WA4DBG 28, W4CXY 26, WA4NUJ 24, W4PFP 17, W4TZJ 17, W4DIJ 16, W4MXF 16, WA4WYP 13, K4-UMW 11, WA4NEC 10, WA4CGK 9, W4TYV 8, WA4EWW 7, K4MIQ 7, WA4ZBC 7, W4FLW 6, W4VTS 6, W4SGI 4.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYL. Appointments: WB4AFH as OES, WA4-AUR as EC, K4NHY as OPS and EC. Endorsements: W4CSN as EC.

Net	Freq.	Days	EST	Sess.	QNI	QTC	Mar.
EMKPN	3960	M-F	0630	21	341	57	W4BEJ
MKPN	3960	Daily	0830	31	510	147	WA4KFO
KTN	3960	Daily	1900	31	866	238	WA4AGH
KYN/KSN	3600	Daily	1900/1700	49	315	298	W4BAZ
KPON	3945	Sat.	1300	4	105	23	WA4AVV

WB4AIN is going to school in Louisville, W4N4CRY is club president in Danville. W4JUI has the new frequency measuring system going. WA4IBG lost all his antennas in the storm of July 6. The Northeastern Kentucky Emergency Net has been formed under the management of WA4TJS and meets at 1930 EST Fri. on 3942 kc. The Kentuckiana Radio Club came up with some fine publicity on its Field Day activities. K4KZH is on with a Drake 2B. WA4UAZ has a new big signal with an SB-200 amplifier. W4WNH was visited by W4AWS after keeping MS skeds for two years. W4MWX is back in business with a new antenna. Your SCM attended both the Paducah and Henderson Hamfests during July and both clubs are to be congratulated on fine jobs. W4BAZ wants more stations on KYN. Traffic: (July) WA4UAZ 272, WA4HJM 225, WA4-AGH 218, W4BAZ 159, K4MIAN 146, WA4 TJS 146, WA4-VUE 127, WB4AIN 71, WA4DYV 64, K4NHY 62, W4RCF 62, WA4KFO 58, WA4TPB 53, WA4AUR 33, WA4GMA 33, WA4GHQ 32, K4LOA 26, WA4DXA/4 24, WA4WVW 22, WA4IBG 20, W4KJP 20, WA4BZS 14, W4CDA 13, W4-KKG 8, WB4ACO 5, W4OYT 5, W4BTA 3. (June) W4BAZ 269, K4HIS 95, W4N4BZ 35.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—Asst. SCM: K. E. Stecker, W8SS. SEC: K8GOU. RAs: W8ELW, K8QY, W8FU, K8KMQ. PAMs: W8CQU, K8-LQA, K8JED, V.H.F. PAMs: W8VCV, W8YAN. Appointments: W8WVL as ORS; K8CKD and WA8NFE as OPS; K8PVC as EC, WA8KYO as OBS, WA8EFK as OBS, W8CQN as OO, K8LNE BPLs again. Silent Key:

Anna May Hall, W8QPT, Ludington. W8CQB had a bad coronary but is recovering. W8OQH, secy. of the U.P. Evening Net, advises it meets each evening at 2230 on 3920 kc. with e.w., s.s.b. and a.m. check-ins welcome. B/R Men net mgr. is W8ZBT and asst. mgr. is W8TJL. W8TYE promises he will not be a Novice for long. The FARL Bolt has 6 low-pass filters in its Aug. issue. W8-IFB has moved to Mississippi. WA0EZZ/8 now is at the Coast Guard base at the Soo. WA8KZW is teaching at N.M.U. WA8CVH is in lower Michigan. WA8MNF married Cheryl. WA8MEE is in Akron RCA Computer school for 6 months. WA8SHF has a new TX-62, and WA8QCV bought the SRA5S a 75A-3. K8NTI has his new Finco 6&2 beam up. K8TEI is handling MARS traffic from Viet Nam. K8AGO has a new SB-100 transceiver. The CMARC had trouble getting workers for FD. The CMARC 29ers Sunday Net, at 1500 GMT on 29 Mc., is off to a fresh start. Communications for the '66 Michigan State water skiing championship was handled by the CMARC Lansing gang. The Van Buren ARC had its usual fine annual V.H.F. Picnic at Allegan County Park—same day as the U.P. Hamfest. K8CKD is putting time in on RTTY and on Navy MARS. K8KMQ is on QM, 8RN and EAN. WA8-MCQ worked HK3ASJ, his first DX. The airline strike caused difficulty in delivering eyes for the Eye Bank Net. W8FGB made the BPL on deliveries/originations. The second annual N. E. Michigan V.H.F. Hamfest will be held at East Tawas. Oct. 7, 8 and 9. See you at the Alu-congon Convention, Oct. 21 and 22. Traffic: (July) K8LNE 536, K8KMQ 294, WA8PIM 134, W8FGB 132, W8ASTAN 132, WA8OEE 114, W8EUI 108, W8YAN 105, WA8OGR 94, WA8PH 77, K8NJW 75, WA8MCQ 64, WA8LRC 63, W8FX 41, K8HLR 38, K8VDA 38, W8AGTM 37, W8UM 32, WA8-BJD 28, K8JED 25, W8FWQ 21, W8NOH/8 19, W8TPP 19, K8ZJU 19, WA8LXY 17, W8REZ 16, K8GOU 16, WA8-MVH 14, W8SWF 14, W8PWF 12, W8ALQ 11, W8CZJ 7, W8DSE 6, W8RTN 6, W8AUD 4, W8AKME 3. (June) K8NJW 290, WA8PH 143, W8AMQT 46, K8HLR 36, K8-GOU 33, W8UM 20, K8LQA 14, W8WVL 1.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE, SEC: W8HNP, RMs: W8BZX, W8DAE and K8LGB, PAMs: W8VZ and K8UBK. Attention all Ohio Radio Clubs: Don't forget to mail Sweepstakes entry blank to Miss Karla Hamel, 81 W. Main St., Westerville, Ohio 43081, to be eligible for the Ohio Council Sweepstakes trophy. Also if you have worked 25 Ohio women, send her for the Ohio Council of Amateur Radio Clubs' the Worked Ohio Ladies Award. She also issues the Worked All Ohio Counties Award. K8BXT sent this news: W8PKC has a new SB-100 transceiver. W8HSP is operating mobile s.s.b. with a TR-3. K8QUC joined the Silent Keys. W8ATZU and W8ATNO are new amateurs in Warren. WA4HR moved to the Warren area. K8YMU is on 2 meters. K8BXT vacationed in New England. W8-HCL and W8APTA were in the hospital. WA8ABE has an HRO receiver and W8OBY has a new SB-100. W8NUFV is on 2 meters. K8VYO has a new Swan 350. Toledo's Ham Shack Gossip tells us that WA8HWD joined the Silent Keys. K8HWJ joined the Silent Keys, WA8EIQ moved to Iowa and K8PMI is in Viet Nam. Greater Cincinnati ARA's *The Mike & Key* informs us the club heard W8FLN discuss Microwave Systems and K8CNQ is in the Air Force and stationed on Ascension Island with ZD8CN as the call. Tusco RC's *The Beam* says the club held its annual banquet, W8NPAD is now WA8TRG, W8NPJ is now WA8PJI and W8NTVU is a new Novice. Canton ARC's *Feedline* relates that W8FSM and W8INU both joined the Silent Keys. WA8LRM attended the Northeast Ohio V.H.F. Group hamfest, W8FMW and W8GAB took a fishing trip. Mr. Horth explained operation and function of a cable TV system. WA8LAM drove your SCM to the Buckeye Net Picnic meeting at Mt. Vernon with W8BZX, DAE, CHT, LZE, RYP, K8DDG, LGA, LGB, LVC, YSO, WA8CFJ, GYT, LAM, MIQE, ORX and PAMN attending. They are begging to have stations in Southeastern Ohio to check into either the Ohio Slow Net or Buckeye Net on 3580 kc. at 6:30 EST for OSN and 7 p.m. EST for BN. I have heard the Ohio Single Side Band Net also is looking for these stations on 3972.5 kc. at 1530 and 2345Z. W8BU writes that W8BAH is in Cleveland VA Hospital. Lancaster & Fairfield County ARC's *The Rag Chever* tells us that K8KNU gave a review of an article on Understanding AVC and WA8HJD was in the hospital for surgery. W8QCU was on active training duty at Ft. Knox. From K8QEW we learn the Steubenville Area ARC held a picnic with KIMRP as visitor. W8LVW is on crutches. W8OYV vacationed in Iowa. W8YAB was in the Denver area and W8DNC was on a camping trip. Columbus ARA's *Carascope* tells us that Mr. Art Goodman spoke on Communications in the Petroleum Industry. W8DWP leads the state in the VE/W Contest and WA8RWU leads the Great Lake Division in the Novice Roundup. Parma RC's *P.R.C. Bulletin* informs us that W8EPP had two colored films shown, invitation to Ohio produced by Ohio Bell and one about New York State. The V.H.F. High Banders' *The Log* tells

us K8MAG graduated with honors from Clarks Technical School and K8DMU graduated from Ohio School for the Blind. K8BAX reports WA8S STW, STX, TRL, TRAI, TRP, TSD and TSE are new Technicians and WN8TYF is a new Novice. W8WCW is a new OO. W8UPH and WA8-CFJ made the BPL in July. The writer wants to correct a statement he made in Aug. QST, "ex-W8D8X is living in Jamaica." Len writes he still is W8D8X, living in KP4-Land and has his first baby girl. A clipping from *The Blade*, of Toledo, shows a picture of amateurs seated at the Lucas County AREC station in rehearsal for another disaster. They want to be prepared if any emergency should arrive. We need ECs for many Ohio counties. Why don't you select an EC among you and form an AREC.

Net	Freq.	Sess.	QTC	%	Time
OSSB	3972.5	51	513	10	1530 & 2345Z
BN	3580	31	282	9.1	0000Z

Traffic: (July) W8UPH 781, WA8CFJ 621, W8LJH 481, WA8-PMN 288, W8CHT 256, W8DAE 202, WA8FSX 195, W8BZX 163, K8LGA 118, WA8QES 96, WA8AUZ 86, K8YSO 81, WA8MIQE 78, W8RYP 75, K8BYR 72, K8UBK 66, WA8-OCG 62, WA8LAM 60, K8DDG 55, W8NAL 49, W8QCU 44, WA8NTA 40, K8DHF 31, WA8BTE 30, W8DQD 29, K8BAX 26, WA8XJ 25, WA8NSL 22, W8LZE 21, W8OE 21, W8GOE 20, WA8NYM 17, W8OUI 16, W8FGD 15, W8-GYT 14, W8HII 14, K8MIZ 14, WA8FKD 13, K8LGB 12, W8TV 12, W8LAG 9, K8BNL 8, WA8KPN 7, WA8PLJ 5, W8WEG 5, WA8RD 4, W8GIU 3, K8AKN 1, W8AYR 1, W8CSD 1, WA8DRL 1, K8VWB 1. (June) W8CHT 260, WA8FSK 181, W8OB 32, W8FGD 17.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: WA2VYS, PAM: W2LJC. Section nets: NYS on 3870 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Congrats to WA2UZK on making the BPL for June traffic. Welcome to WB2YKX and WB2PYZ, who joined the General Class ranks. WB2-MOJ, secy. of the Westchester ARA, reports new officers for 1966-67 are K2EEM, pres.; WB2MOI, vice-pres.; WB2MOJ, secy.; K2CJL, treas. The Westchester Technical Net meets the 1st and 3rd Wed. of each month on 28,690 Mc. at 2000 local time. WB2HZ is a new member of the A-1 Operators Club. Congrats. The *ESS Bulletin* reports that WB2DXL is enlisting in the Navy. WB2UHZ is reporting into both the ESS and NYS Nets. Approximately 15 members and guests attended the ESS Net Picnic at the QTH of W2JWZ on July 9. K2AVP, the RACES group in Westchester Co., operates weekly on four bands with both phone and RTTY. W2ODC operated /VE3 for two weeks while on vacation. All traffic-handlers should obtain Form CD-3 which lists the new ARRL numbered messages. Both W2ANV and WA2VYS were honored by NYS Mgr. W2RUF for attendance over 250 during the year. K2VTW/6 is working for Lockheed in Calif. Dan is on 20-meter s.s.b. Traffic: (July) WB2FZY 169, WA2UZK 118, WA2VYS 75, W2THE 74, K2AVP 65, K2SJM 50, WB2-UHZ 42, WA2HGB 27, W2PKY 24, WB2DXL 23, W2URP 20, W2ANV 17, W2BXP 16, WA2WGS 9, WB2QYZ 6. (June) WA2UZK 639, K2AVP 50.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	K2UFT-RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSnm	W2EW-PAM
NYCLIPN	3932 kc.	1600 Daily	WB2DXM-PAM
NLS (Slø)	3630 kc.	1845 Nightly	WB2SLI-RM

NYC-LI AREC nets: See Dec. 1965 column for sheets.

The nice new high Zepp has been good to WB2SLI. WB2-RBA has a new Drake 2B going like the dickens. WB2-DXM is now sporting an Amateur Extra ticket! WB2SRN is the new manager of the Eastern Area Sideband Net on 3815 kc. at 2100 local. W2GKZ is operating a class to upgrade the licenses of members of the Suffolk County RC. WB2PYI, 2nd district chairman of the YLRL-type girls, received a most pleasant visit from VE2KO. Remember last July when we were all lookin' around an 'wonderin' where ole K2UBG was at? Well, he was just sashayin' through the bourbon country and ended up in Morehead, Ky., at a motel owned by WA4TJS's daddy. WB4PN/2 picked up a handsome CP-15 last July '66. WB2RQF served as NCS on the V.H.F. Net during W2EW's vacation. Listen, the section traffic nets listed above are always eager to introduce new operators to the joys and pleasures of handling traffic. No prior experience is necessary so, "C'mon and give it a try!" WB2TNY, bicycle/mobile in Brooklyn, worked WB2HVW in Yonkers for a bit of ole DX. Hey, you 10-meter guys in Queens who want to join the AREC will be snapped up rather quickly

by our old reliable-type 10-meter EC, W2IAG. W2BCB has returned to the fold after taking a long rest in the mountains of Westchester. The section is indeed saddened by the passing of one of our pioneers, W2LP/W2CLA. "Doc," as he was known to most old-timers, was licensed back in 1912 and along with guys like W2PF helped organize our current Hudson Division out of what used to be the old Atlantic Division in the early 20s (1924, I think). He was the first Director of the Hudson Division and continued on to many honors, not the least of which was the QCWA 50-Year Award. He will be sorely missed throughout the section and division. WB2AWX, EC for Kings-10, is starting a 15-meter AREC net for those who can't get on 10 meters. It will be on 21.37 Mc. Wed. at 2030 local time. WB2EYS got his draft notice awhile back and by now is cavorting through boot camp, etc. WB2IIA is on a European jaunt. The Hamster Radio Club says it is supporting WA2YQW for Hudson Division Director. The Lake Success Radio Club says it is supporting W2TUK. W2EW reminds us that it's time to dust off the rigs and get into the swing of things now that the seashore and mountain shindigs are over. K2HTX reports that Huntington AREC/RACES is going full blast again Fri. nights. Hey everybody, don't forget the HARC Hudson Division Convention Oct. 15 at Tarrytown, N. Y.! Everybody's going to be there and we'd like to see you—all. Traffic: (July) WA2UWA 485, WB2MHT 271, K2AAS 186, WB2-DXM 179, W2GKZ 132, WB2SLH 105, K2UBG 93, W2EW 92, WB2UEH 82, WB2NGZ 81, WB2TCS 47, WB2AEK 34, WB4APN/2 30, WB2RQF 27, WB2TNY 20, W2EC 12, WB2MBU 8, WA2LJS 6, W2PFF 6, WB2NZL 4, WA2QJU 4, WB2UIV 3, WA2PJJ 1.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-IQP. SEC: K2ZFI.

NJN	3695 kc.	7:00 P.M.	Daily	WB2AEJ-RM
NJ Phone	3900 kc.	6:00 P.M.	Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZI-PAM
NJ 6	51,150 kc.	11:00 P.M.	M-W-Sat.	K2VNL-PAM
NJ 2	146,700 kc.	10:00 P.M.	Tue.-Sat.	K2VNL-PAM

All times shown local prevailing. AREC net data is available from K2ZFI. New appointment: WB2FUW as OBS. WA2UDT took Air Police training at Lackland AFB and should be back in N.J. by now. WB2TFK is using a homebrew five-element 2-meter beam indoors. The Fairlawn ARC meets Fri. nights at the Fairlawn Recreation Building and invites home-brewers to participate in its amateur construction projects. Contact W2TIW for details. The Union County ARA meets at the Washington St. School, Roselle, the 2nd and 4th Fri. of the month, 8 p.m. when they operate their club station, W2HFF. WB2FUW has entered Bucknell U. WA2ASM has completed a cruise aboard the USS *Wrangal* operating MIM. The Telephone ARC is on the air with W2FWG. Its memorial station, WB2PXO has been aiding NCS duty on NJ 6 & 2. WB2-SJH and WB2SJI pulled communications during a forest fire in Hampton. WA2CCF has replanted his antenna farm consisting of 80-10-meter vertical, tri-band team, big wheel and discone. WB2SEZ has a new bug and is picking up on his net operating. Congratulations to W2-JDH on the receipt of his Extra Class license. Walt is working out the bugs from his HQ-129X home-brew modifications. WB2WWH is a new member of the NJN and is active in the Maplewood C.D. as well as an NNJ ragchewers net on 15 meters. WB2UFV has 13 new countries on 20 and 15. W2NVA is an expert on indoor antennas with three for 10, 20 and 40. Frank's next project will be a shortened 160-meter dipole. W2QMT is moving to N. Y. State. WB2FZU has entered military service for four years. WB2GKB is back on the air after an operation. WB2ERM has a new Ranger. All amateurs are welcome in the Bergen Amateur Radio Assn. Net Sun. on 145.8 Mc. at 8 p.m. and 50.4 Mc. at 9 p.m. WA2RIN uses a two-channel tape recorder for logging, one channel for WWV to establish time, the other channel for received and transmitted signals. WB2QMP has 9 states on 2 meters. QO reports for July: W2TPJ-18. Traffic: (July) WB2FUW 502, WB2AEJ 264, WB2OHK 210, K2VNL 206, WB2IYO 42, K2USA 38, WB2BCS 34, WB2QMP 30, W2CVW 24, W2QNL 20, K2-EQP 15, WB2BCK 14, K2JTU 13, WB2KTO 12, WB2QLF 10, K2ZFI 10, WB2LUT 9, WA2TAF 7, WB2VHG 7, WB2-PXO 6, WB2SJH 6, WA2CCF 5, W2DRV 5, W2PEV 5, WB2URD 5, WB2SEZ 4, WA2DEW 3, K2MPX 3, W2-TFM 2, W2JDH 1. (June) WA2ASM/MIM 122, WB2QLF 22, WB2TFK 17, WB2IYO 9, WB2KTO 3.

MIDWEST DIVISION

IOWA—Acting SCM, Verlin Rowley, K0BRE—SEC: K0BRE. It is good to see the increase in the number of traffic reports this month. Regardless of whether or not you are interested in the points, this is the only way that ARRL Headquarters has of knowing how much traffic has been handled and using such statistics intelligently for the

good of amateur radio. If you handle traffic, let us know via the "traffic report." And please get them in by the 6th of the following month; we have a deadline to make.

75 M	QNI 1360	QTC 169	Sessions 26
Tallcorn	QNI 74	QTC 17	Sessions 21
Tallcorn (June)	QNI 81	QTC 3	Sessions 21
160 M IEN (May)	QNI 620	QTC 7	Sessions 31
160 M IEN (June)	QNI 514	QTC 5	Sessions 30

Traffic: (July) W0LCX 934, W0LGG 730, W0USL 91, WA0JEG 56, W0LJW 37, WA0DYV 36, WA0KXJ 33, K0BRE 29, WA0DAG 23, W0DRE 20, K0KAQ 18, WA0IYH 17, WA0JUT 16, W0GQJ 13, WA0MIH 11, W0-BKR 10, W0GPL 10, W0NGS 9, W0PTL 9, WA0KWH 7, WN0NVM 4. (June) K0TDO 11. (May) K0TDO 12, WA0KXJ 4.

KANSAS—SCM, Robert M. Summers, K0BXF—SEC: K0EMB. RM: WA0JIT. PAM: K0JHF. V.H.F. PAM: W0HAJ.

Kansas EC Net	QNI 63	QTC 10	Mgr. WA0CCW
HBN	383	119	WA0BHG
QKS	131	51	WA0JIT
KPN	258	51	K0JMF
RSN	486	109	K0JMF
Kans Wx Net	547	3	K0EMB
Kans PI Net	62	3	WA0HMZ

K0EMB reports 565 AREC members, 35 local Emergency Nets. K0MZZ is working on the 2-meter repeater in Salina. WA0CCW and WA0HMZ still are making skeds on 145.350 Mc. Tue. and Fri. at 2145 CST. WA0HAJ says several good band openings appeared on 6 during July. Lee says he still is looking for Kansas 2-meter stations on the Kansas PI Net. 145.350 Mc. Sat. at 2100 CST. Lee is now running a 4x150A on 2. The Chippawa Ragchewer Net meets Sun. at 8 p.m. CST. W0EEZ is about ready to try 432 Mc. WA0DZI reports 6-meter openings average range around 650 miles. Zone AREC Nets are functioning rather smoothly. Zone 10 QNI 50, Zone 13 QNI 46, Zone 15 low-band phone net QNI 30, c.w. net QNI 4 and 6-meter net QNI 16. The Wheat Belt Radio Club's new officers are W0VDF, pres.; K0MRI, vice-pres.; K0IFI, secy.; K0MXU, treas. W0QNI, Topeka, was awarded the W0FNS Amateur of the Year Trophy at the Kansas Nebraska Radio Club Hamfest Aug. 7. *The Log*, the printed voice of the Flint Hills Amateur Radio Club, celebrated its 12th anniversary. Members of the JARS in K.C. helped out in the Powder Puff Derby July 2 through 5. Traffic: (July) W0OHJ 378, WA0JII 121, W0INH 110, K0GZP 102, K0GII 84, K0EMB 83, WA0LLC 70, K0JMF 61, WA0MLE 57, W0AUX 51, K0BFX 48, K0-UVH 45, K0MRI 42, W0VRZ 41, K0MZZ 30, WA0CCW 26, WA0EMQ 23, K0LPE 12, W0FDJ 5, WA0HAMZ 5. (June) WA0EMQ 3.

MISSOURI—SCM, Alfred E. Schwaneke, W0TPK—SEC: W0BUL. New appointments: K0IFL as OO; K0TCB as OBS and OPS. Appointments renewed: K0-DEQ as ORS, K0YIP as OO, W0BUL as OBS, K0JPL as OO and OPS. I am very sorry to report that W0HVV joined the ranks of Silent Keys July 13. Gib was licensed in the early '30s, worked all bands from 6 to 160, was one of the original members of MEN when it first started and was a member of the Ridge Runners Net K0AXU of the N.W. St. Louis ARC, placed first for the SCM Field Day Trophy with 329 contacts in 71 sections on 20 meters for a score of 23,359. W0GWX, of the Lees Summit ARC, was second with 432 contacts in 39 sections on 75 meters for a score of 16,848. The ARC of Jackson County is now an ARRL affiliated club. K0LQZ achieved membership in CEC. WA0JRP is a new call in Elsberry, having moved from Colorado. WN0OSU is publishing a St. Louis Teen Ham newspaper. The following have qualified for MTN certificates: WA0HQR, WA0JOA, WA0KRL, WA0LCV and K0ONK. WAYAM/D, editor of *Tri-State QRM*, has a new Swan 350. OES reports were received from W0JTD and K0JWN. The FCC office in K.C. has moved from the 17th to the 31st floor. July net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	13	172	17	W0BUL
MoSSB	3963	2400Z	M-Sat.	26	345	108	K0TCB
MoPON	3810	2100Z	M-F	20	210	99	W0HVJ
MTTN	3940	2300Z	M-F	22	176	70	WA0ELM
MON	3580	0100Z	Daily	31	164	151	W0WYJ
QMO	3580	2200Z	Sun.	5	15	6	WA0FKD
MSN	3715	0300Z	Daily	30	47	—	K0ONK
MNN	7063	1800Z	M-Sat.	25	49	10	W0BUD
PHD	50.4	0130Z	Tues. (GMT)	3	45	1	WA0FLI

Traffic: K0ONK 1071, K0AEM 279, WA0FKD 169, W0WYJ 168, W0HVJ 73, WA0FMD 50, W0OOD 47,

THE new National 200 transceiver differs rather substantially from its closest competition in that it incorporates crystal-controlled pre-mixing in the front end to allow the use of a single VFO rather than a separate, tunable, VFO for each band.

THE advantages of crystal-controlling the front end of a receiver, transmitter, or transceiver should be well-known by now, and it is somewhat surprising to see the old tunable front end technique still in use by at least one manufacturer of low-cost transceiving equipment. To briefly review the pros and cons . . . brand "X" uses a separate, bandswitched, VFO range for each amateur band, removed in frequency from the signal by the IF — approximately 5 MHz. As a result, on the 10 meter band the VFO is operating at approximately 33 MHz! Stability, of course, greatly suffers because of the difficulty of building a stable oscillator at high frequencies, and is further impaired by two important factors — the introduction of bandswitch contacts into the oscillator circuit, and the necessity of individually temperature compensating each tuning range. In addition, dial calibration must necessarily vary from band to band.

THE National 200, on the other hand, incorporates a single, non-bandswitched VFO which tunes only the 600 KHz range from 8.7 MHz to 9.3 MHz. This VFO is accurately temperature compensated, and is inherently mechanically and electrically more stable because it is not affected by bandswitch variation or contact cleanliness. Of course, because it is used for each of the five bands, the same stability is achieved from band to band and dial calibration is unchanged when changing bands. The output of the '200 VFO is "pre-mixed" with that from one of three stable crystal oscillators to produce a tunable mixer output, which is in turn mixed with the signal frequency to produce the IF frequency of 5.2003 MHz. Crystal oscillators are necessary only for 40, 15, and 10 meter operation — on 80 and 20 meters the VFO mixes directly with the signal frequency to produce the 5.2003 MHz IF. As you can see, this technique permits the use of one VFO for all bands, and makes the task of obtaining good stability much easier from the very beginning. One additional advantage of the VFO-crystal oscillator pre-mixer is that the mixer itself acts as a VFO buffer — thus minimizing extraneous effects on the VFO which might otherwise cause FM problems or keying chirp.

AT only \$359, the new National 200 is a lot of five-band transceiver for the money — offering, as it does, SSB, CW and even AM operation with separate AM detection in that mode. Like the top-of-the-line NCX-5, it incorporates a solid state balanced modulator for "set and forget" carrier suppression with automatic pre-set carrier insertion for AM or CW operation. Single knob band-switching is included, of course, with only *Exciter* and *PA Tune-Load* controls to adjust when changing bands. ALC is included to further increase its 200 watt PEP sock on all bands through 10 meters, and an additional operating convenience is front panel choice of either manual or push-to-talk operation.

It's probable that the power supply for the single or tri-band transceiver (such as the NCX-3) that you trade in on the new '200 will operate the new rig — it was designed to operate from an NCX-A or NCX-D supply without modification. On the other hand, if you own no supply, the National 200 and its new AC-200 117-234 V.A.C. supply come to only a few dollars more than the closest competitive transceiver *without* power supply. Why not move up to the five band National 200 right now?

FRANK ROBERTS, W1JVG



National Radio Company, Inc.

WA0ELM 46, W0EEE 42, W0GBJ 32, W0TPK 26, K0JPL 25, K0TCB 25, W0RTO 17, W0GQR 15, K0LZG 14, K0ORB 10, W0BUL 9, W0QFL 8, W0QJL 7, K0DEQ 6, W0CCH 2.

NEBRASKA—SCM, Frank Allen, W0GGP—SEC: K0JXX. Appointments: K0JPP and K0FVB as ECs; W0AQOB as OPS. Net reports for the month: Nebr. Storm Net, W0AKGD, 1st session, QNI 919, QTC 26; 2nd Session, QNI 581, QTC 35. Dead End Net, W0AMCX, QNI 282, QTC 32. Nebr. Morn. Phone Net, K0UWK, QNI 890, QTC 34. Nebr. AREC Net, W0IRZ, QNI 164, QTC 1. West Nebr. Net, W0NIK, QNI 430, QTC 23. Nebr. C.W. Net (NEB) W0AGHZ, QNI 94, QTC 37. AREC C.W. Net (NACN) W0EEI, QNI 12, QTC 0. Nebr. Emergency Phone Net, W0AGHZ, QNI 1643, QTC 88. A new Novice net has been formed in the state, according to W0ANUK. It meets at 0200Z daily on 3747 kc. W0FQB displayed and then donated a "Joy Stock" antenna to the Central Nebraska Radio Club at Victoria Springs in July. Governor Morrison attended to award Centennial Certificates and make several amateurs "Admirals" in the Nebraska Navy. Traffic: W0AGHZ 279, W0ANUK 148, W0ALOY 94, W0LOD 69, K0UWK 34, K0IXY 17, W0BOK 12, W0GGP 12, W0BFV 11, W0FQ 11, W0PBY 10, W0AGVJ 10, K0FJT 8, W0EEI 7, W0AGK, 0 6, K0DVG 5, K0HNW 4, W0LO 4, W0RAM 4, K0KJP 3, W0WKP 3, W0ABL 2, W0AIXD 2, K0OAL 2, W0PFF 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. Net reports for July:

Net	Freq.	Days	Time	Sess.	QNI	QTC
CN	3640	Daily	1845	31	259	187
CPN	3880	M-S	1800	31	380	99

CN high QNI: K1TKS and K1OQG. CPN high QNI: W1AEEJ, W1YBH 23; W1GVT 22; K1LFW 20; K1EIC, W1AIBA 19; W1HBB, K1YGS 18; K1OQG 16; W1DXS 15. Appointee reports were received from W1EBO, W1EQV, W1BGD as OOs; K1YON as OES; K1AFC as OBS. All ECs should report to SEC W1PRT each month. EC reports were received from K1OQG, K1QPM and W1WHR. W1PRT keeps ECs informed via his *Pi-Conn Bulletin* (Prepare in Conn.). Clubs should include at least one Official Observer among their members. These appointments are available to qualified General Class (or higher) licensees. See July QST page 99. Application blanks will be sent to all who express an interest to become OO. W1EFW, 1RN Net Mgr. (3605 kc.) publishes a very good *First Regional Net Bulletin* for net members. W1ADW and K1EFM are editors of *CARA Newsletter* for the Candlewood Amateur Radio Assoc. in Danbury—a good example for other clubs to follow. *Conn. Council Newsletter* suggests that club representatives join in QSO on 3830 kc. at 6:30 p.m. local time each Wed. New officers of the Conn. Wireless Assn. are W1NJM, pres.; W1RZJ, vice-pres.; W1TJC, secy.; K1HTV, treas.; W1BGD, comm. mgr. W1QV, N. E. Director, is general chairman for the Tri-City Hamfest in New London Oct. 1. W1NTH is now CNRFV with the USNAF. K1MBA now is in military service. W1DWF is attending Air Force Electronics School. K1CSY has been checking into the Eye Bank Net daily for over two years and until recently was the only New England outlet! K1OQG was incorrectly listed as K1LQG in the May report. Traffic: (July) W1EFW 317, W1BGD 144, K1LMS 138, K1TKS 136, K1LFW 103, K1OQG 94, K1EIC 92, K1EIR 74, W1BDI 40, K1EYJ 37, K1STM 35, W1YBH 26, K1QPN 24, W1AIDM 20, W1QV 18, W1GVT 17, K1NTR 15, W1AFNJ 10, K1YGS 10, W1YBI 7, W1CUH 6, W1OBR 6, W1ZL 4. (July) W1OBR 11, W1BNB 4.

EASTERN MASSACHUSETTS—SCM, Frank Baker, Jr., W1ALP—W1AOG, our SEC, received reports from W1s STX, LVK, K1PNB, K1ERO, new EC for Rowley, is General Class now. K1EJM is a new OES. W1UOP is a new OPS. K1NPS is on his way to Thailand for 3 years. His dad is K1AFF. W1ZSS/1 is from N.J. and Westfield, Mass. K1SXB is on 40-meter c.w. The B12MN held 26 sessions with 100 QNIs, 151 traffic. W1PSL has his call back. W1YTB won an award for an article in QST. W1KSO visited W1LAZ. K1YGV is on 15. W1GA is mobile on 75. K1LZV is on 160 and 75. The EMNN had 49 QNIs, 10 sessions, 16 traffic, reports K1PNB. Kx-W1NXX is waiting for a new call. His brother is W1A2ABO. New check-ins to our EMCWN on 3660: W1s DEK, DGG, DGH, DLT, DOB, ECV, EVD, EYV, W1EAF is back on the air. Heard on 75: W1s GKZ, EKV, DOB, K1ZJK. Heard on 2: W1BVV, K1YZE, W1DAL has a new antenna for all bands. W1NFFJ is now General Class and has an HQ-110. W1AFFS is moving to Portland, Me. W1ZLX visited W1AW, W1MVO

CONNECTICUT QSO PARTY

October 29-31

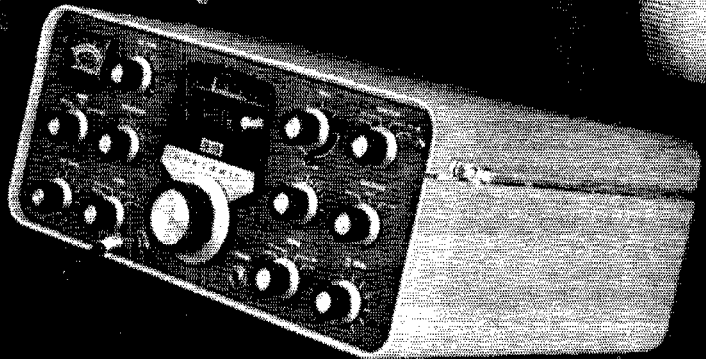
The Candlewood Amateur Radio Association invites hams throughout the world to take part in the 4th Connecticut QSO Party.

Rules: 1) The contest period is from 2100 GMT October 29 to 0300 GMT October 31. 2) The general call is "CQ Conn" on c.w. and "CQ the Connecticut QSO Party" on phone. 3) Exchange number, RS(T), ARRL section, Conn. county or country. 4) Scoring: 5 points per QSO. Out-of-state stations multiply times Conn. counties. Conn. stations multiply times ARRL sections, countries. A station may be worked once per band/mode. 5) Suggested frequencies: 3540 3840 7040 14,040 14,240 21,100 and 144 Mc. (Slow speed operators use 3700 7150 and 21,100 for Conn. QSOs) Awards: Certificates will be sent to the high scorer in each ARRL section and country, also the two highest scorers in each Conn. County. 7) Logs must show dates, times, band, mode numbers, RS(T) and QTH. Note your license class, your address and show your score calculations. Send all logs before December 3rd to Connecticut QSO Party, Candlewood Amateur Radio Assn., Tom O'Hara, W1DDJ, 7 West Wooster Street, Danbury, Connecticut 06810.

has a new antenna. W1DWP is on 6. W1PGN has a new QTH. K1OKE is NC for the 6-meter net. The Whitman ARC is now incorporated. New officers are K1YBS, pres.; W1ADD, vice-pres.; K1UMP, treas.; Mary Hooker, secy. W1BOQ is on c.w. on 40. W1QZO is a Silent Key. The 6-Meter Crossband Net had 21 sessions, 197 QNIs, 6 traffic. W1AQE won in the Fla. QSO Party. K1KBO is the daily NCS of the "QTC" Traffic Net on 7215 at 1800Z Mon. through Sat. W1JNV has a 310 DXCC sticker and is a member of the Nutwork Net on 14,282. W1UE is on 15 a lot and works F3DX, his brother-in-law. K1KTC is at the U. of Mass. for the summer. W1HKG went to the Calif. Hamfest. W1ALB writes from Indiana. W1HIL is getting out well on 2, working all N.E., N.Y., N.J., Pa., Va. and Que. W1OFY has an HW-12 s.s.b. receiver for 75. W1NF uses two for "Intruder Watch." K1UKT, now General, is on 2 and 6. W1AET is DXing on 15. He still needs Utah. K1GPH is having rig troubles. K1MIF worked out in Colorado for the summer. K1PNB overhauled his v.f.o. Needham stations on during the July 4th celebration: W1s STX, PEX, K1s VPJ, VFY, VHZ, EZX, OQQ, AIKY, ZKK, OQT, KBB, W1s GHJ, FEP, FRK, W1AECY has a new receiver. W1DEG/DED have a Twoer. W1DJC is on 20 c.w. W1ADGH is DXing on 20. W1UOP is building a new ground system for the HyTower vertical. W1OJM is on the Cape for the summer. K1EYM has a new QTH. W1ZQM and K1BUF helped out in the July 4th celebration in Burlington. W1SPW is over in Portugal. The Massachusetts Area had a very good Field Day this year. W1BVP was chairman. K1VWJ writes from Greece and is on at S1QWV 1500 GMT to 2300 GMT around 14,250 and 14,300 on s.s.b. New officers of the Cheshire Club are K1MGP, pres.; K1RZK, vice-pres.; K1TEE, secy.-treas. A new net, the Mass. Bay Net is on 7050 c.w. at 0000 GMT. Mon. through Fri. W1A8YA is NCS. W1A8EY Mgr. W1ACT/1 is handling traffic from the U.S.S. Mass. week ends. K1FPV is on s.s.b. K9AQP/1 has a 6148 on 6 and built a converter for 2. K1EJM worked W3BSV in Md. on 2. W1ALCD is on 2. K1FWF worked his first W2 on 2. W1PEX and W1AGS/1 made the BPL Appointments endorsed: W1PEX and W1MME as OPSs; W1s THT, DFS, JNV, AXG, EFW and K1-CCL as OOs; W1s UE, MME, STX, VYI and K1VD as ECs; W1ZLX and K1CTM as OBSs; K1SCL, W1MME and W1ALP as OBSs. Traffic: (July) W1PEX 143, K1PNB 134, W1AGS/1 133, W1EMG 124, W1ZSS 58, K1ESG 56, K1VPJ 53, W1AET 46, W1UIR 46, K1CLM 45, W1CTR 38, W1DOM 36, W1OFK 30, W1SI 30, W1AECY 27, W1A8EY 26, W1ADLT 25, W1AOG 17, K1ETT 15, W1AID 14, K1GA 14, W1A8YA 13, W1AIDJ 9, K1EJM 8, W1A8EY 7, W1ADGH 5, W1AIDC 4, K1RCD 4, K1LXC 3, W1UOP 2, K1YUB 1. (June) W1OJM 58, W1ZLX 27, K1EYM 6, K1LXC 5, W1BGW 4, K1BUF 4.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1WQI, K1ZVN. RM: K1TZZ, V.H.F.P. PAM: K1OYB. Traffic Nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 on 3940 kc. Mon. through Sat. Pine Tree Net, daily at 1900 on 3596 kc. Earle B. White, W1KJN, of Belfast, passed away recently. Although he has not been active lately he was active on c.d. and the nets. He will be sadly missed by all who knew him along the way.

the most advanced 6 meter SSB transceiver in Amateur Radio . . .



the **HEATHKIT® SB-110** 6-meter transceiver

You Will Pay Over A \$100 More For A Comparable 6-Meter SSB Transceiver And Still Not Receive The Quality, Value, High-Performance Features, And Protection Against Obsolescence Included In the Heath SB-110

• Built-in VOX at no extra cost • Upper & lower side-band or CW operation • Built-in 100 kc crystal calibrator at no extra cost • Oscillator Mode switch for VFO transceiver, xtal control transceiver, or xtal control transmit — vfo receive (ideal for net operation) • 2.1 kc SSB filter with superior 2 to 1 shape factor • Built-in sidetone for CW operation • The famous Heath LMO (Linear Master Oscillator) that provides tuning linearity with 1 kc dial calibration . . . stability, and calibration accuracy never before found on six • Sophisticated triple conversion circuitry • Low cost companion AC and DC power supplies

Here's The 180-Watt PEP, 170-Watt CW Input Transceiver That Sets The Pace For All Future VHF SSB Transceivers. The Heath SB-110 provides full VOX, PTT, & CW operation on six with the same selectivity, stability, and performance already made famous by the Heath SB-Series equipment on 80-10 meters. Choose the appropriate power supply and go fixed or mobile. Discover for yourself the pleasure of operating the most advanced VHF transceiver in amateur radio . . . the satisfaction of owning a truly high-performance 6 meter rig you have assembled yourself.

Kit SB-110, 23 lbs. \$320.00

PARTIAL SB-110 SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 uv for 10 db signal-plus-noise to noise ratio. Selectivity: 2.1 kc @ 6 db down, 5 kc max. @ 60 db down. Image rejection: 50 db or better. IF rejection: 50 db or better. Audio output power: 1 watt. AGC characteristics: Audio output level varies less than 12 db for 50 db change of input signal level (0.5 uv to 150 uv). **TRANSMITTER SECTION:** DC power input: SSB, 180 watts PEP; CW, 150 watts. RF power output: SSB, 100 watts PEP, CW, 90 watts (50 ohm non-reactive load). Output impedance: 50 ohm nominal with not more than 2:1 SWR. Carrier suppression: 55 db down from rated output. Unwanted sideband suppression: 55 db down from rated output @ 1000 cps & higher. Distortion products: 30 db down from rated PEP output. Hum & noise: 40 db or better below rated carrier. Keying characteristics: VOX operated from keyed tone using grid-block keying. **GENERAL:** Frequency coverage: 49.5 to 54.0 mc in 500 kc segments (50.0 to 52.0 mc with crystals supplied). Frequency selection: Built-in LMO or crystal control. Frequency stability: Less than 100 cps drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 cps drift for ±10% supply voltage variations. Dial Accuracy: Electrical, within 400 cps on all band segments, after calibration at nearest 100 kc point. Visual, within 200 cps. Dial backlash: No more than 50 cps. Calibration: Every 100 kc. Power requirements: High voltage, +700 v. DC @ 250 ma with 1% max. ripple. Low voltage, +250 v. DC @ 100 ma with .05% max. ripple. Bias voltage, —115 v. DC @ 10 ma with .5% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps. Dimensions: 14 1/8" W x 6 3/4" H x 13 3/4" D.

- Kit HP-13, Mobile Power Supply, 7 lbs. \$59.95
- Kit HP-23, Fixed Station Power Supply, 19 lbs. \$89.95
- Kit SBA-100-1, Mobile Mounting Bracket, 6 lbs. \$14.95
- Kit SB-600, SB Series Speaker, 5 lbs. \$17.95
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AM-167



NORTHWESTERN DIVISION

VEIHL and family paid a surprise visit to KIDYG. Ralph was one of the original members of the Satellite Data Network. KIDAP has been active in the CD Parties and doing very well. Traffic KIWQI 55, WIGU 43, WAIDOW 17, KIDAP 12.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, WISWX/KIDSA—SEC: WIALE/WITNO, PAM: K1-APQ, RM: WIDYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2300Z and Sun. at 1330Z. The VTNH Net meets on 3685 kc. Mon. through Fri. at 2230Z. Endorsement: KIWKPK as QES. The Manchester Radio Club is having its Annual Banquet Oct. 22 and WAIDZX will supply information for those interested. KIHK made DXCC. KIJFQ was Operator of the Month. Congratulations to you, Bea. KIAFG has changed jobs. KIPCY likes apple pie. KINMU is now active on 2 meters. K1-RNN is a new GSPN member. KIAPO was active in the Phone CD Party. K1GQH is working DX on 10 meters. W2KHE also is WIWHP in New Hampshire. WICMV is getting married. KIAEG is now on v.h.i.-u.h.f. with his new color TV. KIGTZ is on vacation in our state. Traffic: WIMEX 12, KIPQV 5, WISWX 3.

RHODE ISLAND—SCM, John E. Johnson, KIAAV—SEC: WYINE, PAM: WITXL, RM: WIBTV, V.H.F. PAM: KITPK, RISPAN report: 31 sessions, 410 QNI, 78 traffic. The WIAQ Club of Rumford issued the following WRI certificates: No. 82 to W2LQP, No. 83 to W2NCG, No. 84 to W4HYW and No. 85 to K1ONU. The club made 138 contacts during R.I. Amateur Radio Week. Members of the club bowling team are WIWAC, WYUUT, KIAMG, KIEMO and KIPEL. KIVPZ has been elected to club membership. WAIEEJ has been elected asst. net mgr. for the New England Teenage Net. The net meets every Tue., Wed. and Thurs. nights on 3880 kc. at 1900 local time. KISGX is net mgr. Now that fall activities are about to begin make sure that copy of your special events is sent to the SCM for use in this column. The University of Rhode Island RC, WIKMU, has set up a 6- and 2-meter station. The club has worked Ohio on the 2-meter station and the 6-meter station has an effective radius of 150 miles. This should be a good chance for hams to work Washington County for the WRI certificate. Traffic: (July) WITXL 298, WIBTV 91, KITPK 60, KIVYC 25, WYKQ 29, WAIEEJ 25, K1YEV 17, K1VPK 4, (June) K1VYC 46, K1YVN 15, (May) WIBTV 37.

VERMONT—SCM, E. Reginald Murray, KIAMPN—SEC: WIVSA, RM: KIUGZ. July net reports.

Net	Freq.	Time	Days	QNI	QTC	NCS
Gr. Mt.	3855	2130Z	Dy x S	511	13	W1VMC
Vt. Fone	3855	1300Z	Sun.			W1UCL
VTNH	3685	2230Z	M-F	64	29	KIUGZ
VTCD	3980/4	1400Z	Sun.	34	12	W1AD
VTSB	3909	2230Z	M-Sat.	590	30	W1CBW
		1230Z	Sun.			

Welcome to new hams WN1GMW, Newport Center, and WN1GMS, North Hero. Congrats to new Generals WA1-ETJ, Burlington, and WA1GOF, Bennington. K1MFP moved back to Montpelier. K1EKI transferred to St. Albans. W1UCL moved to Caledonia County. W1WFZ graduated and left us. K1FSY has an SB-400. Traffic: (July) K1BQB 293, K1MPN 11, W1FRT 9, K1UGZ 4, (June) W1FRT 6, K1FSY 2.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU, C.W. RM: K1IJV. Lacking the usual club bulletins during the summer months we are a bit stuck for news (since very few of our West. Mass. members take the time to mail reports of their activities to me.) Sure wish they would! W1EOB has a new Heath SB-400 in the works to go along with his SB-200. WN1GHA, formerly of the East. Mass. section, is now in ours. Welcome, C.W. RM K1IJV reports the following: WAM (3560 kc. nightly at 7 p.m.) handled 57 messages during July with the following in attendance (in order of activity): K1WZY, W1ZPB, W1-DYW, K1IJV, W1BVR, WA1FNX, W1DWA, W1ZKZV/1, W1MNG. This net will gladly welcome any West. Mass. c.w. operators any nights they might care to report in. Although the net usually operates at a fairly fast clip, the Net Control will gladly adjust speed to suit your requirements so don't hesitate to report in at any speed. My personal opinion is that every amateur should know how to originate traffic. For emergency work definite forms can cut time. Operators without the know-how usually just gum up the whole works (this applies to both c.w. and phone operation). Also, in my opinion, if you are without the know-how to operate in either a traffic or emergency net, then you are not carrying your share of the responsibility of having an amateur ticket! Ever hear of PICON? (Amateur radio is authorized in the Public Interest Convenience or Necessity). Traffic: K1SSH 42, K1WZY 39, K1IJV 38, W1BVR 35, W1ZPB 25.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roytance, W7RZY, V.H.F. PAM: K7IOA. New appointments: K7MEA, W7MSB as ECs. The Glacier Park Hamfest was held July 23 and 24 with 236 registered. VE6ASN was the youngest licensed ham at the gathering. A new American Director was elected. K7VPS, of Columbia Falls. The annual Flathead Area Picnic had hams from all over the state in attendance. K7DCI is the secy.-treasurer of this group. At the Montana PON Picnic K7BON was the fish-derby winner, beating out last year's winner K7UON. While on vacation in O-Jand W7NPV stopped to visit the facilities of WWV at Colorado Springs. K7UPEH has moved to his new QTH in Billings. A recent visitor at the Butte Amateur Radio Club meeting was K7PWY. On July 17 the Havre group held a fine picnic just outside of Havre. K7MYC is on with a new SW-350. K7PWY also is on with a new SW-350. K7TQM is starting a new net on 3881 kc. at 3:00 MIST called the Bitter Root Net. The Yellowstone Amateur Radio Club is going to get 51% of the membership members of the ARRL so they can become re-affiliated with the League. Why not check and see if your club is affiliated. If not join the League to help your group obtain this 51%. If you are interested in joining the Navy MARS program check with K7VSS, in Billings. K7LDZ, with the help of K7EGJ, WA7EJQ and K0QLAI, moved his own station out to the State Fair in Great Falls to help demonstrate amateur radio to the fair-goers. Traffic: W7FL 7, K7EGJ 5.

OREGON—SCM, Everett H. France, W7AJN—Will be on vacation the first two weeks of August. July activities, etc., will be combined with August reports. See you next month.—Ev.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7WUT, RM: W7OEB, PAM: W7LEC, V.H.F. PAM: W7PQG, NTS nets:

WSN	3535	Daily	QNI 362	QTC 481	Sess. 31
NTN	3970	Drily	1930Z	QNI 977	QTC 563
WARTS	3970	Ex.-Sun.	0100Z	QNI 848	QTC 217
				Sess. 26	

The Washington Section Traffic Hamfest held in Yakima July 9-10 had over 350 members and families present; for WARTS, new Net Mgr. K7YFJ, directors, N.E. K7QNW, S.W. WA7BTZ, N.W. secy.-treas. and editor for *Parasite* W7ICW, and recording secy. W7AMCW. The Puget Sound Council of Amateur Radio Clubs will hold its Fifth Annual Banquet Oct. 23 at Waller Road Grange Hall, Tacoma. Your Secy. had the pleasure of speaking to members of the QCWA Northwest chapter annual meeting in Portland July 24. Our section mourns the passing of W7REZ, Tacoma's most-heard signal. OBS K7CHE/7 now is on seek with the bulletin service from Richland. The Northwest Amateur Radio Communications System held its fourth annual camp-out at Indian Creek July 16-17 with over 70 hams and families taking part. EC W7AJV is working all his extra time on the new ham-shack. WSN shows an increase in traffic with the same membership for the summer months and continues to function smoothly with all NCS and liaison jobs fully staffed. Worked Five BEARS (Boeing Employees Amateur Radio Society) awards now are being issued and can be won during the Washington Section QSO Party W7FNE now is MM on the SS *Hudson* to Indonesia via Suez. The new QCWA chairman is K7CNE, W7BV again is on 3950 kc. after surgery. KL7CSR and W7BTB maintain daily contact on 14,220 Mc. W7COG and K7PVF now are in Seattle on a Boeing building project. K7CDI is in Moses Lake on a sub-station job. K7QOM now is USN, San Diego. ORS W7JEY is active on WSN and RN7. ORS W7AIB reports summer DX nil, but the Victoria Wireless Club hosted the Clallam County group in August at Victoria. PAM W7LEC states his code practice net now is under way on 3728. W7AMCW and W7AMC took in the Okanogan Hamfest. EC/ORs W7GYE visited Sheridan, Wyo., and Portland and picked up QSLs to total 39 DX-wise. OPS W7EVA hopes for better conditions this fall. W7VE is now Bremerton and Kitsap County Official RACES station. Our sympathy to W7-HWD on the loss of his wife.

NWSSN	3700	Ex. Sun.	2000Z	QNI 257	QTC 77	Sess. 20
NWSSB	3945	Daily		No report		

Traffic: (July) W7BA 1629, K7TCY 110, W7HMA 765, W7DZX 432, K7CTP 182, W7PI 146, W7APS 133, W7OEB 129, W7BTB 128, W7DXI 124, W7KZ 61, W7JEY 51, W7AIR 43, W7HMQ 42, W7GVC 41, W7LEC 41, W7AMCW 21, K7VNB 20, W7GYF 18, W7CXD 9, W7AMC 8, W7-RVW 7, W7AXT 5, WA7EMM 5, (June) WA7DXI 23, W7GVC 27.

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- Kit HA-14\$99.95
- Kit SBA-100-1, SB-100 Mobile Mtg. Bracket \$14.95
- Kit HP-13, SB-100 Mobile Power Supply...\$59.95
- Kit HP-14, HA-14 Mobile Power Supply.....\$89.95
- Kit HP-23, SB-100 AC Power Supply.....\$39.95
- Kit HP-24, HA-14 AC Power Supply.....\$49.95
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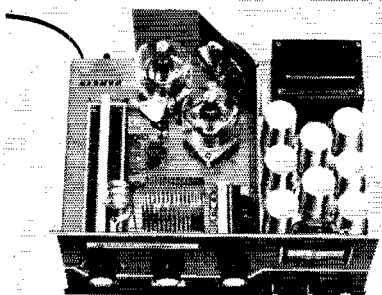
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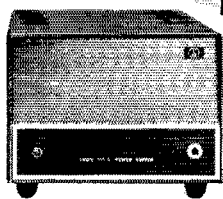
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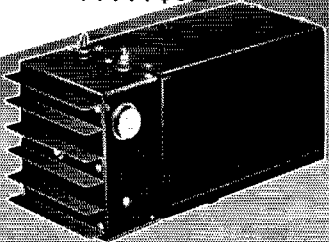
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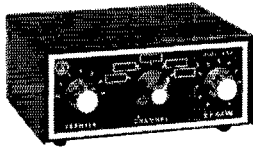
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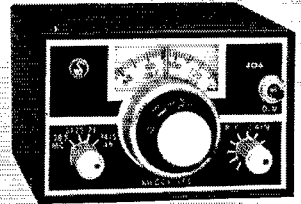
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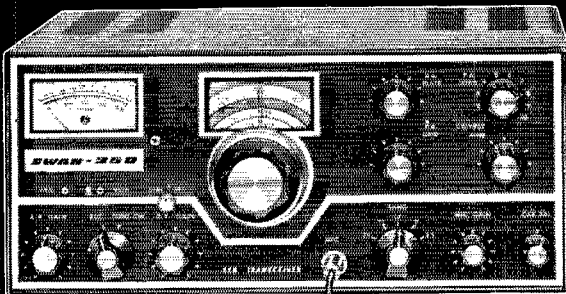
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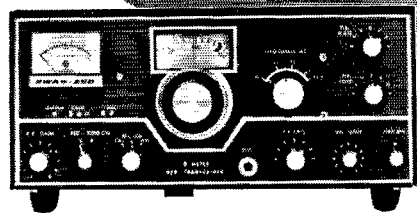
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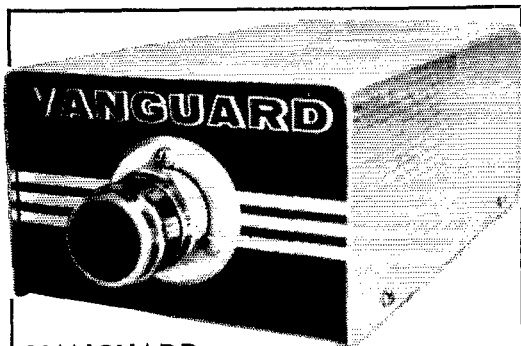
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PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—SEC: None. ECs: W6TYM and K6TFT. OESs: K6SPP, WA6-RRH, W6BYC, W6YKS, WB6SAJ, OPSS: K6TFT, WA6-WNG/WB6CRC, WA6QZA, WA6PTU. ORSs: WB6ETY, WA6WNG/WB6CRC, WA6FBS, W6IDY, WB6FHH, W6-TYM, W6YKS. OOs: K6LRN, WA6KLL, W6TYM, W6-OJW, W6CBF, OESs: WB6NUI, K6TFT, WB6IBU, WA6-VAT, W6DUB, W6LW, W6CB, WA6NEL, WA6RRH, WB6ILH. RM: WA6WNG/WB6CRC. V.H.F. PAM: WA6RRH. The East Bay section hit the jackpot in July with HPL certificates going to WA6WNG/WB6CRC, W6-IDY and W6UZX. W6IDY is planning a trip to Europe. W6UZX is working on break-in circuitry. W6TYM was in Oregon on his vacation. KOPIV/6 is leaving the Bay area and will be /4 soon. W6CBF is mobile with an SB-34. W6ZF is building a conical monopole for bulletin skeds. Ron transmits news of the Pacific Division and other pertinent data on 3540 and 7080 kc. Drop a card to 1573 Baywood Lane, Napa, Ca., 94558, for more information. W6QJW and several others in the section report the weather has been too hot for hamming. WB6LJF and K6ONI are new AREC members. WB6NUI is having fun trying to get his 4-1000A linear on the air. K6LRN sold his rig to WB6FHH and is now trying to get the bugs out of an old Viking II. The Hayward Radio Club is helping to prepare for the Greater Bay Area hamfest to be held at the Edgewater Inn at Oakland Oct. 22 and 23. WN6SSU is a new ham in Hayward and is the XYL of WB6RPK. WA6JCS accuses WN6SPE of being so busy building gear that his Novice license may expire before he has a chance to operate. To the best of my knowledge I have all AREC records. If it has been over a year since you last filled out an AREC form, you will be getting a new one in the mail to fill out and return to me. I would like to have an up-to-date roster of AREC members to give our new SAC—when and if. All applicants for AREC membership residing in Alameda, Contra Costa, Napa, Solano or Lake counties should mail their AREC forms to 107 Cordova Way, Concord, Ca. 94520. Be sure to include your zip code. There also are plenty of openings for ECs, ORSs, etc. Drop me a line or a radiogram for more information.

NCN	0300Z	Daily	3,635
BAN	0145Z	Tues.-Sat.	1467

Traffic: WA6WNG/WB6CRC 655, W6IDY 572, W6UZX 401, W6TYM 182, KOPIV/6 126, WA6FBS 26, W6CBF 8, K6LRN 8, W6ZF 8.

HAWAII—SCM, Lee R. Wien, KH6BZF—Asst. SCM/SEC: Ernie J. Kuriansky, KH6CCL, PAM: WOPAN/KH6, RM: Vacant. V.H.F. PAM: KH6EEM. Join a net today.

Net	Freq. Mc.	Time	Days
Friendly	7.290	2030Z	M-F
No Ka Oi	7.290	2230Z	Sat.
50th State	3.885	0500Z	Tue.-Sat.

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 RACES 40 7.225 1930Z 2&4 Sun.
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 RACES 6 50.252 1930Z 2&4 Sun.
 RACES 2 147.000 1930Z 2&4 Sun.

K3DIO/KH6, his XYL and that harmonic, Michelle Elaine, left the islands for work in Delaware. KH6EXI and his gang were all up on the Mainland for the summer. KH6HP recently was cited by his insurance firm for 21 years meritorious service. W6EKJ, his pretty XYL and their family arrived for a Hawaiian vacation aboard the USS *Lurline*. Marty flew over with the Swan 350, KH6-AFS, down Hilo-way, placed 14th in the recent Kona Billfish Tourney. KH6PHQ, the daughter of KH6SN, is the only licensed harmonic at home this summer and at the OM's rig. KH6DJE is working at the USARHAW Signal station, KH6USA. KW6DK assumes the Army MARS Director job at Schofield, WN2YED/KH6 recently moved here from Rome, N.Y. KH6DJ recently spoke at the Engineering Association of Hawaii luncheon about the more exotic technical aspects of his two 6-month tours in Antarctica. KH6ATS, KH6CPW, KH6BQQ and KH6ELW are the chief net control stations behind the Friendly Net. Traffic: (July) KG6AIG 169, KH6BZF 10, WOPAN/KH6 1. (June) KH6EOQ 26.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7BEU, K7SRM, W7SRM, W7YKN and K7WLX were the Field Day operators for the NARA at Glenna Creek. A Worked-All-Nevada-Counties certificate by the NARA is in the making. ON5DS was a guest at W7YKN. K7RKH has a new HB-432 s.s.b. rig running 100 watts. W7CFS is the EC for Fallon and reports the 3825 s.s.b. net check-ins are increasing with all parts of Nevada being represented. W7YDX and K7USU have new

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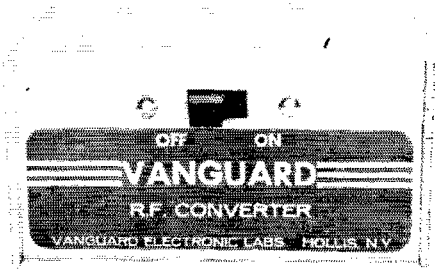
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	301-E2	145-146	.6-1.6
	301-F	144-146	28-30
	301-Q	144-148	14-18
	301-R	144-148	7-11
	301-S	143.5-148.5	30-35
6M	301-B1	50-51	.6-1.6
	301-B2	51-52	.6-1.6
	301-C1	50-54	7-11
	301-C2	50-54	14-18
	301-J	50-52	28-30
20M	301-G	13.6-14.6	.6-1.6
CB	301-A1	26.5-27.5	.6-1.6
	301-A2	26.8-27.3	3.5-4.0
40M	301-K	7-8	.6-1.6
CHU WWV	301-L	3.35	1.0
	301-H	5.0	1.0
Int'l. Marine	301-I1	9-10	.6-1.6
	301-I2	15-16	.6-1.6
	301-M	2-3	.6-1.6
Aircraft	301-N1	118-119	.6-1.6
	301-N2	119-120	.6-1.6
	301-N3	120-121	.6-1.6
	301-N4	121-122	.6-1.6
	301-N5	122-123	.6-1.6
	301-N6	123-124	.6-1.6
Fire Police VHF Ma- rine etc.	301-P1	154-155	.6-1.6
	301-P2	155-156	.6-1.6
	301-P3	154-158	7-11
	301-P4	154-158	104-108
	301-P5	156.3-157.3	.6-1.6
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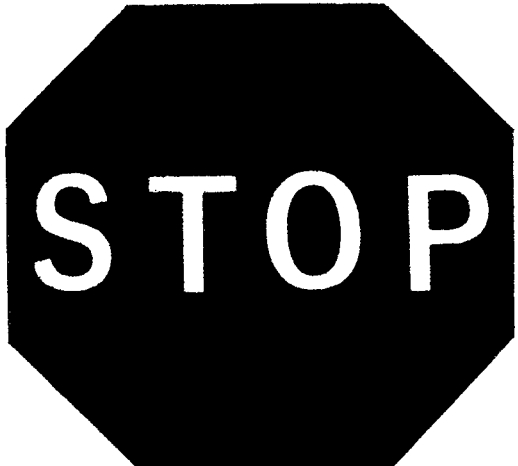
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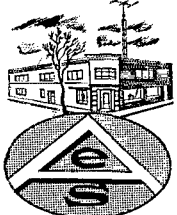


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wheels for their mobiles. Section net certificates have been mailed to K7AOA, WA7BHC, WA7CFS, W6DIX/7, WA7ERY, K7QGO and K7SNS. WA7BAV is telephoning relaying messages for GIs in Viet Nam. W7BIF and W7-PRM vacationed in Utah. K7RBM has taken up color-photo finishing. W7AAF is doing a lot of flying. W7JU is missing a couple of TV sets, and has traded his sail boat for a two-wheel cycle. Traffic: WA7CFS 31, K7-OHX 11, K7RKH 7.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB, ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ. RM: W6LZNZ.

Net	Freq.	Time	Days	Mgr.
Yolo Co. CD	146.94 Mc.	0200Z	Wed.	WA6TQJ
SCEN	146.28 Mc.	0400Z	Wed.	WB6BWB
SVN	146.28 Mc.	0330Z	T-Sun.	WA6YYK
NCN	3635 kc.	0300Z	Daily	WB6HVA
Tri-Co. Emer. Net	3815 kc.	1700Z	?	?

Let's all support President Denniston's Hamquest '67 in doubling membership in both your club and the ARRL. Let Every Amateur Give United Effort. SCEN held a "Rabbit" Hunt on July 31 with WB6RVR as the rabbit, or better, a "rat." The "rat" had a L.R. switch on his ear switching from a J-antenna to an antenna hoisted up a flag pole to confuse the boys. W6CIS, former Pacific Div. Director, retired from the Cal. Disaster Office with over 38 years of State Service. WN6TOZ, the XYL of ex-WN6QMT, is a new ham in Carmichael. WA6FWU is watching for 6-meter band openings from Soda Springs. The RAAMS held a barbecue at W6TEE and WB6PHQ. WN6TOA, of McClellan AFB, is trying to initiate a Novice-Tech. net. WB6MAE moved back to his ranch in Orangevale from Fair Oaks. WB6MXD put up a 40-meter antenna consisting of #12 AWG wire. W6AF is using a 65-watt 7-Mc. rig for Official Bulletins. Traffic: (July) W6LZNZ 116, WB6MAE 36, K6IKV 13, WN6TOA 9, W6AF 3, WB6MXD 3, (June) WB6MAE 18, WB6BWB 9.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—W6KZF has completed over a year without missing a report but would like to get more Form 5s from the ECs. W6CIS, former Pacific Division Director and California State Disaster official, was a visitor at the Aug. meeting of the Humboldt Radio Club. W6HSA finds more DX coming through with eight new countries in July. W6UDL checks into the Mission Trail Net regularly. W6DTV operated portable most of the summer from Old Station, north of Mt. Lassen. WA6MGG is a new OO in the Eureka area. K6SAA returned from the Bastille Day celebration in Papette reporting not much doing on 20 meters from FO8AA. WA6QXV has put an HW-12 on the air. In the July CD Party W6BIP, W6-BYS, W6GQA and W6HSA were heard in the c.w. portion and W6CYO and WA6AUD in the phone section. WB6GVI is getting antennas up at his new QTH. W6-BIP gave a talk on his experiences at Thule in OX-1 and at the July meeting of the San Francisco Radio Club. OO WA6RXM reports clicks and chirps the most frequent problem with c.w. signals. The San Francisco Section Net meets Mon. and Fri. at 1830 local time on 3900 kc. WB6JOX is the present N/C with a powerful s.s.b. signal. WB6AIS continues to gain on the staphylococcus infection which has bothered him since his operation early this year. However, Doc reports 33 countries worked outside North America since returning home from the hospital. WA6ARE is looking for anyone interested in a 2-meter net in Sonoma County. W6WLW was the best man at his 80-year-old father's wedding. K6TWJ continues to be the main source for traffic on the Golden Bear Net. W6SRZ and XYL W6-QOJ recently moved to Marin County. WB6IMO continues to turn out the QSL 5 paper for the Marin Club, doing a fine job with WA6UTE helping with the art work. W6CYO is working the DX openings to Asia almost every morning and reports the new TH-4 beam working well. W6PTS is erecting a tower and beam at his new Corte Madera QTH. W6BCM, W6DXA, WB6-IMO and K6OJO attended the QCWA July picnic in Sonoma County. The Sonoma Radio Club had a film shown on optical lasers at its Aug. meeting. Traffic: (July) W6KVQ 345, W6WLW 72, K6TWJ 55, W6UDL 32, W6BWV 22, WB6DMP 18, WA6AUD 15, WB6GF 7, WA6ARE 6, WB6JOX 5, WB6GVT 4, WB6KWL 4, K6-TZN 4, WB6IMO 3, K6SAA 3, W6DTV 2, K6MBV 2, WA6QXV 1. (June) W6DTV 3.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6-JPU—W6COB has a new Swan 350 and Moseley trihand-er beam. K6AXV is moving to Manteca. WB6MUY and XYL WB6SMQ are moving to Berkeley. The Delta Net meets on 50.4 Mc. every Thursday at 2000 local time. The Tulare Co. FD was at Mountain Aire., 6500 feet high. All those who participated in FD reported excellent results. WA6RTI is on 75 with an HW-12. W6-

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DC Grid Voltage	-34	-34	-34 volts
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Single-Tone DC Plate Current	720	755	710 mA
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3rd Order	-38	-40	-40 db
5th Order	-47	-48	-48 db

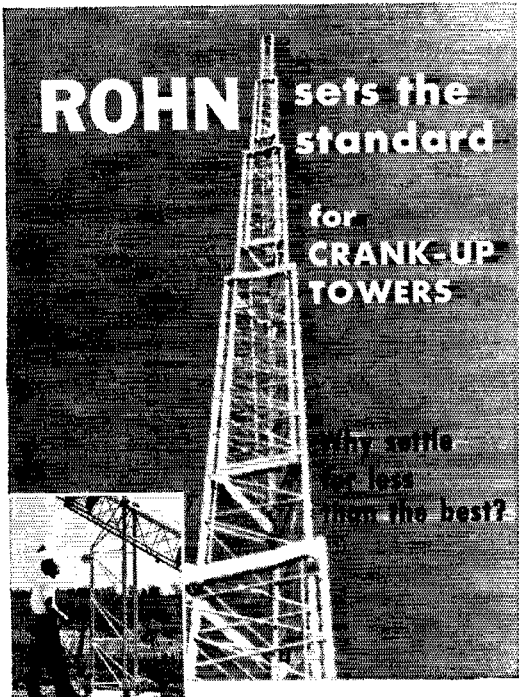
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JUK has a new 71-ft. self-supporting tower. K6BKZ is on 75-40-20 with a KWM-2. WA6HKK is on 75 s.s.b. W6TZN is experimenting on 2100 Mc. with pulse modulation. WB6GIT has modified his antenna and is getting out much better. WA6TQL is building a linear amplifier for his S-Line. WA6RLW was heard operating portable from Lake Tahoe using an SB-34. WB6LMB has been checking into the S.S.B. Net from Mineral King. W6TRP is operating from Camp Nelson with his KWM-2. W6YGF reports the loss of a mike and key with oscillator during F.D. W6BWK, the Delta Amateur Club station, is operating on 80 meters. WB6EVA has a 75S-3, a 32S-3 and a Henry 2K. WB6OSH is heard operating s.s.b. on 40 meters. W6MSU is putting up a repeater station on 2 meters. W6ADB made the BPL for the first time in years. The Tulare County Radio Club meets the 4th Fri., the Delta Amateur Radio Club the 3rd Fri., the Fresno Amateur Radio Club the 2nd Fri. I want to thank my friends for their support in the SCM election. Traffic: (July) W6ADB 689, WB6PCQ 248, WB6HVA 103, WA6SCE 45, WB6NCJ 2.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM; Ed Turner, W6NVO, RM; W6QMO. Both W6RSY and W6DEF made the BPL for the month of July, Hal on orizations plus deliveries. W6RSY made the BPL with only 19 nights of operation. Congratulations to both. W6QMO, our very fine RM, was in the hospital for over two weeks. She is now recovering and will be back on the air soon if not already. The NPEC of South San Francisco held a picnic in July with 16 members and families attending. WA6PTF was the MC. The club is busy organizing for the fall operating season. The West Valley Radio Club held its Annual Pancake Breakfast in Campbell with over 200 amateurs attending. The usual fine breakfast was served up by WA6YDF and his crew. Pacific Division Director W6HC, your SCM and SEC all attended the event. W6DEF reports that K6MPN and W6JSR are both recuperating from recent heart attacks. Hal now has new antennas for 80 and 20 meters. W6VZT was guest speaker at the SCCARA meeting, speaking on the subject of antenna design. The PAARA took part in the operation of W6OTX at the San Mateo County Fair. The meeting of the Santa Cruz Radio Club featured slides and films of various hams and ham shacks in the area. The club meets the first Fri. of each month at Cabrillo College. The SCARS was busy planning for the operation of a station at the San Mateo County Fair, as was SCCARA for the Santa Clara County Fair to be held two weeks later. Both clubs plan on handling traffic as well as demonstrating amateur radio operation. W6AIT is active on NCN. K6GK reports that there has been much QSB on all nets during the summer months. W6AUC is active as OO and on several nets. Russ is now secy. of the QCWA area chapter. WB6NXX is operating on 40 meters in the early morning hours and working DX. W6BYB now sports a new 75S-1. Bob works NCN. W6VZE is very active as EC for Burlingame and is making plans for the SET. W6OII is OPS on the Mission Trail. W6ASH is QRL with school work, but manages to check into nets. WB6IZF is now active on WCARS on 40 meters. W6ACVU is now NCS on P.A.N. Traffic: W6RSY 1316, WA6CVU 496, W6YBV 412, W6DEF 199, W6AIT 64, W6GIC 33, K6GK 33, W6ZRJ 23, W6AUC 18, WB6NXX 18, W6BYB 14, W6VZE 13, W6OII 11, W6ASH 10, WB6IZF 7.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM; Robert B. Corns, W4FDV, SEC; W4MFK, RMs; WA4ANH and K4CWZ, P.A.M.s; W4AJT and W44LWE, V.H.F.; PAAL; W4HJZ. The combined NCN/SSBN Picnic was held at Morrow Mountain State Park. Certificates were presented to WA4ANH, W4EVN, K4JEX, W4IWZ, K4TTN and W4UWS for earning the N.C. Service Award, and WB4RGL was presented a net certificate and named "The Rookie of the Year." Albert W. Parker, W4BAW, 1889-1966; North Carolina amateurs are saddened by the passing of one of its best-known amateurs. Licensed in 1919 as 4EA, Al received the call W4BAW in 1925 and devoted the next 40 years of his amateur life to public service and to other amateurs. He held many station appointments, was EC for Craven County, a charter member of THEN, initiated NCN, received many awards and citations from the Red Cross and civil defense for his public service work during the N.C. hurricanes. Net Traffic: NCN(E) 194, THEN 105, NCN(L) 93, NCSSBN 56, Traffic: W4LEV 170, WB4BGL 207, W4EVN 153, W4IRE 136, W4LWZ 136, K4BUJ 82, W44UFQ 59, K4CWX 46, K4EO 42, W4BNU 26, W44FJM 21, W44VNV 21, K4EOF 20, W44CFN 19, W44UQC 14, W44UHV 12, W44VT 12, W44NUO 11, W44ANH 10, K4ZKQ 8, W44GMB 7, K4SHU 4, W44KWC 4, W4ACY 2, June: W4LWZ 141, W4OTE 128, K4GNX 24, (Apr.) W4IRE 172.



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SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LNJ—SEC: WA4ECJ, Asst. SECs: W4WQM, WA4EFP, RM: K4LND, PAM: WA4RUB. Vacations took their toll in July. The SC Slow Net is still trying to hold together. It needs more use by the SCSSB members. The Rock Hill Hamfest is scheduled for the middle of October. WA4ECJ hopes to finalize emergency plans through AREC, current nets and c.d. into one combined effort. W4CE is progressing well from a trip to the hospital. The Greenville V.H.F. Society is planning another mountain trip after the wonderful experience on the mountain-top adventure. WA4LDM received an OIRB appointment. W4NTO reports a real need for more OOs. Volunteers are wanted for printing the *SCN News*. K4HDX and K4LNO need the help. There is plenty of 2-meter activity over the state but little reporting. Traffic: WA4LDM 105, K4LNJ 40, W4NTO 35, WA4QKQ 28, K4OCU 15, W4JA 11, WA4ICF 10, W4PED 5.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—PAM: W4OKN. RMs: K4LJK, W4SHJ, WA4EUL. We were again shocked by news of the death of another of the section's prominent and devoted amateurs. In mid-July, Dr. William Grigg, WA4AGB, passed away—suddenly and untimely. Dozens of Richmond amateurs paid tribute at the final rites. We all mourn his passing. Elections for Roanoke Division Director will be held in October. Among the candidates is W4KFC. Study your ballot carefully. Vote for Vic if you can—but by all means, vote. WA4HHH is in New York State studying for a new job while W4WDZ, long absent from the nets, hopes to become active after graduate work at Harvard. W4NLC and WA4DAI, both ECs, are not getting the best of response in forming up local AREC units. W4ZM finally took on a TCC assignment. W4OWB has a fine country location with an antenna farm except for 80 meters where the antenna touches a metal screen door and sparks fly. W4QDY reports the best activity in nets in several years. W4JUJ was the highest W4 in the YL-OM C.W. Party. It took K4ASU several weeks to work 150 countries from the new location without a beam. Traffic: (July) W4RHA 168, W4SZZ 165, WA4EUL 154, WA4OHZ 148, W4NLC 98, WA4UMX 98, K4LJK 70, W4ZM 66, WA4YSE 62, W4BWF 58, W4OWE 54, K4KPN 46, K4FSS 45, WA4QOC 43, W4TNS 43, K4MLC 39, W4QDY 38, WOKN 35, WA4DAI 28, K4ITV 28, W4DVT 22, W4BZE 16, K4LMB 16, W4MK 16, W4KFC 13, W4ZAU 10, W4SHJ 9, W4VG 9, K4ASU 6, K4YEE 6, K4PIK 3, W4JUJ 2, W4KZ 2, W4KX 1, W4PTR 1. (June) WA4YSE 56, W4OKN 16, WA4KVR 12.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RMs: K8TPF, W8LMF. PAMs: K8CHW, W8IYD. Nets meet on 3570, 3890, 3903, 3905 kc. WA8GRE is moving to Florida. The Monongalia Wire-less Assn. had a fine exhibit at the County Fair. K8BIT and K8MQB report "trailer life with a mobile, line."

WEST VIRGINIA QSO PARTY

October 29-31

All amateurs are invited to participate in the annual West Virginia QSO Party, sponsored by the Kanawha Radio Club of Charleston, West Virginia. The contest starts 0001 GMT Oct. 29 and ends 0500 GMT Oct. 31. Use all bands, all modes. Each station may be worked twice on each band, once by phone and once by c. w. Complete exchanges consists of QSO number, reports and West Virginia County (or ARRL Section/Country for non-West Virginians). Each completed exchange counts one point. Non-West Virginia stations will try to work as many West Virginia stations as possible. West Virginia stations are not permitted to work stations in their own state for point credit. Suggested frequencies: 3570 3890 3903 7050 7205 14,050 14,300 21,050 21,410. 28,050 28,800 and 50,250 kcs. In scoring, non-West Virginia stations multiply total points by the number of West Virginia counties worked. West Virginia stations multiply total points by number of ARRL Sections/Countries worked. Certificates will go to the highest scoring phone and c.w. stations in West Virginia and in each ARRL Section/Country. Multioperator stations are not eligible. Logs showing usual information in GMT, should be mailed to Wayne Moore, WA8PWW, 1516 Valley Drive, South Charleston, West Virginia 25303. To be eligible logs must be postmarked no later than December 1, 1966.

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They've made the 753 kit, for example, the industry's hottest seller. And the new 717 Keyer seems headed for the same fate.

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The EICO 753 is a complete 3-band transceiver, offering SSB/AM/CW operation with conservatively rated 200 watts PEP on all modes (rated for maximum efficiency rather than maximum possible input power). A new Silicon Solid State VFO provides full coverage of the 80, 40, and 20 meter bands. Assembly is made faster and easier by VFO and IF circuit boards, plus pre-assembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The EICO 753 is at your dealer now, in kit form and factory-wired.

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tion. Unique ball drive provides both 6:1 rapid band tuning and 30:1 vernier bandspread with single knob. The Model 753 is an outstanding value factory wired at \$299.95

EICO Model 751 AC Supply/Speaker Console: Provides all necessary operating voltages for Model 753. Incorporates PM Speaker, conservatively rated components and silicon rectifiers for minimum heat and extended trouble-free life. Includes interconnecting plug-in cables. **Kit \$79.95 Wired \$109.95**

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If you're a club member, and your club is not already embarked on HamQuest 67, you should request a club promotion kit from HamQuest 67, ARRL, Newington, Conn. 06111. Individual members and the club alike can earn prizes as they add members to the club and the League rosters.

And if you're not a club member, why not make it a point to drop in at the next meeting and see for yourself what it has to offer?

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W8NTV visited W8RXO, now located in California. The WVN C.W. Net had 21 sessions, 96 stations, 61 messages; the WVN Phone Net, 19 sessions, 435 stations, 107 messages. W8DYJ has added a Heath Linear. WA8-ACQ has a new TR-4. K8ZPR is operating on 28.6 f.m. WA8KCIJ is the new EC for Cabell County. W8CHT, 8RN Net mgr., congratulates WVA on the fine showing in the 8RN. New officers of the Black Diamond ARC are K8ZDY, pres.; K8OEN, vice-pres.; W8SSA, secy.-treas. Club members from the East River ARC appeared on WHIS. Bluefield TV station, WA8RHT is a new General. K8UOA is back on the air and W8SSA has a new s.s.b. mobile. K8WNZ will be in KP4-Land for two years and WA8APZ is moving to Buffalo. W8-WHQ, operating 2-kw, p.e.p., creates quite a few queries during contacts. The Thumping Keggers held its annual meeting at its Ham-Picnic in Bluefield. Traffic: WA8-POS 121, WA8GRE 52, W8CKX 43, W8HZA 33, WA8-KCO 19, K8BET 16, WA8NDY 16, W8GUL 5, K8CHW 4, K8QEW 3, K8RFB 3, K8WNQ 3, K8WVV 3, K8CFT 2, W8IRN 2, WA8RHT 2, K8SOR 2, WA8ALI 1, WA8-BUM 1, WA8CKN 1, W8CNY 1, WA8GGI 1, W8IMY 1, W8JIM 1, K8KQX 1, WA8NLI 1, K8OQL 1, WA8PWN 1, WA8QND 1, W8QOB 1, WA8RAS 1, WA8RQB 1, W8-SSA 1, K8TFP 1, K8ZPR 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crompton, K0TTB—Asst. SCM: A. E. Hankinson, WA0NQL. SEC: W0-SIN. We regret to report that W0DDM is a Silent Key. Congratulations to Howard and Valerie, K0DCW and K0ZSQ, on receiving the 1965 Division PICON Award. Colorado YLs were hosted at a picnic by K0EPE, from Liberal, Kansas, held at Palmer Lake. The Arapahoe Radio Club was formed Aug. 1 composed primarily of Englewood and Littleton AREC members. WA0NQL is pres.; W0MMI, vice-pres.; W0GIL, secy.-treas.; W0FA, activities. The club meets the 1st Mon. of each month at Englewood City Hall. W0KAU, ex-K6KDE, is at Loveland and looking for 2-meter a.f.s.k. contacts. W0GHEP is new in Denver. W0PG reports the V.H.F.-U.H.F. Seminar of Boulder held an antenna-measuring party at the QTH of W0EYE. W0EYE holds regular skeys on 2 with New Mexico and South Dakota using 432. W0HEP remains the mainstay of the OBS in Denver. Bulletins are sent on the 10-meter net Sun. at 0855 MST (28,730). ECs awake, prepare for the SET. Be a fink, send me a card naming your club officers so I can run them down. I welcome traffic reports via the traffic nets. K0SPR is a new EC in Pueblo. K0WGC is the new EC for Delta County. We need volunteers to work in HamQUEST 67. Who's game? Traffic: K0DCW 63, K0SPR 25, W0HEP 12, W0SN 5, K0ZSQ 2.

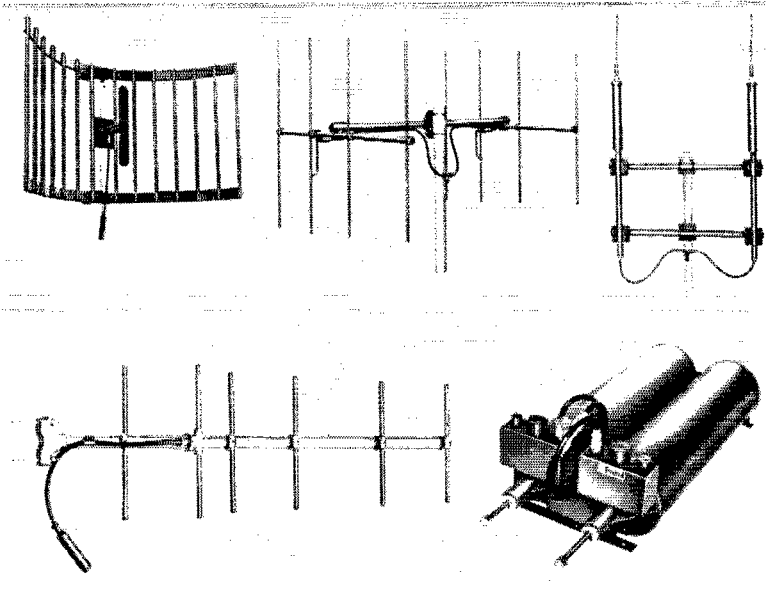
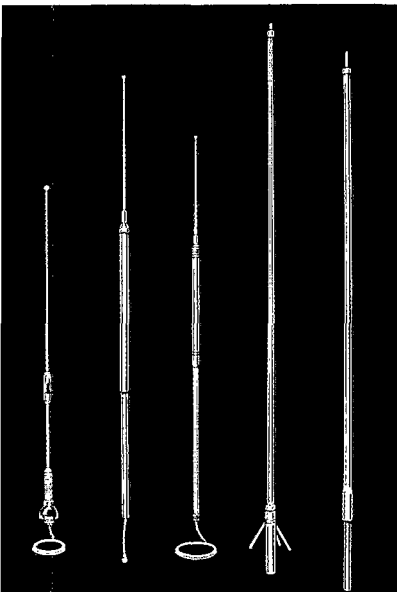
NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: K5HTT, PAM: WA5MCX. We are sorry to see Tiny and his family leave this area for Texas. W5ROH and his house of hams will be missed. Anyone passing through the Los Alamos area should stop by and get a look at our SEC's operating bench. He says it really helps capture the rare DX. Welcome home to K5ONE, back from his portable operation in the big city. W5WZE had a very unfortunate auto accident and will have to replace the old buggy. If you want to see a real DX antenna go by Roswell and see the beam of W5YFN. It's 35 feet high and six elements. The Olympic Bicycle Races at Albuquerque will be aided in the communications department by the Caravan Club. Have you heard W5ANB with his new s.s.b. gear? WA5FLG has his new f.m. gear on the air and reports good happenings in the 2-meter band. WA5LFX has some new a.m. gear on 2. W5ALL, in Clendroft, joined the 2-meter bunch and can work some rare ones with his 9200-ft. antenna. Tourist messages are being handled in Albuquerque by WA5DUH and WA5FIK. These are public service messages which really help to advertise amateur radio. K5-MWV is back from his Colorado DXpedition. Traffic: K5VXJ 56, WA5FLG 32, W5UBW 24, W5DMIG 21, K5-ONE 15.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7-WKF. RM: W7OCX. Section nets:

BUN	Daily	7272 kc.	1930Z
UARN	Sat.-Sun.	3987.5 kc.	1500Z

As your new SCM, I would like to thank W7MWR/W7-OAD for a job "well done" as Utah SCM. I hope to visit as many Utah clubs as possible in the coming months. New appointments: W7GPN as EC for Weber Co., K7HEN as OES. Volunteers are needed for OBS work, especially on v.h.f. W7OCX reports that TWN moved to 7060 kc. for the summer months. UARN check-ins are picking up after a mid-summer slump. There are now AREC-c.d. nets in Davis, Salt Lake, Utah and Weber Counties on 2 meters. Check with your

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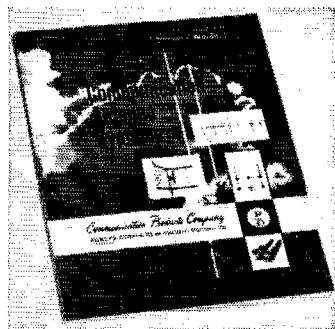
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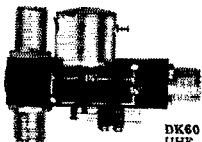
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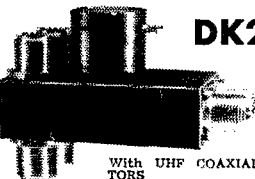
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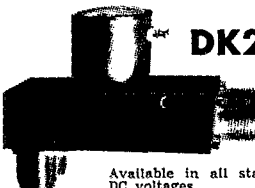
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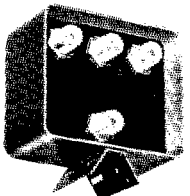
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local EC for time and frequency if you would like to participate. Traffic: W7OCX 107.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7Y WE, RM: W7BHH, PAMs: W7TZK, K7SLM, OBSs: W7TZK, K7SLM, K7ZHT, WA7DNZ. Nets: Pony Express, Sun. at 0830 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. K7N9X ran into Murphy's law the first part of Aug.; came upon an accident on the highway and was calling for assistance when the mobile failed. On July 4 the Shy Wy Club furnished communications for the Annual Powder Puff Derby (women's trans-continental air race) with K7YGV as chairman. K7YGV has been appointed deputy base commander of the F. E. Warren Air Base. On Aug. 4 the Cheyenne Club hosted Carl Smith, our Division Director, to an open house meeting. From the comments that have been made it appears that the hamfest was one of the best we have had. Traffic: WA7-CLP 30, K7SLM 29, K7ITH 22, W7BHH 14, K7POX 8, K7YPT 6, WA7EDC 3.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML, RM: WA4EXA, PAM: K4WHW. We deeply regret to report K4JSL and K4WNC as Silent Keys. Remember the SET Oct. 8 and 9. Let's keep ole number 1! K4PFM is the new NM AENP. Thanks for a fine job to K4NUW. Nominations for SCM close Oct. 10. I will not be a candidate. July net reports (times in GMT):

Net	Freq.	Time	Days	Sess.	Ave. Tfc.	Ave. QNI
AENB	3575	0100	Daily	30	4.1	5.6
AEND	3725	2400	Daily	28	2.4	7.25
AENB	50.7	0200	Sun./Tue.	9	1.1	18.67
AENM	3965	0030	Daily	31	1.96	35.8
AENO	50.55	0115	T/T/Sat.	13	0.21	14.0
AENP	3.955	1230	Mon.-Sat.	26	1.08	14.3
AENP	3955 (June)		Mon.-Sat.	24	1.5	11.6
AENR	50.52	0115	Wed.-Fri.	8	.25	14.75
AENT	3970	2230	Daily	30	.7	4.8

Sorry that AENP report was omitted last month. K4-KJD is home after a second trip to the hospital. Congrats to W4WGI for DXCC & 2XSSB. K4ANB is back in the section with an Extra Class license. New BARC officers are W4GET, WA4MHG, WN4ATY, K4BSK and W4BAI. The HARC is investigating the surplus RTTY distribution plan. Traffic: (July) W0HXB/4 234, WB4-BMO 214, WB4APL 130, K4HJX 120, WA4EXA 84, K4-AOZ 66, WA4UXC 37, K4BSK 33, K4NUW 30, W4NML 23, WB4ADT 21, K4KJD 15, WA4FYO 14, K4WOP 13, K3WHW 12, WA4EEC 10, WN4BLX 5, WA4HON 5, K4UUC 4, K4NSU 3, WA4WLD 3, W4YRM 3, W4ANB 2, WN4DCR 2, W4DGH 1. (June) K4NUW 80, WA4RES 57, WA4YDQ 18, K4FZQ 1.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5-TT—Asst. SCM: Russell E. Oberholzer, KZ5OB—SEC: KZ5MV. The Canal Zone Amateur Radio Assn. is working on design and rules for a new certificate to be issued by the club; details will be announced when the plans are finalized. New licenses include General Class for KZ5FU and KZ5OP. U.S. Army Security Agency, Southern Command, produced five new novices: KZ5-CBN, KZ5DAN, KZ5JRN, KZ5MON, and KZ5RBN. July must have been a restless period on the Atlantic side—KZ5RW, KZ5AD and KZ5SW all moved to a new QTH during the month. KZ5MV was vacationing in Florida, but talking to the gang daily on 15 meters. Traffic: KZ5MV 76, KZ5RW 54, KZ5FN 45, KZ5CD 36, KZ5CT 24.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4-SJH—SEC: WHYT, RM C.W.: W4LUV, RM RTTY: W4RWL, PAM S.S.B.: W4OGX, PAMs: W4SDR, W4-TUB, V.H.F. PAM: WA4BMC. Cuban c.w. QRM (and phone) on our 8.5-Mc. band can't be avoided. It's legal operation but the wrong time in the skip cycle. Wish there were more c.w. training nets such as the one meeting on 3651 kc. at 7:30 p.m. EST, Mon., Wed. and Fri. at speeds of 10 to 15 w.p.m. The Alachua County Training Net (ACTN) is also in session. Contact WR4CAP for information. Please use the Form 1 with little bits of information; then it will be no chore at all filling this column. Reference traffic reports—average was 65 per month. This month brings 71. We are at present capable of 180 Maximum. Perhaps you can tell me how to get more traffic reports. Traffic: (July) WA4SCK 51, W4TUB 541, WA4NEV 430, WB4AIW 387, K4EYV 347, WA4BMC 255, W4FPC 179, W4DFU 159, WA4PDM 158,

ANTENNA BREAKTHROUGH

IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

ALL-BAND VERTICALS

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HCILC, PY5ASN, FG7XT, XE21, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15,
10, 6 meters \$14.95

V80 vertical for 80, 75, 40,
20, 15, 10, 6 meters. . . . \$16.95

V160 vertical for 160, 80, 75,
40, 20, 15, 10, 6 meters. . . \$18.95

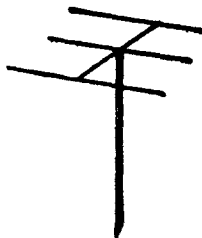
ALSO AVAILABLE AT
AIREX RADIO CORP., NEW YORK CITY
CANADA — ON REQUEST

HOW TO ORDER: SEND CHECK OR MONEY ORDER. WE SHIP IMMEDIATELY UPON RECEIPT OF ORDER BY RAILWAY EXPRESS, SHIPPING CHARGES COLLECT.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

BEAMS

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36' of tubing for each 20 meter element); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 7/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

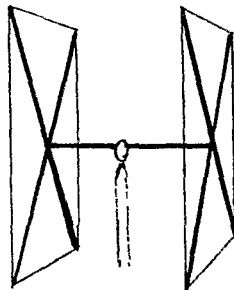


2 EI 20	\$16	7 EI 10	\$32*
3 EI 20	22*	8 EI 10	36*
4 EI 20	32*	4 EI 6	15
2 EI 15	12	5 EI 6	20*
3 EI 15	16	6 EI 6	24*
4 EI 15	25*	7 EI 6	26*
5 EI 15	28*	8 EI 6	28*
4 EI 10	18	9 EI 6	30*
5 EI 10	24*	10 EI 6	32*
6 EI 10	28*		

* 20' boom

QUADS

NEW! NEW! NEW!
CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional!

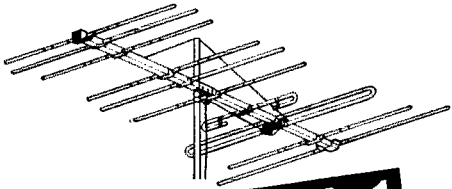


ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

TWENTY METER CUBICAL QUAD	\$25.00
FIFTEEN METER CUBICAL QUAD	24.00
10-15-20 CUBICAL QUAD	35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00

(all use single coax feedline)

FINCO 6 & 2 Meter Combination Beam Antennas



2 ANTENNAS in 1

MODEL A-62 · 300 OHM

On 2 Meters:

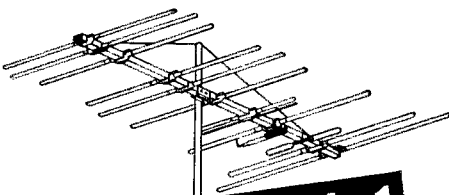
- 18 Elements
- 1-Folded Dipole Plus Special Phasing Stub
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- Full 4 Elements
- 1-Folded Dipole
- 1-Reflector
- 2-Directors

Amateur Net . . . \$33.00

Stacking Kit . . . \$2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:

- Equivalent to 18 Elements
- 1-Gamma-Matched Dipole
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- 4 Elements
- 1-Gamma-Matched Dipole
- 1-Reflector
- 2-Directors

Amateur Net . . . \$34.50

Stacking Kit . . . \$18.00

MODEL AB-62 GMC

On 2 Meters:

Equivalent to 30 Elements

On 6 Meters:

Equivalent to 6 Elements

Amateur Net . . . \$52.50

Also:

- 5 New 6 Meter Beams
- 3 New 2 Meter Beams
- 1 New 1 1/4 Meter Beams

Gold Corodized for Protection Against Corrosion

See Your Finco Distributor
or write Dept. QS for Catalog 20-226

The FINNEY Company - Bedford, Ohio

W4LUV 118, WA4RQR 115, WA4FGH 90, K4BNE 82, WB4AJV 79, WA4DEL 71, W4EHW 71, K4BY 70, W4AKB 68, W4SDR 68, W4BKC 66, W4FP 66, W4NUH 60, W4AKB 59, WA4PWF 56, W4ACIQ 51, WA4HDI 51, W4VDC 51, W4OGX 50, WA4YH 41, K4SJH 39, W4GUJ 37, W4NGR 35, K4DAX 34, WA4NBE 34, WB4CAP 33, W4LE 28, K4KDN 27, W4VPQ 27, K4EBE 22, W4LIVE 22, WA4OHO 22, WA4BGW 21, K4L1B 21, W4TJM 18, W4KRC 17, K4COO 16, K4ENW 16, WHYT 16, W4SMK 16, W4HFR 14, K4LPS 14, WA4LJH 12, W4MVB 12, W4IQL 12, WN4CBM 9, W4DVO 8, W4LDM 8, K4MTP 8, W4RRB 7, K4EX/4 6, K4FQP 5, W4LMT 2, WA4WVC 1, (June) WA4WZ 44, WB4AJV 42, W44HDH 42, K4LPS 17, W4QBY 13, WA4WVC 12, WA4LJH 2, (May) WA4PDM 68.

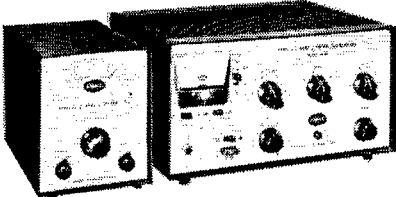
GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM; James W. Parker, Sr., W4KGP. SEC: W4DDY, RM; W4CZN, PAMS: K4PKK, WA4JSTU, W4KR, WA4WDE, WB4APC now is DJ5KS, W4CZN is vacationing in N.C. W4LRR is using stacked big wheels for 2-meter net activity. K4NFP finished the college quarter with an academic A average. W4FQX is on 40 with a doublet and Swan 350, WB4BDG passes on c.w. since he disposed of his lever, WA4HYW was active in the CD Party as well as Minn. and Ind. QSO Parties. WA4UYT will return to Rome. W4IJK/4 now is W4HBS, K4YZE now is all solid state on 2 meters, Jim is air mobile in the new C-182 on a.m. and s.s.b. W4YE has a new TR-4 for mobile and operated in the CD Party. WA4GAY is QRT with receiver problems. Traffic: W4RZL 148, W4FOE 140, W4CZN 126, WB4BDG 119, W4PIM 112, WA4JSTU 89, W4HYW 48, K4NFP 46, W4DDY 43, K4FLR 40, WA4WDE 33, WA4UYT 22, WA4L1 20, K4BVD 19, K4BAT 18, WA4JES 16, W4HBS 16, WA4OV'S 8, K4YZE 8, W4FQX 7, W4YE 4, WA4FUN 3, WA4GAY 3, W2TPV/4 3, WA4BVD 2.

WEST INDIES—SCM, Albert R. Crumley, Jr., KP4DV—KP4DJ and KP4AT moved into their new homes, and suddenly found they were only two houses apart! KP4WT is actively engaged in telephone relaying for South American and Dominican Republic students. KP4AXN graduated from college at Mayaguez, KP4AAK is Doctor Guillermo Rios, now practicing in Ponce, KP4BRT moved from Guayannilla to Ponce, KP4AST, the son of KP4ES, obtained his General Class ticket. KP4BQC has scheduled moving to Texas. KP4BJM, Doctor Ollona, is a c.w. DXer, Arceibo is well represented by KP4RE who finally bought a s.s.b. rig., along with KP4RA, who works c.w. and a.m. KV4AA, Dick Spenceley in Saint Thomas, V.I., recently was heard in San Juan at night on 20-meter c.w. "long-skip." The distance is only 75 miles. KP4DV resigned as editor of the PRARC's *Ground Wave*. The bulletin will appear monthly in Spanish, put out by the Board of Directors. Traffic: KP4VT 283.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: WA4FLI, RM: W4BVE, Tallahassee; The TARC changed its meeting date to the 1st Wed. of each month. Cypress: W4KCA moved to a new home. Blountstown: K4NML is back on the air, mostly on c.w. Chipley: WA4ZIM, Tech. Class, is active on 2 meters with HW-30 and a sixteen-element beam 40 feet up. W4IKB has submitted the county RACES plan for approval. Panama City: WA4FIJ is the first known U.S. ham with permission to operate portable in Italy. K4LQE is active on 75 meters from St. Joe Beach with an SBE-33. Fort Walton/Eglin AFB: The EARS will serve as a QSL bureau for incoming cards for local hams. QSL to Box 1773, Eglin AFB, Fla., 32542. The EARS also is conducting code and theory classes Mon. and Thurs. 7-9 p.m. WA4EVU and WA4WAX are on 2-meter RTTY, using a.i.s.k. Pensacola: WN4CZG is a new ticket holder. W4DAO had all his ham gear stolen. The Gulf Power Co. honored W4PHQ on his retirement. Traffic: (July) K4Vfy 154, WA4EOO 101, K4BS/4 77, W4BVE 52, W4IKB 43, WA4JIM 11, (June) K4BDF 55, (May) K4BDF 45.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY, PAM: W7CAF, RM: K7NHL. The Scottsdale Amateur Radio Club's officers are W7EXT, pres.; K7YAM, vice-pres.; K7OYE, secy.; K7ZQL, treas. W5EZQ/7, going RTTY, has a new Bell teletypewriter and accessory gear. OES K7NIJ has worked 20 states on 2 meters. An Armed Forces Day certificate was earned by W7FKK on c.w. The 1966 Fort Tuthill Hamfest was enjoyed by 200 amateurs. W7CAF won the 75-meter transmitter hunt and K7GHS located the 6-meter transmitter first. Prize winners at the hamfest were W7KOY, W7WGW, K7PRS, WA7BVU, K7JTT, K7HGZ, K4ROK, WA7DSW, K7SUZ and K7LPB. All those holding appointments are reminded to check the expiration date on their certificates and return them to the SCM for

AMECO*Leader in Compact, Quality Ham Gear***NEW VFO FOR TX-62 or any other VHF TRANSMITTER****NEW AMECO VFO FOR 6, 2 & 1 1/4 METERS**

The new Ameco VFO-621 is a companion unit designed to operate with the Ameco TX-62. It can also be used with any other commercial 6, 2, or 1 1/2 meter transmitter.

Because it uses a transistorized oscillator circuit, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

This new VFO is truly an exceptional performer at a very low price **Model VFO-621 \$59.95 net.**

The NEW AMECO TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.

Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters)

7984-Final, 12AX7 and 6GK6 modulator.

Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.

Meter reads final cathode current, final grid current and RF output.

Solid state power supply.

Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.

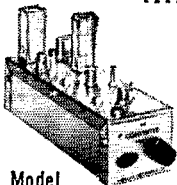
Potentiometer type drive control. Audio gain control.

Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only \$149.95

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE

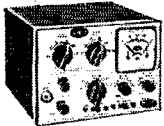
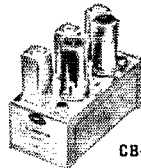
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired, (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95

**Model CN****ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS****MODEL PCL, Wired, \$24.95
MODEL PCLP, with built-in power-supply, wired, \$32.95**

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db, depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

COMPACT 6 THRU 80 METER TRANSMITTER

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6J46 operates straight thru on all bands. Size — only 5" x 7" 7/8" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 KIT \$89.95 — Wired Model TX-86W \$119.95. Model PS-3 Wired \$44.95. Model W612A Mobile Supply wired \$54.95.

**Model TX-86****CB-6**

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. \$19.95
CB 6W — wired & tested \$27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix. 6J6 osc. \$23.95
CB-2W — wired and tested, ... \$33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CB-2 and CN units. PS-1K — Kit ... \$10.50
PS-1W — Wired \$11.50

EASY TO UNDERSTAND AMECO BOOKS

Amateur Radio Theory Course \$3.95
Amateur License Guide50
Radio Operators' Lic. Guide, EL 1-275
EL 3 1.75 EL 4 1.25
Amateur Log Book50
Radio Electronics Made Simple 1.95

**CODE PRACTICE MATERIAL**

Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.



Write for details on code courses and other ham gear.

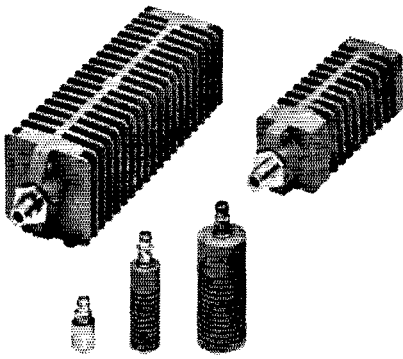
Dept. QST-10

Ameco equipment at all leading ham distributors.

AMECO EQUIPMENT CORP.

Div. of Aerotron, Inc.

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Dry Loads to 100 Watts

- * Operate in any position
- * Frequency ranges from DC to 6 Gc
- * Low VSWR (Max. 1.2 to 4 Gc)

Five convection-cooled 50-ohm loads in the Sierra Model 160 Series dissipate r-f power at 1, 5, 20, 50, and 100 watts. Dry construction eliminates problems of leaking coolant. You can operate them in any position.

Cast-aluminum bodies assure high stability at full-rated power. Infrared tests confirm the high heat-radiation characteristics of this construction. Complete enclosure of r-f fields within non-porous housings minimizes r-f leakage.

Prices are no more than you used to pay for big, damp loads. They range from \$20 (1 watt) to \$75 (for the 100 watter). For full information mail coupon below to Sierra/Philco, 3885 Bohannon Drive, Menlo Park, California 94025.

SIERRA ELECTRONIC DIV.

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A SUBSIDIARY OF *Ford Motor Company*

----- CLIP AND MAIL TODAY -----

Please send complete information on Sierra Model 160 Series 50-ohm coaxial loads to:

Name -----

Co. Title -----

Company -----

Address -----

City ----- State ----- Zip -----

endorsement if more than a year has elapsed. Your SCM is about to clean out the "deadwood" so please return those certificates if you wish to retain your appointment. If you do not already hold an appointment and are interested, write your SCM. W7SDU has increased his DX totals. Keep those Form 1s coming in. If you need more, contact your SCM. Traffic: K7NHL 140, W7FKK 17.

FIRST CALIFORNIA QSO PARTY

October 15-16

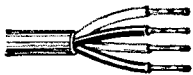
Rules: 1) The contest runs from 2200 GMT Saturday, October 15 until 2200 GMT Sunday, October 16. 2) Use all bands, c.w. and phone. The same stations may be worked and counted for a point on each band mode. 3) California stations score one point for each contact, including contacts with other California stations. All others score one point for each California contact only. 4) California stations multiply total QSO points by the total number of different states, Canadian provinces and foreign countries worked. All others use California counties as the multiplier. 5) California stations send QSO number, RS(T) and county. All others send QSO number, RS(T) and state, province or country. 6) Suggested frequencies are 1910 3550 3725 3900 7075 7175 7220 14075 14300 21075 21125 21300 28075 and 28700 kc. 7) The top 25 entries in California will be awarded certificates. In addition, a certificate will go to the top three scorers from each state and province and the top scorer in each country. The top five Novices will also receive awards. 8) Logs must show dates, times, stations worked, exchanges, bands, mode and total claimed score. They must be postmarked by November 10, 1966 and sent to Mr. Tom Frenaye, WB6KIL, 617 Purdue Drive, Claremont, Calif. 91711. (Enclose an s.a.s.e. for scoring results.)

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: W. R. Calkins, W1KUX/6, RMs: W6-BHG, W6BBO, W6QAE, PAMs: K6MDD, W6MLZ, W6ORS, BPLers for July are K6EPT, W6WPF, W6-BBO, K6MDD, K6IOV, W6MLF and W6TXJ, all contributors to a very nice section total of 11,288. W6GYH still is on vacation in the eastern part of the U.S. otherwise he would be in the BPL listing. SCS voted to combine its net operations with the National Traffic System. K6MDD reports EBN handled 714 pieces of traffic in July. K6IOV is busy with USO traffic relay. W6TXJ was elected asst. net mgr. of EBN. W6QAE put up an 80-meter dipole to replace the vertical for better ground-wave. W6QXY is busy with liaison relay of USO traffic. W6TYR is vacationing in Eastern Canada. K6-IWV reports her OM K6YDJ still is under the doctor's care. W6WPX is getting teletype equipment in operation. K6ASK listens to SCN. W6BMZ/6's 2-meter transceiver is almost finished. W6GGGL reports working on a new tower and antenna for 2 meters. W6CXC reports that W6SZU and his XYL sailed June 10 on a 4-month freighter trip around Africa and will be M/M on the voyage with a Swan 350. WB6KIL has a new tower. You may be hearing W6AM/VE7. K6KUU is busy helping newcomers, scheduling several for Novice and Technician Class tests. K6EA, vacationing in Bemidji, Minn., reports W6MFW made 2272 points in the Minnesota QSO Party. W6BRWF is experimenting with 473-million-Mc. communication equipment using amplitude modulation via laser light. W6WJT reports the West Los Angeles AREC Net inactive for the summer. W6YKP is putting up a 2-meter antenna and soon will have a 100-watt rig going. W6BTY/6 just moved from Duarte to Roundland Heights, operating h.f. bands only. *Support your section level nets:* The Eight Ball Net (EBN) Mon. through Fri. at 1615Z and Tue. through Sat. at 0230Z on 50.500 kc.; the Southern California Net (SCN) daily at 0300Z on 3600 kc. Traffic: (July) K6EPT 2903, W6WPF 2681, W6BBO 1037, K6MDD 820, K6IOV 646, W6MLF 634, W6TXJ 504, W6QAE 425, W6QXY 381, W6TYR 225, W6BTY 155, W6WKF 112, W6KZI 99, W6BBH 89, W6FD 86, K6IYW 72, W6WPX 60, K6ASK 52, W6-GXI 51, W6HHG 47, K6LJ 34, W6BMZ/6 28, W6AEL 27, W6TWS 23, W6GGGL 18, W6KKGK 14, W6HUJ 10, W6DGH 9, K6CDW 7, W6USY 7, W6CXC 6, WB6KIL 6, W6AM 4, WB6DQX 3, W6QJW 3, K6KUU 2, W6BQF 2, W6ORS 2, W6PCP 2, W6BTMC 2. (June) W6BTY/6 14.

ORANGE—SCM, Roy R. Maxson, W6DEY—K6MCA has a new five-element beam for help on Vietnam and other skeds. W6JFO reports the SoCalSix Net for July had 62 sessions, QNI 709, 410 messages, 210 visitors. The net is now NTS. Leo J. Bennett, pres. of the Mission

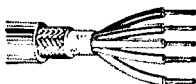
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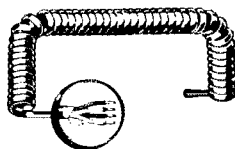
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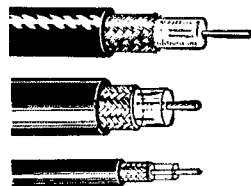
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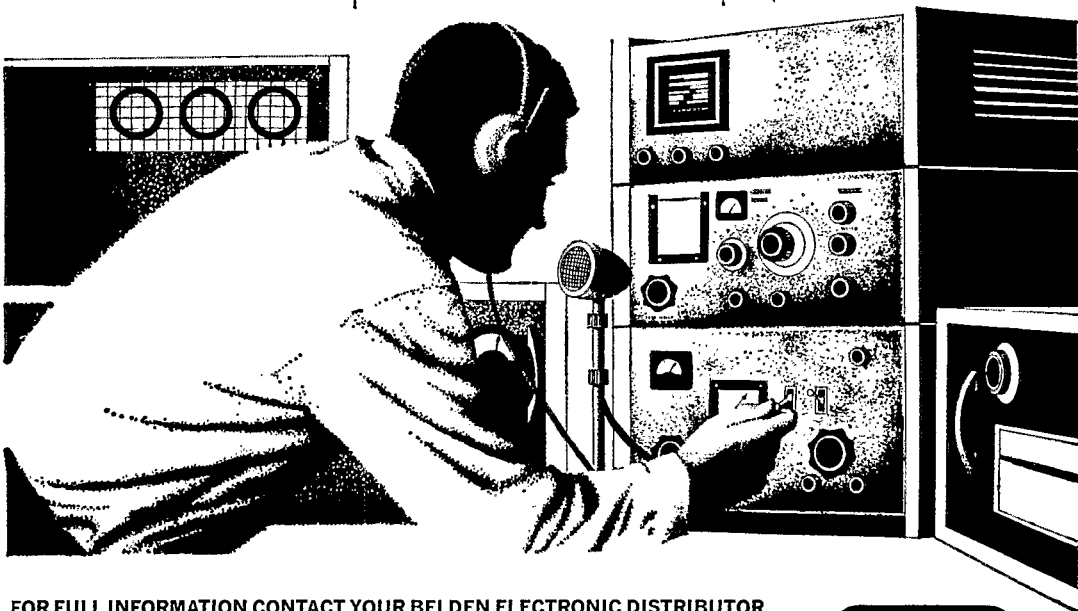
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Trail Net, furnishes a report as follows: QNI 1139, messages 244, relay 57, cont 218, QST 10. A nice bulletin was received from SCN, thanks to Mgr. K6IME, BPL was made by K6MCA, W6ZJB, WA6OQM and W6BJFO. K6HYC runs a KW Johnson to a folded dipole all bands and to a three-element tri-band beam. W7SMB/6 sent 12 OO notices in June. W6BAM is busy looking through the junk-box for parts to give younger hams. W6BLCO plans higher power. WA6ROP's traffic is down as he has been East on business. WA6UBP, W6TON and XYLs and W6DEY/W6PJU mobilized in a caravan to Washington visiting W7HO, ex-W6PM. Traffic: K6MCA 2000, W6ZJB 1666, W6BJFO 462, WA6OQM 158, K6HYC 146, WA6ROF 140, K6IME 103, W6BODU 44, W6WRJ 27, W6BLCO 23, W6BNGE 23, KOYVN/6 21, W6BODW 14, WA6TAG 3.

SAN DIEGO—SCM, Don Stansifer, W6LRU/WA6-VUT—My special thanks again to Asst. SCM W6EWU, who kept me posted during my vacation. W6ENYU joined the Silent Keys. W6TWF is Net Control for the 10-meter ARPSO on 29.5 Mc. The San Diego V.H.F. Club celebrated its fifth anniversary in August. W6-EWU and XYL motored through the Midwest. W6-VNQ, ORS/OO in Solana Beach, has now replaced W6-JUH, ORS/RM Imperial Beach, as Pacific Area Net Manager. W6JUH has gone overseas. The Palomar Radio Club held its Annual Picnic at Live Oak Park in Fallbrook in late July. W6GJC is now in Hawaii. K6ROR again is active after rig troubles. W6YKF and XYL W26EVU visited SCM W6LRU/WA6VUI in the High Seira during the summer, as did W6BGM. Traffic: (July) K6BPI 17,590, W6JUH 798, W6VNQ 616, W6FOT 446, W6BGF 202, W6BGM 20, (June) W6IAB 363.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: W6BNDP, RM: W7WST/6. An interesting TVI problem has been reported in Thousand Oaks. The owner of an old TV set is complaining that he can hear his next door neighbor (a 6-meter buff) on channel 1. W6ORW has acquired a model 14 TTY. The Ventura Co. ARC has a club project consisting of the conversion of a quantity of small 2-meter fm. units. W6DYQ is an active OBS. Look for him each evening at 8 p.m. on 3695 kc. The Satellite ARC was very much pleased to have Lew McCoy, from Hq., address the group. Two new amateurs in Thousand Oaks are WN6SVM and W6MFF. A report of success and problems during Field Day was received from the Estero ARC via W6S8BH. W6CVU has a new KWM-2. The Simi Valley ARC set up a communications center during the recent Pioneer Days and drew much attention. New appointment: K6GV, Simi Valley EC. Canceled: W6OXJ and WA6KCM (both ORS and OBS). Traffic: W6ORW 7.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG —Asst. SCM: E. C. Pool, W5NFO, SEC: W5PXY, PAM: W5BOO, RM: W5LR. The months of July and August seem to be the worst months to get any news on what is going on in the ham kingdom. Hot weather and vacations take their toll of activities. Because of time needed for editing and printing, this report will not appear until the October issue so if the news you have submitted does not appear in the next issue don't give up, it will come up soon. I receive reports after every FMT and judging from some of the measurements I receive it seems that more hams are qualified for appointment as 1st-class OO than apply for the appointment. Here are a few making measurements with an average error of 6.9 to 24.8 parts per million: W5ARV, W5BKH, W5-CVL, W5DZ, W5MSG, W5NUS, W5OGZ, W5PCW and W5RBL. Most of these amateurs do not use professional equipment for their measurements unless you call the old reliable BC-221 and the 100-ke. oscillator professional. We welcome to the Northern Texas section WA5KHE and WA5KIV. Ken Sr. and Ken Jr. are from Louisiana and will live in Dallas. Ken Sr. holds OPS and V.H.F. PAM appointments and Ken Jr. holds ORS appointment and they will be appointed in this section as soon as paper work is completed. We note from the *Telephone Times* (sent by K5WZT) that Les Harbin, W5BNG (SCM) has just had 40 years with SW Bell. Congrats! Traffic: WA5AGH 143, K2IEU/5 7, W5MSG2.

OKLAHOMA—SCM, Daniel B. Prafer, K5CAY—Asst. SCM: Sam Whitley, W5WAX, SEC: K5DLP, RM: W5-QMJ, PAM-75: WA5BTQ. Our thanks to W5NML for taking on the job as net manager for SSZ. Congratulations to K5RJ and his YF on the arrival of a son, David Curtis, July 16. K5OOV has taken over as editor of the Electron

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Benders Club paper. The Bartlesville Amateur Radio Club has got live of its members working on 2 meters with the mobile 1 m. unit, W5BTZ, W5JRK and W5MKW are all proud owners of TR-4s. W5OXX has his new Galaxy 300 on also. K5OXE has been working 20 and 15 meters with his new Swan 350. W5WAX received confirmation from KLTFAV that they made contact on 6 meters using A-1 emission. K5IQL has worked W3RUE and W8KAY on 2-meter s.s.b. during Sporadic "E" to the northeast. W5PML, net mgr. for OPEN, has been getting good reports with his new NCX-3. We are happy to announce that W5KZA has taken on the EC job for Pawnee County. Traffic: K5TEY 901, W5QMJ 130, W5FEC 24, W5FKL 19, W5UZX 16, K5LMG 11, W5-EHC 6, W5MDN 6, W5FFW 2, K5OCX 2.

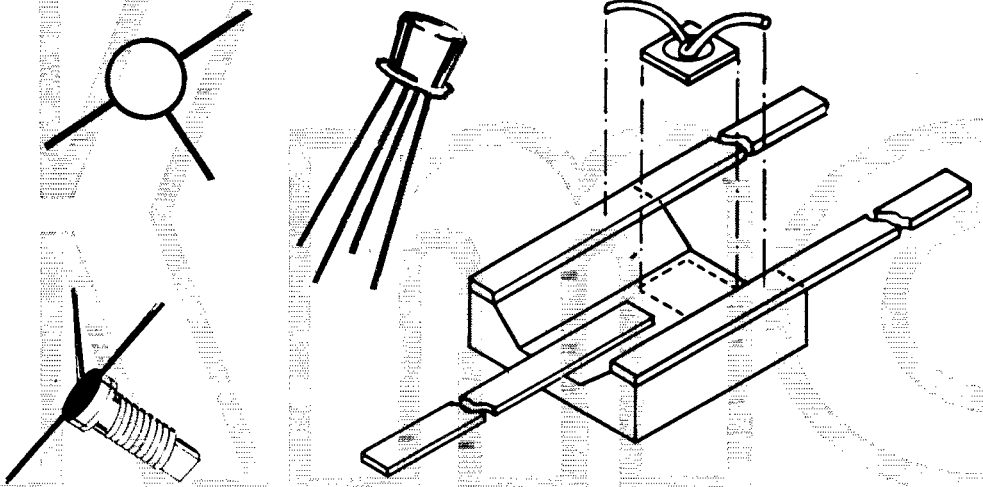
SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5QQG, PAM: W5ZPD, RM: K5ANS, WA5BUI, aboard the USS *Cadmus*, sends a nice letter advising that WA5OSA/MIM, aboard the USS *Semmes* and WA5BUI will be separated from the Navy and have great plans to push 2 meters when they return to Brenham. K5HZR reports a fine meeting of the Texas V.H.F./F.M. Society was held in Austin July 24. WA5IOO is the proud owner of a new TR-4. EC K5HMF reports new officers of the Brazoria County ARC are K5VIX, pres.; WA5IOO, vice-pres.; WA5MHD, secy.-treas. PAM W5-ZPD reports that W5NHB is now s.s.b. with a KWS-1 and WA5MDB with a Swan 350. W5EKP says a week in Kerrville resulted in many pleasant contacts and he was amazed at the extremely low noise level there. WA5AUA and his XYL have been giving the yard a lot of attention which has greatly curtailed amateur operations, as reported in the *W5MS Bulletin* from Corpus Christi. Section Net certificates went to the following stations for their excellent work in the 7290 Traffic Net: K5FPJ, W5HYG, W5KBP, WA5LNV, K5PNC, WA5NAO, W5-VW, W5ZIN, WA5BEU and K5RGT. WA5AUZ reports traffic was slow in July. With vacations over and everyone getting back in the swing things should start picking up. There are about 175 on 2 meters in the Houston area. Traffic: WA5AUZ 288, K5HZR 114, W5BGE 111, W5NRJ 23, W5ABQ 14, W5HWY 11, K5HMF 6, W5TFW 2.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM APN: VE6ADS, PAM SSBN: VE6ALQ, ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE6XC, VE6XC, VE6AFQ, ORS: VE6BR, OPSS: VE6HM, VE6SS, VE6BA, VE6ADS, OOs: VE6HM, VE6NX, VE6TY, VE6AKV, OBSs: VE6HM, VE6AIF, OBS: VE6DB. Our SEC reports that the AREC is preparing for the Oct. Test and the Boy Scout Jamboree; also that he is impressed with our new EC for the south, VE6AFQ. The south should look forward to some fine mock tests. OOs report that infractions are few and far between these days. VE6FS is a proud grandfather. VE6JI is having quite a hard time these days with his XYL in the hospital so long. VE6AO is having a good rest after a long illness. VE6YZ is improving very slowly. Had a short visit from VE8SL who said that he had to get back to the north country. He left his XYL in the Cardston Hospital and she will follow in a month or two. Somebody forgot to send in the traffic count this month. Traffic: VE6FK 69, VE6TG 7.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —The Okanagan International Hamfest held in the State of Washington was well attended by both sides. VE7XW, VE7AQW and VE7AGF found the hidden transmitters. The 1967 International Hamfest will be hosted by the Penticon ARC and this being Canada's 100th birthday it should be a hamfest to attend. VE7XW's XL-500 was stolen and smashed the same week end. VE7UF has spent some time in the hospital. VE7BLO is in the hospital with a broken leg; fell out of his wheelchair. VE7BGJ has been plagued with transmitters blowing up in his face for his July entertainment. North and West ARC supplied communication for the community parade and then was invited to the president's house for refreshments. VE7AKA had a reason, his tower is now in a vertical position. VE7BQB is busy building gear for the winter activity. VE7AOI had a short stay in the hospital. VE8ER, ex-VE7ER, was in town; also VE2BYU, VE4XA, VE7APH, who is in Montreal and looking for the day to return to B.C. VE7GR is now s.s.b. and a real DX hound. VE7DH, active on 2 and 75, reports nothing exciting happening in the Hub City. BCEN reports a lack of check-ins. Traffic: VE7BHH 250, VE7ASY 84, VE7QQ 22, VE7DII 13, VE7SE 10, VE7AEG 7, VE7BOQ 4, VE7BQB 1.

MANITOBA—SCM, John Thomas Stacey, VE4JT—VE4EP has been transferred to Ottawa and hopes to be

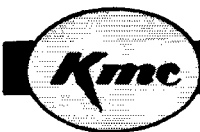


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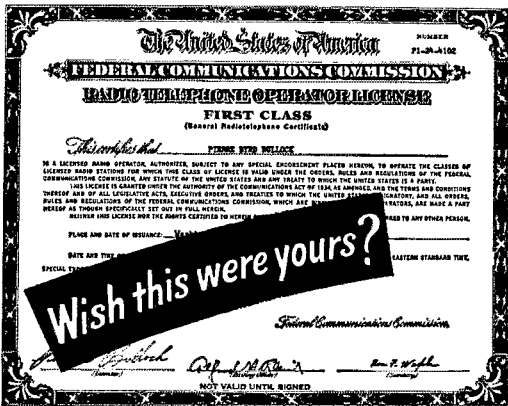
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signing a VE3 call shortly. VE4HI is back in Winnipeg. VE4UJ is sporting an s.s.b. exciter for 6 meters. From all reports the hamfest at the International Peace Gardens was very well attended. We are pleased to report that VE4QD is out of the hospital and back on his favorite band, 75 phone. Your SCM is looking for a PAM (v.h.f.) and could also use an additional OO. If anyone can fill these positions please drop me a line. Station reports are very sparse this month. Each station is urged to forward a monthly activity report. It might be old hat to you but your reports will make this column interesting. Holidays and propagation have taken their toll on the traffic nets. The phone net held 12 sessions with QNI 93 and QTC 3. The c.w. net had 31 sessions with QNI 103 and QTC 68. Both nets solicit your support. Traffic: VE4JT 53, VE4QX 43, VE4ET 39, VE4NE 20, VE4GN 6.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM; A. E. W. Street, VE1EK, and R. P. Thorne, VO1EI, SEC: VE1MI. The section was saddened to hear of the recent passing of VE1ACL. All join with me in extending deepest sympathy to the family. VE1YU reports the handling of emergency traffic for the RCMP VE1KK/mobile at the scene of a serious accident in northern New Brunswick. New calls for the Bathurst area include VE1ABO and VE1ATX (Beresford). VE1-AFC is moving to the VE2 district (New Richmond). VE3RZB (ex-VE1BK) was a recent visitor to the Halifax area and asks for more VE1 representation on the ECN, 3540 kc, 0040 GMT daily. While on the subject of nets, VE1AAX asks for additional participation in the APN (Atlantic Province), 3653 kc, 2300 GMT daily. VE1s VC, ADH and AMC have been on a DXpedition to FP8. VO1AL is moving to Lewisport. Members of the SONRA recently held a successful Ham-an-army at Nova Park. Newly-elected officers of the NBARA include VE1FN, pres.; VE1BY, vice-pres.; VE1AGE, treas.; VE1IZ, secy.; VE1AYL, asst. secy.; WA4-TUH/VO1 and WA4EJM/VO1 are departing Newfoundland. Traffic: VE1OM 26, VE1ABS 24, VE1AAX 12.

ONTARIO—SCM, Richard W. Roberts, VE3NG—To all of you who gave me your support in my reelection as SCM, I wish to thank you very, very much. The satisfaction that one receives in knowing that the majority is behind him is very gratifying. I regret to announce that VE3BKB and VE3ART are Silent Keys. VE3HW is active again after three serious operations. VE3NG and Marge, VE3DZA, were in eyeball QSO with W1MNP, SCM of Vermont, when in walked VE3-CDX and VE3ASO. From all reports the S.S.B. Picnic near Guelph held by the Chicken Junct. Net was a huge success. VE3YC, says the Trans-Canada Canoe Races will be reported via AREC next year. VE3CGP has returned from the land of the cod wallopers. VE3FCK was in P.Q. with an HW12/c; likewise VE3NG was portable in VE2-W1-VE1-Land. The Sudbury ARC is now in with EMO and is working up a fine winter program. The Scarborough ARC will have a station at the Exhibition Show in Toronto with the call VE3WE. Your SCM requests that you check the date of expiration of your appointments. Otherwise he will be forced to cancel after notification to you. Send your certificate to him. Traffic: (July) VE3BH 117, VE3NG 105, VE3DFO 93, VE3AT 75, VE3CYR 73, VE3DRG 69, VE3GCE 63, VE3DGB 58, VE3FHV 46, VE3FGU 36, VE3DVE 28, VE3HW 27, VE3UN 22, VE3AUU 18, VE3TT 16, VE3-AFA 14, VE3BUO 14, VE3DU 13, VE3AVE 7, VE3BTV 7, VE3EBC 5. (June) VE3AVE 40, VE3GCE 40.

QUEBEC—SCM, Jim W. Ivey, VE2OJ—SEC: VE2-ABV, RM: VE2DR. The RAQI Convention at Chicoutimi was a well-managed affair. A preliminary to a trans-Canada canoe race, as part of "EXPO 67", staged from Montreal to N.Y.C. in mid-August, had amateur radio communications from the press boat. Despite vacation time and warm weather OQN and ECN have been well attended. VE2ATL is now in Brossard with a new rig. You can contact the St. Maurice Valley gang on 144.1 Mc. at 2330Z. VE2AOL was the key man at St. Maurice Valley club station VE2MO during Field Day. VE2AJG is very active on 80 meters and VE2AGI/MM tests his operating ability from his yacht. VE2BLM is now heard from St. Remi du Lac-du-Sables. VE2BRT and brother VE2BRD/VE2 have done a fine job translating some operating aids to French. When VE2UQ, a confirmed 160-meter DX man, was asked why he was on 80 his reply was "I'm v.h.f.-ing." VE2BAL, the new EC for Chicoutimi, has a well-equipped v.h.f. setup. VE2APU/VE2, who kept Great Whale on Hudson's Bay on the map for two years, has now departed for VE7-Land with nine acres on a mountain top for an antenna farm. We regret the passing of VE2AVK on July 9. Traffic: VE2BLL 123, VE2DR 104, VE2OT 70, VE2AGQ 59, VE2EC 35, VE2BRD/2 27, VE3AUU 19, VE2ALE 17, VE2BWL 14, VE2AJD 12, VE2BRT 5, VE2NT 5, VE2BXW 3, VE2AZQ 2, VE2DCJ 1.

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516F2 AC..... 84	S95 152-174MC... 29	HQ100C..... 117	HQ100C..... 22
30L1..... 419	S120..... 39	HQ110C..... 127	DOW TR SWITCH... 6
312B4..... 129	SK71..... 117	HQ180..... 259	SWR BRIDGE & MTR 12
SM2 MIKE..... 24	SK99..... 79	HG10 CONV..... 47	100KX XTAL CALL. 9
DRAKE 1A..... 117	SK111..... 147	CONSET GR211... 47	RF 2 ANT. BRIDGE 14
DRAKE 2B..... 199	SK150..... 139	SUPER 12 CONV... 29	R46B SPEAKER.... 7
2B SPEAKER..... 14	SK140..... 77	MONITONE..... 19	KNIGHT VTVM..... 17
DRAKE TR3..... 389	SR160..... 219	ELMAC PMR7..... 47	P&H DB1 SCOPE W/ 47
DRAKE TR4..... 519	HT40..... 57	NCX5..... 399	tone oscillator 47
DRAKE R4..... 289	HT44..... 239	NC155..... 119	TRIPLETT 3414... 37
DRAKE R4A..... 349	PS150-120AC..... 89	NC300..... 139	HICKOK 820 VTVM 27
SWAN 240..... 199	PS150-120C..... 77	HROSOT1R & COILS 139	tube,trans ckr. 27
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SBE 34..... 339	CHALLENGER..... 57	GR54..... 37	FISHER FM90X TRR 69
SBZLA LINEAR..... 209	MOBILE VFO..... 17	SENECA..... 189	HAMMARLUND SPKRS 7
CLEGG 99ER..... 77	TR SWITCH..... 19	DX60..... 67	24 HOUR CLOCK... 8

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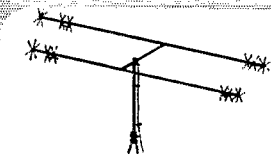
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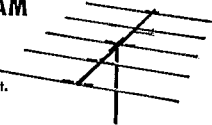
Oper. Freq.	40 and 10 Meters
Power Rating	1000 Watts AM
Single Feed Line	52 ohm coax.
SWR at Resonance	1.5 to 1.0 max.
Total Weight	22 lbs.

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97.73 — or Bust

(Continued from page 64)

power-supply bleeder resistor. If this resistor has burned out, the power supply will not be sufficiently loaded under key-up conditions, and the difference in B+ voltage between key up and key down may be sufficient to introduce chirp. Unsolder one end of the bleeder and check it with an ohmmeter. If the power-supply filter uses a resistor instead of a choke, unsolder it and check its value.

An additional cause of trouble is crystals that just seem to be "chirpers." Some of them genuinely are, but most chirp only when the transmitter is improperly tuned. Many novice-type transmitters contain only the bare minimum of components and adjustments to put a reasonably clean signal on the air (and some not even that). Failure to tune them properly leads promptly to trouble. *Listen to your signal.*

Many "economy" model ham transmitters do not use voltage regulator tubes to control the oscillator plate and screen voltages, and do not compensate for this deficiency in other ways. The frequency instability deficiency problem is enhanced by the lack of buffer stages. Some of these transmitters chirp when they are new, and will continue to chirp until the oscillator voltages are stabilized. Adding a VR tube is a very easy job, requires very few parts, takes up less than one square inch of chassis space, and makes a dandy little project for the hordes of novices (and OTs) with chirping transmitters on 40 meters. Even allowing for the purchase of a chassis punch to make a socket hole, the total cost of this little project is less than \$5. It is highly recommended. See the ARRL *Handbook* (under power supplies) or the Editors and Engineers *Handbook* for the technical details.

Key Clicks

There are two kinds of key clicks. The first, called "r.f. clicks," are caused by the small spark at the key contacts, and are not radiated via the antenna. They are only heard a short distance away, and do not ordinarily cause troubles on the band. If the transmitter and receiver must both operate simultaneously in the same vicinity (as when you are monitoring yourself), this click is easily eliminated by a simple filter.

The other kind of key clicks (forbidden by section 97.73) is caused by improper shaping of the c.w. pulse. If the rise and fall times of the pulses are too short, clicks are sent ringing up and down the band causing interference to other stations both in and out of the amateur bands. Since the ARRL *Handbook* contains a complete chapter on the symptoms and cures for this problem (titled "Keying and Break-In") you are referred directly to it. Nuff said.

(Part II of this article will appear in a subsequent issue.)

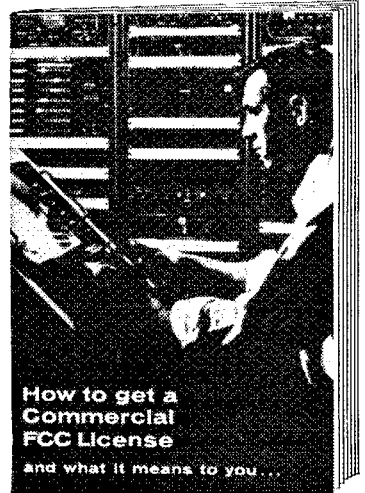
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(Continued from page 50)



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Ward's and neighborhood urban hardware stores generally go only to $\frac{3}{8}$ inch sizes, and are cheaply made. For example, a $\frac{3}{8}$ inch eyebolt, of the kind having a formed, unwelded eye, if used at the top of the vertical plank mentioned above, could easily unwind and drop the load on the ham below at the boat winch. Where does one get better hardware? Try industrial suppliers, such as McMaster-Carr Supply Co., 2828 North Paulina Street, P.O. Box 4355, Chicago, Illinois 60680.

An item not as widely known amongst amateurs as it should be is the screw anchor. This is a long rod with eye at one end and an auger plate at the other, by which it is screwed into the ground. A common size is the Hubbard 7526 or Chance 6346, 66 inches long, $\frac{3}{4}$ inch rod, 6 inch blade, which sells for about \$5.00. Fully screwed into good soil, these withstand 4500-pound pull. Many varieties are made: swamp anchors with blades 15 inches in diameter; rock anchors, etc. A well-stocked supplier is Graybar, with warehouses in most U. S. cities. Graybar also has excellent ground-rods — not as cheap as you see in radio stores — but better. Typical sizes are Hubbard 9438, $\frac{5}{8}$ inch in diameter \times 8 feet, or Hubbard 9450, $\frac{3}{4}$ inch \times 10 feet. They even make one (No. 9697) 1 inch in diameter \times 40 feet long. Graybar also stocks clips, clamps, thimbles, arming bolts, eyebolts, shackles, etc.

If the terms used above, and others such as: "gin pole," "tag line," and "come-along" are unfamiliar, some preliminary reading or talking with persons having experience in rigging, is desirable prior to undertaking a major antenna project. Alternatively, there are people who, for a fee, will take the problems off your hands.

Rescue squads or fire departments which accept public contributions, can be helpful in raising antennas to the top of, say 60, foot towers or poles. A local amateur made a \$25.00 contribution (tax deductible?) and found willing and effective cooperation.

Raising a tower with a crane can be dangerous, though it is common procedure commercially. A 130 foot, 24 inch tower was once being raised with a 60-foot crane by wiring the tower base to its concrete foundation, and picking up the tower by attaching the crane hook below the tower center. The base temporary wires failed. The tower base whipped sidewise and killed a rigger instantly.

Locally, the most experienced ham riggers, W3MSK and W3GRF, prefer to assemble towers such as the AB-105 vertically in place by carrying up pieces, bolting them on, climbing up to the next level, etc., using a light gin pole and ground helpers to pull up materials as required.

The reason why self-supported high towers are rare compared to guyed towers, is that they cost several times as much.

(The next instalment will appear in an early issue.)



High Gain Pre-tuned IF Strip

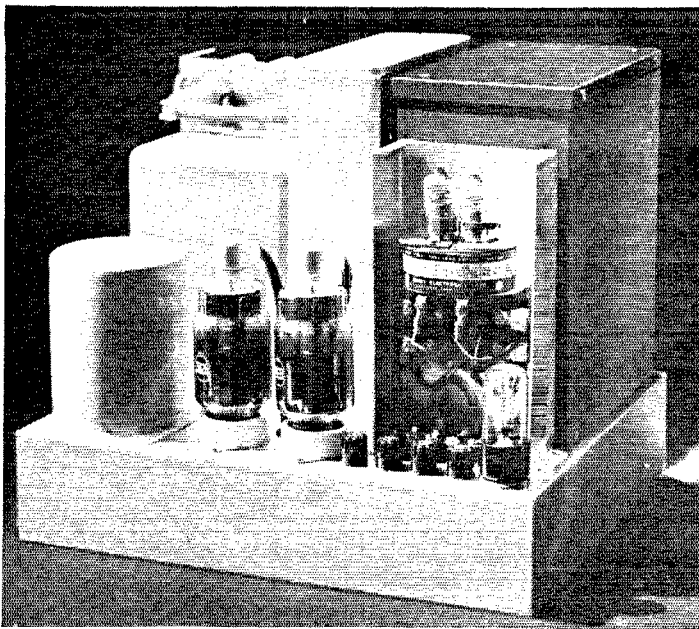
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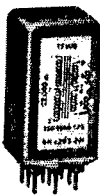
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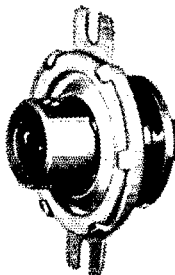
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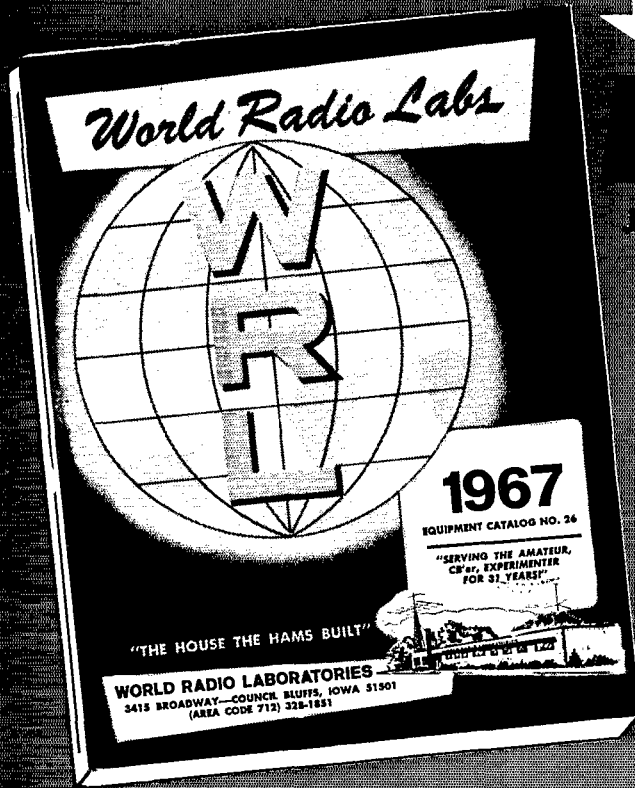
It is with deep regret that we record the passing of these amateurs:

- W1AEB, Arthur W. Flint, South Yarmouth, Mass.
 W1BBN, Warren W. Anthony, Portsmouth, R. I.
 W1CBB, George L. DuBois, Manchester, N. H.
 W1QZO, Harry H. Warner, Wollaston, Mass.
 W2ATK, Harold L. Van Pelt, Rahway, N. J.
 W2CFR, Lardner R. Kerr, Trenton, N. J.
 W2GIB, Clarence H. Pennington, Madison, N. J.
 W2LP, Lawrence J. Dunn, Garden City, N. Y.
 WA2OWN, Kenneth L. Brunneman, Endicott, N. Y.
 W2PYS, Frank A. Zugner, Bronx, N. Y.
 W2QAV, Wilbur C. Miller, Rochester, N. Y.
 W2RUH, Sherman A. Dennis, Elizabeth, N. J.
 WA2STD, George Breckheimer, Parish, N. Y.
 K3BIB, Robert H. Dunham, New Albany, Pa.
 W3FVK, Norman P. Stephan, Hampstead, Md.
 W3SGK, Ralph D. Sharp, Glenolden, Pa.
 WA4AGB, William F. Grigg, Jr., Richmond, Va.
 W4BTY, Gilbert L. Faw, Albemarle, N. C.
 W4CVY, Jack Adams, Columbus, Georgia
 K4JSL, Ernest M. Veal, Decatur, Alabama
 K4MYZ, Harry L. Eisen, North Miami Beach, Fla.
 K4PJJ, Walter L. Rives, Fort Lauderdale, Fla.
 W4QD, Louis C. Goldich, Atlanta, Georgia
 K4QDO, John Sawyer, Spring Hope, N. C.
 K4UCL, Sven Hokanson, Tavernier, Fla.
 K4WNC, French H. Craddock, Jr., Sylacauga, Ala.
 W4YLY, Herman J. Johnson, Lynn Haven, Fla.
 K5BAT, John W. Watkins, Manchester, Okla.
 W5BZI, Archie L. Compton, Henryetta, Okla.
 K5GLB, John B. Trottmann, Oklahoma City, Okla.
 W5GYS, Walter D. Baer, Gallup, N. M.
 W5SP, William O. Ansley, Abilene, Texas
 W5VB, Hallet E. Worthington, Houston, Texas
 K5ZKJ, Joseph Franz, Austin, Texas
 W6CHN, ex-W7HCS, George E. Minich, Clearlake Highlands, Cal.
 W6CPQ, Warren T. Dodge, Napa, Cal.
 W6DYX, Frank J. Ostman, Santa Barbara, Cal.
 W6MU, A. Houston Barnett, Beverly Hills, Cal.
 W6MYH, Harry M. Baker, Burbank, California
 WA6NYU, Wildon J. Seber, San Diego, Cal.
 K6ODY, Foster Suits, Long Beach, Cal.
 K6OFS, Raymond Rivers, Duarte, Cal.
 K6SWB, Milton S. Futterman, Arcadia, Cal.
 W6ZRI, Donald Schwab, Kentfield, Cal.
 W7HDQ, Claud R. Brand, Salt Lake City, Utah
 W7HRU, Walter C. Puryear, Moses Lake, Wash.
 W7OUT, Norin O. Holman, Salem, Oregon
 W8CQD, Ilorace C. Dolph, Grand Rapids, Mich.
 W8CSQ, Donald M. Jewell, Sebring, Ohio
 K8DPO, Charles S. Baker, Port Huron, Mich.
 W8FSM, Frank Wagner, Massillon, Ohio
 WA8HWD, Frederick N. Gossman, Weston, Ohio
 K8HWJ, Douglas J. Scheick, Toledo, Ohio
 W8INU, James A. Long, Canton, Ohio
 W8NKH, Robert B. Bolden, Sr., Willowick, Ohio
 W9DCT, Alva B. VanAlstine, Menomonee Falls, Wisconsin
 W9FEH, E. J. Gerard, Kokomo, Indiana
 W9LKL, Robert E. Blair, Springfield, Ill.
 K9RLG, Emmett Hall, Shipman, Ill.
 W9VNW, Rex Maupin, Winnetka, Ill.
 K8BAT, Edward R. Roser III, Leavenworth, Kan.
 W0DDM, Edgar F. Percival, Hillside, Colorado
 W0HYV, Gilbert A. Burr, Pleasant Hill, Mo.
 WA0FR, Carl O. Brunsvold, Fargo, N. D.
 W0MXC, Charles M. Boye, Minneapolis, Minn.
 W0NDM, Lewis A. Shell, La Junta, Colo.
 G2OS, J. M. Ostens, Newcastle-on-Tyne, Northd., England
 LU4ABZ, Luis M. Tambussi, Buenos Aires, Argentina
 VE1ACL, D. V. Moser, Charlottetown, P.E.I.
 VE3ART, Percy G. Ryerse, Port Dover, Ont.
 VE3EID, Lawrence Dukes, Sudbury, Ont.

(Continued on next page)

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<input type="checkbox"/> 100	<input type="checkbox"/> .65	<input type="checkbox"/> 250	<input type="checkbox"/> 1.35	<input type="checkbox"/> 500	<input type="checkbox"/> 2.50
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(Continued from page 158)
 VK3XD, Richard Dowling, Montmorency, Victoria, Australia
 ZS5AM, Allan G. Matthew, Pietermaritzburg, Natal, Republic of South Africa
 ZS6WS, Tom Creed, Springs, TVL, South Africa
 601MT, Mauro Tessieri, Mogadiscio, Somali Rep.

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

Simulated Emergency Test

(Continued from page 83)

extremes is a good compromise between publicity and valid test.

Your cue, if you are an AREC member, is to check with your local EC and find out what's being planned. Check with him even if you aren't an AREC member; it's time you signed up, and he'll be looking for new members.

RACES Role

This will be the first year that RACES will be participating officially as a part of ARPSC: however, RACES has always been a factor in the SET. This first year we are asking all RACES radio officers (ROs) to use the same reporting form as ECs and follow roughly the same procedures. Meanwhile, we are trying to get mailing lists of radio officers from c.d. sources, federal and state. As of the present writing only six states have responded affirmatively (one has "passed" until next year), but we hope to get more lists before the deadline for SET Bulletin mailing.

If you are an amateur active in RACES, your cue is to contact your RO about the SET. It may be that he has not heard about it, in which case we would be glad to mail him a copy of the bulletin should he wish to conduct an ARPSC SET taking advantage of the option to do so after the official weekend mentioned above.

NTS Role

The National Traffic System this year is attempting to set up a standard procedure which will apply in all emergencies in which NTS goes into emergency operation. Further details are given in the NTS subhead in the ARPSC column in this issue. If you are an NTser, we suggest you read it carefully. Even if you are not an NTser, you may derive some benefit from having an idea how NTS will operate Oct. 8-9.

Casual Amateur Role

If you are a casual amateur who has nothing against public service but just wants to work somebody, you can be of most help by avoiding those frequencies on which SET work is being conducted. We couldn't begin to give you a list of these frequencies (other than the NCEFs listed below) because there will be a lot of them,

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115 VAC operation). ■ 10. Metered relative R. F. watts output to antenna. ■ 11. Built in metering and switching for Dummy Load accessory which when attached provides dummy load for linear or exciter. ■ 12. Meter overload protection. ■ 13. Changeover relay feeds exciter direct to antenna when linear is off. ■ 14. All relays have D.C. coils for hum free operation. ■ 15. Safety switch and shorting bars for personal safety and component protection. ■ 16. High voltage overload circuit breakers. ■ 17. Fused filament and control supplies using lighted fuse indicators. ■ 18. Distinguished console (TVI preventive) design (29" H x 16" W x 14 3/4" D.) ■ 19. No exposed high voltage in lower console. ■ 20. Precision console casters for easy mobility. ■ 21. Grounded grid, zero-bias linear operation.

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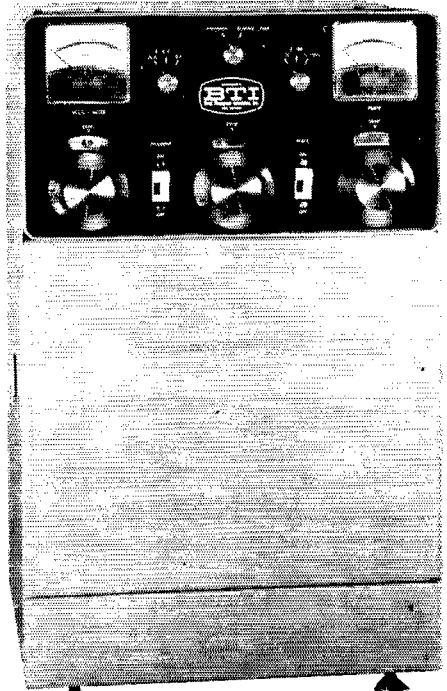
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● **BETTER SHORTWAVE RECEPTION**, by Wm. Orr, W6SAI. Your introduction to shortwave radio. How to hear DX. How to buy a receiver. Amateur radio. How to align your receiver. Antennas! QSLs. Getting your ham license. \$3.25

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SPECIFICATIONS—DC to 250 MCS. (50 Ohm Units)

Price	\$1.95	\$11.95	\$19.95	\$19.95	\$19.95	\$29.95	\$29.95
Model	507	525	525L	525B	510U	510N	510B
Term's	UHF	UHF	N	BNC	UHF	N	BNC
VSWR (max)	1.05	1.1	1.05	1.05	1.1	1.05	1.05
Power	7W	125W	(250W ICAS)		500W	(1KW ICAS)	

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Write for Free Literature (50 and 70 Ohm Units)

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(Continued from page 160)

and we don't know which ones will be used and which won't. We suggest you "play it by ear," and if someone should ask you to move off, to do so graciously. This is asking a lot, but we all have to make some sacrifices in the interest of public service through amateur radio.

Even better, why not plan to be a part of it, instead of an innocent bystander? Contact your EC. If you don't know who he is, contact your Section emergency coordinator (SEC), listed on page 160. You'll be glad you did when you feel the satisfaction you get out of public service operating. — WINJ.M.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July 1954:

Call	Orig.	Recd.	Rel.	Del.	Total
K6BPI	198	8696	8411	285	17500
W3CUC	249	1773	1333	374	3680
K6EPT	3	1450	1207	243	2903
W6WFF	69	1306	1268	38	2681
W8ZJB	14	826	809	17	1666
W7BA	5	815	721	88	1629
W4LEV	188	691	584	107	1570
W8BY	37	623	458	105	1316
W1PXC	91	528	474	50	1143
K7CYC	11	550	510	39	1110
K9ONK	31	522	514	4	1071
W6GBB	39	514	469	15	1037
W8LXC	4	463	402	5	934
K7EY	4	372	372	0	901
K8MDD	20	400	300	100	820
W6BJH	24	387	355	32	798
W8UPH	21	381	329	50	781
K9IVG	22	335	316	1	774
W7EJA	21	372	370	2	765
W8LGG	13	369	334	14	730
W6CCP	288	214	192	5	729
W8EML	34	402	283	7	726
W6ADB	5	342	303	39	689
W6WNG/WB6CRC	37	319	277	25	665
K6DY	21	300	372	0	646
W8MLF	4	312	303	15	634
W8VR	51	299	271	6	627
W8CFJ	75	288	244	14	621
W6VNO	9	309	298	0	616
K9G8Y	38	332	312	0	582
W4ASC	21	300	257	3	581
W6IDY	2	273	255	42	572
W6AIW	22	272	262	10	566
W4TUB	3	269	266	3	541
K8LNE	3	277	246	4	536
W4ZUPC	28	346	208	23	565
W6TXJ	385	207	8	44	504
W6ZFUW	39	232	208	23	502
Late Reports:					
K9IVG (June)	30	392	257	3	682
W4ZUZK (June)	15	313	295	16	639
W9AIO (June)	18	254	219	16	507

More-Than-One-Operator Stations

K6MCA	88	956	948	8	2000
BPL for 100 or more originations—plus deliveries					
K4BYV	231	W4PDM	128	W4ATQ	106
W4BMC	226	W8FGB	127	W4QKT	105
W4HJM	202	W9GJU	123	W4GSA	1104
W6UZX	171	W4TJS	116	W6JFO	102
V67BH	161	W6OQM	116	Late Report:	
W4NEV	155	W6PQC	116	W4SAM	NM
		W6DEF	114	(June)	110

More-Than-One-Operator Stations

Late Report:					
W1IAB (June) 271					
BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: W4ATQ, W4AIW, W4DYL, W4WWT, W4OQM, W4HYR, K9WMP.					

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCML a message total of 500 or a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

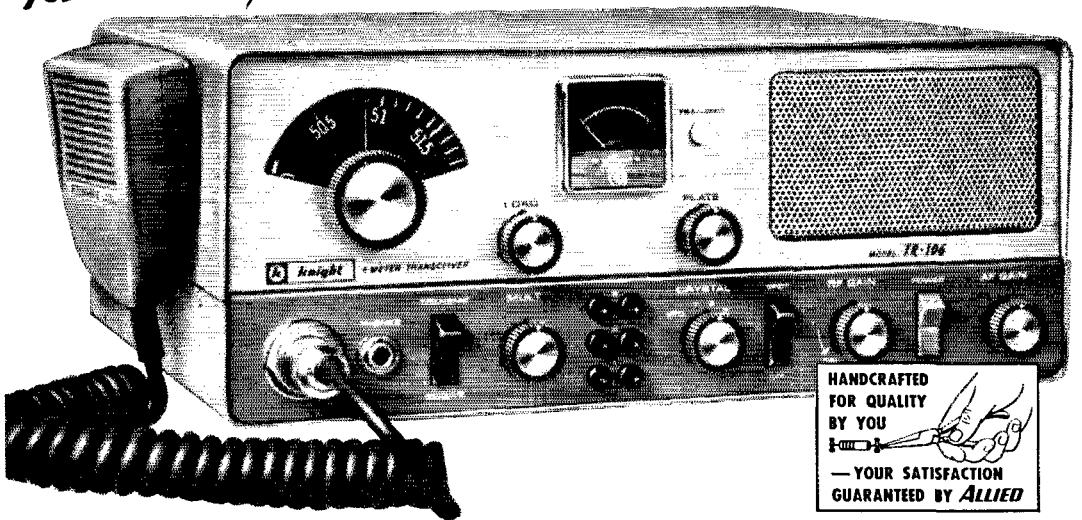


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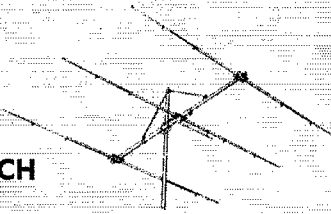
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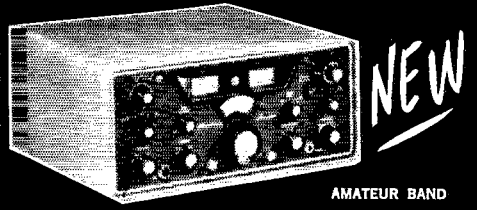
A28-3 10 Meter, 3 Element, Boom 10'	\$31.95
A28-4 10 Meter, 4 Element, Boom 18'	42.95
A21-3 15 Meter, 3 Element, Boom 12'	39.95
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GBA

(Continued from page 55)

WA6XXX/3 happens to bump into a member of the MDD Net he will never know his buddy sent him regards.

The saddest of all these GBA messages are those to servicemen overseas with the APO number missing in the address. MARS will not accept messages that lack this very necessary number. To omit it is very much the same as omitting the city on a letter. It doesn't matter how many numbers, letter groups, rank, Bn, Div, Reg, there are in the address; if that APO number, or ZIP number is lacking some service man won't get a message from his family.

There isn't a thing the traffic system can do about it. Once a message starts on its way, on the section net, it cannot be stopped until it reaches the terminal station for delivery. The result is, of course, delay. In cases where time element is vital in delivery, it means almost certain cancellation rather than a refile of a text, now stale. But a far graver result is an adverse picture of amateur radio's public service facilities by implying, through carelessness on the originating station's part, an inefficiency that does not exist. This carelessness is really too much eagerness on the part of the originator to be a good friend, and to rush the message off even though the neighbor doesn't "quite remember all the address, but anyhow their name is Johnson and they live in Pasadena, California." Rather than say "Well, call me when you get home, and give me the full address," or, "I can't send this without a complete address any more than the post office or Western Union could," off it goes — and back it comes "GBA."

There is a simple formula to remember for those who really want to hear their neighbor or friend say "The Meyerses got my message, and had a real party for us when we arrived," or Carolyn to know that the gang back home are sharing her big moment, or WA6XXX to enjoy his snapper soup more because his friends wish him well. It is a familiar statement that is used at every club meeting. After the secretary finishes reading the minutes of the last meeting, before they can be accepted as club records, the president asks, "Are there any corrections or omissions? If not, the minutes stand approved as read."

Try it as a yardstick on the next origination, and make that red circle date of "Utopia" come for the traffic fraternity. QST

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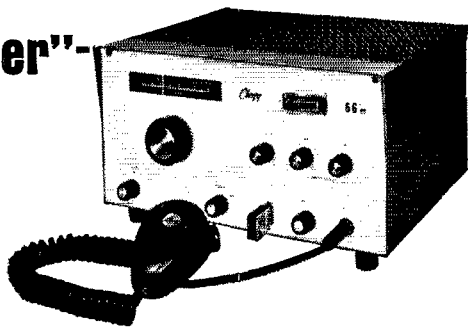
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SUPERSENSITIVE RECEIVER • Dual conversion design with sharp 8 KC selectivity for freedom from birdies, tweets and spurious signals. • S Meter doubles as tuneup meter for transmitter. • Full 49.9 to 52.1 mc coverage for accurate dial readout—excellent band spread. • Sharp cut-off, adjustable squelch. • Excellent AGC performance. • RF stage provides optimum usable noise figure—freedom from cross modulation and overload. 0.5 uv sensitivity captures weakest signals. • 2 watts audio output with internal speaker. Provision for external speaker. • Effective automatic noise limiter.

POWERFUL TRANSMITTER • High efficiency, 22 watt final amplifier, driven by straight-through amplifier for low-low harmonic output. • Dual self-contained, solid-state power supply for both 115 VAC or 12 VDC operation. • Push-to-talk with provisions to automatically switch Apollo Linear and external VFO. • Broadband, multi-tuned exciter stages for rapid QSY and freedom from spurious outputs—no TVI problems! • High level modulation with speech clipping for top talk power. • Transmitter frequency spotting switch. • Operated with 8.3/12.5/25 mc crystals. Ideal for MARS, CAP. Wide variety of accessories for CD application. See the Clegg "66'er" today. \$249.95. Microphone \$10.50. Squires-Sanders, Inc., Martinsville Road, Millington, N. J. 07946.

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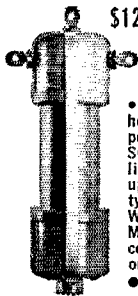
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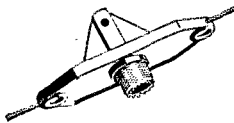
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Yagi vs. Quad

(Continued from page 21)

On the other hand, the Yagi is much stronger structurally and mechanically. The Yagi was comparatively easy to assemble and raise. Constructing and installing a 4-element quad is like trying to handle a crowd of romantic octopuses. During periods of high winds the Yagi seems much more stable and less inclined to shake itself apart or to tear the telephone pole out by the roots.

During the tests I had lightning strike. At the time of the stroke, both antennas were grounded at the station through a Waters Protax coaxial switch.² The Yagi, with its grounded boom, suffered no damage. The quad driven element was burned and cut in two and a small amount of damage was done in the station.

In summary, after three months of playing with the two antennas, I have found that neither is overwhelmingly superior to the other. I know I have two good antennas since they both perform well at my location. For the average U.S. contact or during QSOs of 2000-6000 miles, my antennas seem to run about neck and neck. The quad has demonstrated to me an advantage on the long-haul contacts that makes a difference in pile ups; however, this was not true in every instance. I have also learned that the quad must be carefully tuned at the actual site of operation to acquire this advantage.

I still have a lot of playing to do. I am now trying to figure out some easy way of tying the two antennas together and possibly feeding them in phase to see what happens; to date I have come up with no simple system of phasing two antennas 150 feet apart and at the same height. I would welcome any ideas on this score.

I also have a V beam aimed east and west. While I did learn that this antenna outperformed a tribander, I haven't yet gotten around to comparing it with my quad or Yagi on 20 meters. I also want to compare a Yagi "Christmas tree" against a trihand quad; this I intend to do during the next few months.

I'm still not sure which antenna I will finally keep. Only when someone notices an ad in the back of *QST* listing an antenna for sale will it become obvious which antenna I have selected as the best for my particular station. However, I'll probably wind up keeping the antenna that succeeds in riding out the Tennessee summer thunderstorm season!

QST

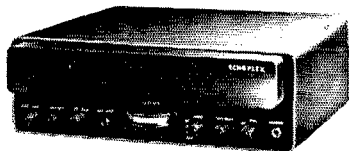
² Protax switches are not designed to protect equipment from a direct lightning stroke — Editor.

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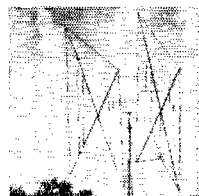
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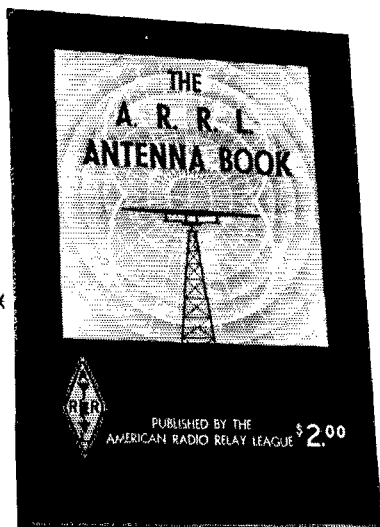
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Field Effect Transistors

(Continued from page 19)

the calibration resistors.

These two circuits were furnished by Don Wollesen and Walter Birks of the Applications Engineering Group at Motorola Semiconductor Products Division.

This article has provided a basic look into the FET and some of its applications. In general, the FET offers much improved noise performance, stability, and cross-modulation resistance over either vacuum tubes or standard transistors (p-n-p, n-p-n). Its many features, such as high input impedance and desirable high-frequency performance, insure its design into a vast number of electronic circuits in the near future. It is probably the most recent radical improvement in device design, and should prove most interesting to amateur radio operators everywhere, allowing them greatly improved freedom in circuit design.

QST

Coming Conventions

(Continued from page 96)

Amateur Radio Council. An informal get-together is planned Friday at 7 p.m. in the Occidental Hotel, to be followed by a tour of the nearby Grand Haven Musical Fountain (billed as the largest musical electronic fountain in the world).

The Saturday program, to begin at 9 a.m., will include a v.h.f. talk by ARRL Assistant Technical Editor Doug De Maw, W1CER/-WSHHS; special SYL activities; MARS meetings; technical sessions on solid state, lasers, amateur TV, Project Oscar RTTY, mobile antennas and operating techniques: "World Travels of the Ham Operator"; and a swap shop. Of special interest will be an address by ARRL President Robert W. Denniston, W0NWX. Also featured will be the Amateur Radio Public Service Corps, with meetings involving AREC, NTS, RACES and all phases of traffic and net operation. Interested conventioners are encouraged to bring ice skates, as the Arena will offer skating facilities.

WSZHO/8 will operate on 3995 kc., as well as on 6 and 2 meters, to handle last minute requests for accommodations or information. Free parking permits will be available.

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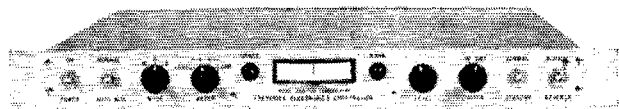


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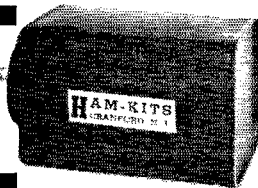
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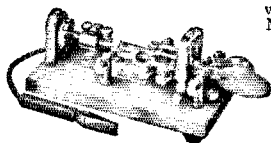
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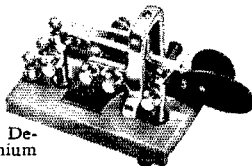


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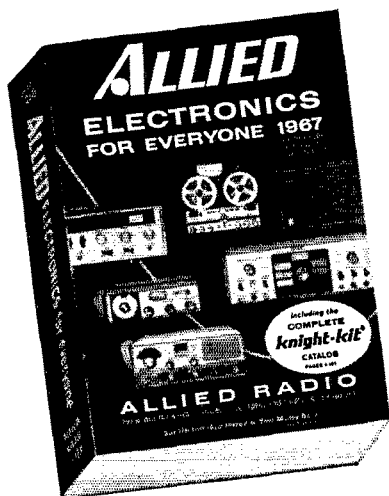
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Gimmicks & Gadgets

(Continued from page 28)

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The completed assembly is pressed into place on the main body of the can after the container has been filled with transformer oil. Mineral oil was found to be a good substitute. Use only enough oil to completely cover the resistors and the copper disks.

Other values of resistance can be made up for working with different antenna impedances. By using 6 resistors in the configuration shown, the reactance should remain low. — WICER

Building Your Own Arrays

(Continued from page 37)

York area stations, and WSWEN, Alliance, Ohio, was worked three tries in a row, without a pre-arranged schedule. Such weak-signal tropo scatter work is perhaps the ultimate test of 2-meter antenna effectiveness. You just don't do it with inferior antennas.

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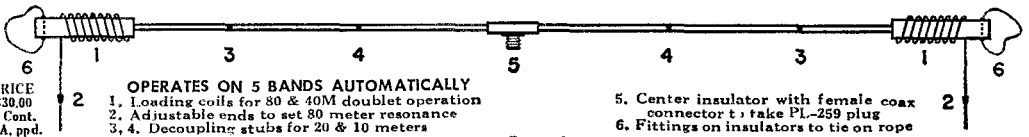
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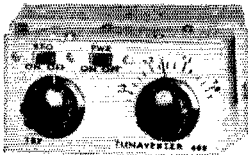
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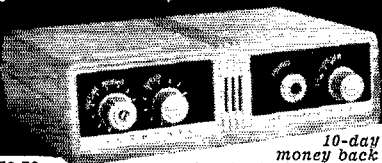
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(Continued from page 81)

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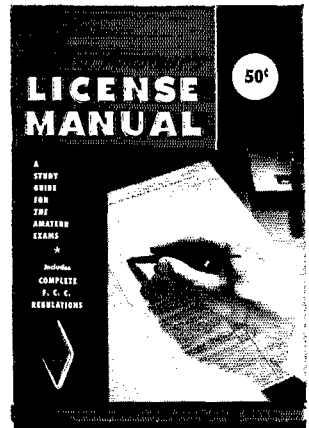
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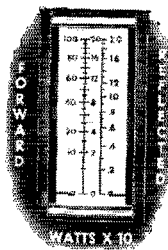
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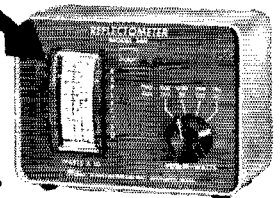
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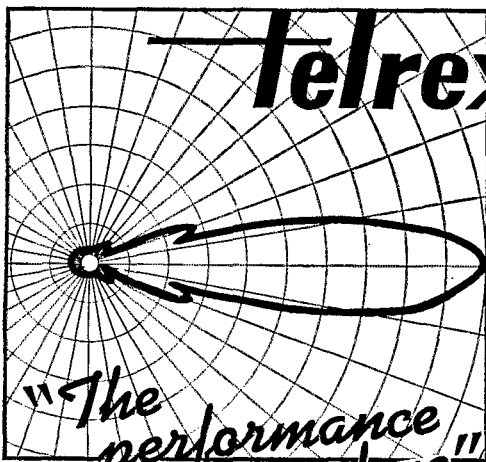
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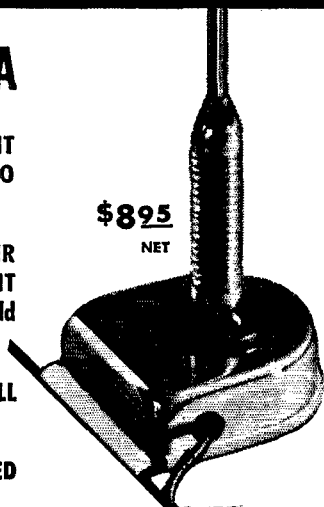
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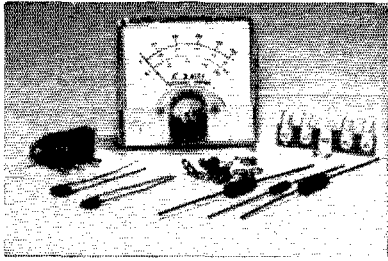
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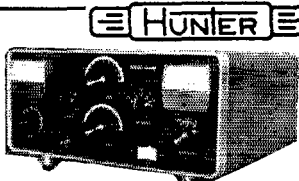
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THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

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(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

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QSLs: Movers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

QSLs-SMS. Samples 10¢. Malgo Press, Box 373 M.O., Toledo 1, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLs. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1994 N. M-18, Gladwin, Mich.

10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave., St. Louis, Mo. 63118.

DON'T Buy QSL cards until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago, Illinois 60639.

SUPERIOR QSLs, samples 10¢. Hamsco, Box 773, Hobbs, New Mexico.

QSLs, finest, YLRL's, OMs, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

HUNDRED QSLs, \$1.00. Samples, dime. Holland, R #3, Box 649, Duluth, Minn. 55803.

QSLs, SWLS, XYL-OMS (sample assortment approximately 96) covering designing, planning, printing, arranging, mailing, eye catching, comic, satate, fabulous DX-attracting, prototypical, snazzy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLs. 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs 300 for \$4.35. Samples 10¢. W9SKR, George Vesely, Rte. #1, 100 Wilson Road, Ingeside, Ill. 60041.

QSLs 3-color glossy, 100. \$4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J.

QSLs Kromekote 2 & 3 colors attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Aryle Terrace, Irvington, N.J.

QSLs-100 3-color glossy \$3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLs Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

FINE EMBOSSED QSL cards, 21 samples, 25¢ (deductible). Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

RUBBER Stamps \$1.15 includes tax and postage. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLs \$2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N. J.

SMART Ham operators buy their QSL cards from the Ham Wholesale Card Club. Special Customer Dpt., Box 461, Lexington, N.C. 27292.

QSLs—Free samples. Attractive designs. Quick Service, W7IIZ, Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for \$1.00 or 10 for \$3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

QSLs. Radio Press, Box 17112, San Diego, California 92117. HUNDRED QSLs, \$1.00. Samples, dime. Holland, R 3, Box 649, Duluth 3, Minn.

QSL Cards, quality printing. Samples 15¢. Sargent Press, 19 Glen Ave., Lynn, Mass.

COLORFUL QSLs. Very artistic—very different: Samples 10¢ or SASE. Colorful QSLs, M. A. Berliner, 333 Crowden Dr., Cincinnati, Ohio 45224.

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CANADIANS. Eico Model 720 xmttr with Model 730 modulator with cover, both \$125.00. Perfect condition. VE1AN, Rothsav N.B., RR #1, Kings Co. Canada.

TWOER with DC supply, \$50.00; Heath B-1 balun, \$5.00; AC-13 stereo headphone control, \$5.00. All new. Also two Hy-Gain 40/80 traps, \$10.00; two URC-4 transceivers, best offer. WASERC, Crisler, 154 Ronald Boulevard, Lafayette, La. 70501.

WANTED: Collins filters No. F-455J21 and F-455J08 or F455-J05 for 75A-4 receiver. Have Hallcrafters SX-99 for sale, \$9.00. In excellent condition. Cliff Wyne, 1420 Third St., Spearfish, So. Dak.

CENTRAL Electronics 100-V w/new finals. Used little, except for SS and/or mint condx. \$375.00. Want: NCL-2000, Tom Bergan, K9DVZ, 1506 Woodmont, South Bend, Ind. Tel: 219-291-4528.

SELL: Hallcrafters HT-32, excellent condition, \$200.00; NC-125, \$60.00; KSUPX, Charles Bausch, 5650 Sylmar, Houston 36, Texas. Tel: 713-771-0824.

HW-12, HP-13, HD-20, Turner PTT mic, half-year old. Built by EE, in exclnt condx. \$128.00. Bob Schwartz, B583, Bucknell University, Lewisburg, Penna.

NC-300 with xtal calibrator and speaker; 2nd conversion osc. Xtal controlled with switchable xtals for USB/LSB; coil compartment heater; in excellent condition; \$160.00. R. Markel, WA9WS, 1435 Lexington Ave., New York 10028.

FOR Sale: 755-1 Collins receiver, \$285.00; SSB Heath HX-30 6-meter transmitter, AM, USB, LSB, \$150.00. Both units in gud cond. WA9FOL, Lintz, 2826 Woodview Ct., Normandy, Mo.

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SR160, 6146Bs, 240 watts. Acc p/s, plate meter, \$220.00, local deal, Richard Bain, W8WNZ/9, 1328 Union St., Fort Wayne, Indiana.

SELL Collins 32S-1 noise blander NO. 136A-1. \$28.00. W8YBS.

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ATLANTA Area! Little used Galaxy V station: AC power supply, vertical antenna, 80 m. coil, GD-104 mike, calibrator, accessory console: \$350.00. WB4BKP, Tel: 404-436-6640.

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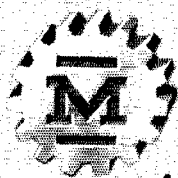
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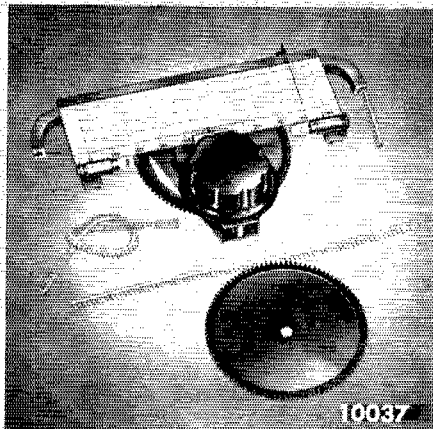
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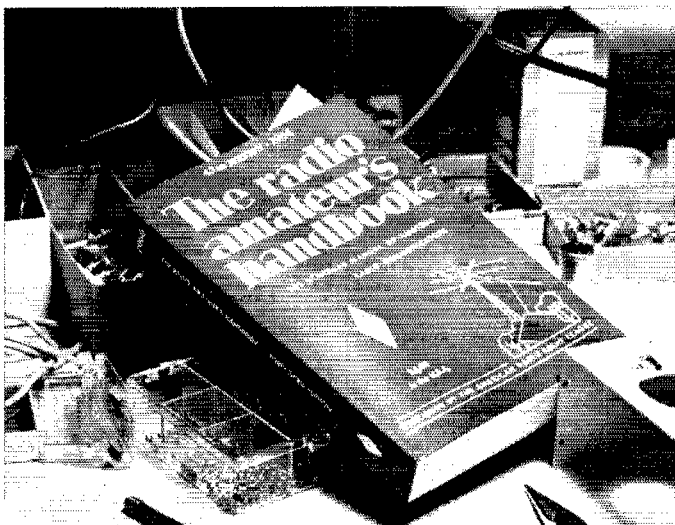
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Index of Advertisers

Airondark Radio Supply	174
Allied Radio Corp.	163, 166
Alltronics-Howard Co.	177
Amateur Electronic Supply	132, 133
Ameeco Div of Aerotron, Inc.	145
American Radio Relay League, Inc.	145
<i>QST</i>	140
<i>Adrevisina Policy</i>	134
<i>Antenna Book</i>	168
<i>Emblems</i>	160
<i>Handbook</i>	183
<i>Licence Manual</i>	173
Membership Publications	175, 176
Arrow Electronics, Inc.	158
Barry Electronics	148
Belden Manufacturing Co.	147
Hookbinder Publishing Co.	171
British Radio Electronics, Ltd. (Eddystone)	167
Budwig Manufacturing Co.	166, 172
Hurstein-Applebee Co.	167
Cleveland Institute of Electronics	155
Collins Radio Co.	2
Communication Products Co.	141
Cubex Co.	173
Cush Craft	164
Dahl Co., Peter W.	170
Dames Co., Theodore E.	172
Daveo Electronics, Inc.	149
Dow-Key Co., Inc., The	142
EICO Electronic Instrument Co.	159
EIMAC a division of varian	135
Electro-Voice, Inc.	171
Electronic Equipment & Engineering Co.	165
Electronics Corp.	172
Evans Radio	166
F-Z Mobile Antenna Mount, Inc.	174
Fair Radio Sales	176
Farnore Corp., The	166
Fichter Electronics	168
Finney Co., The	144
Fredrick Electronics Corp.	169
Fugle Labs	158
Gain, Inc.	176
Gentec, Inc.	162
Gift Shop	162
Gotham	143
Grand Central Radio, Inc.	164
Hallcrafters Co., The	1
Ham Kits	169
Harrison Radio	184
Heath Co., The	125, 127
Henry Radio Stores	157
Hotel Bechenbmer	182
Hunter Sales, Inc.	176
Hy-Gain Electronics Corp.	5
Instructograph Co., Inc.	173
International Crystal Manufacturing Co., Inc.	7
Jan Crystals	164
Kahn Research Labs., Inc.	167
KMC Semiconductor Corp.	151
Lampkin Labs., Inc.	171
Lattin Radio Labs.	171
Millen Manufacturing Co., Inc., James	182
Miller Co., J. W.	156
Mini-Products, Inc.	154
Mission Ham Supplies	161
Mor-Gain	175
Mulry Sales	150
National Radio Co., Inc.	123, Cov. III
National Radio Institute	152
Omega Electronics Co.	175
Poly Paks	160
Quarter Century Wireless Association, Inc.	169
Radio Publications, Inc.	162
RCA Electronic Components & Devices	Cov. IV
Rohn Manufacturing Co.	136
Saleh & Co., Herbert	172
Shure Bros., Inc.	171
Sideland Engineers, Inc.	4
Sierra Philco	146
Skylane Products	167
Sound History Recording	158
Space Electronics	174
Squires-Sanders, Inc.	165
Stevens & Co., Inc., J. P.	165
Swan Electronics Corp.	128, 129
Tetrex Labs	169, 174
Tri-Ex Tower Corp.	138
Trigger Electronics	153
Unadilla Radiation Products	165
United States Fiberglass Co.	156
United Transformer Corp.	Cov. II
Van Sickle Radio Supply Co.	168
Vanguard Electronic Labs	130, 131
Vibroplex Co., Inc., The	169
Waters Manufacturing Co.	173
Webster Manufacturing	137
World Radio Labs	159

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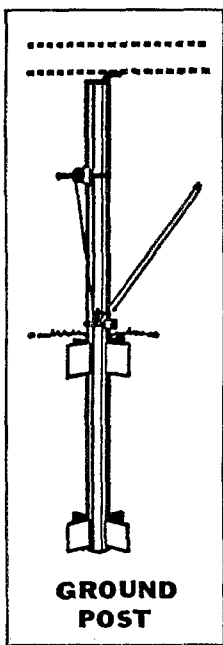
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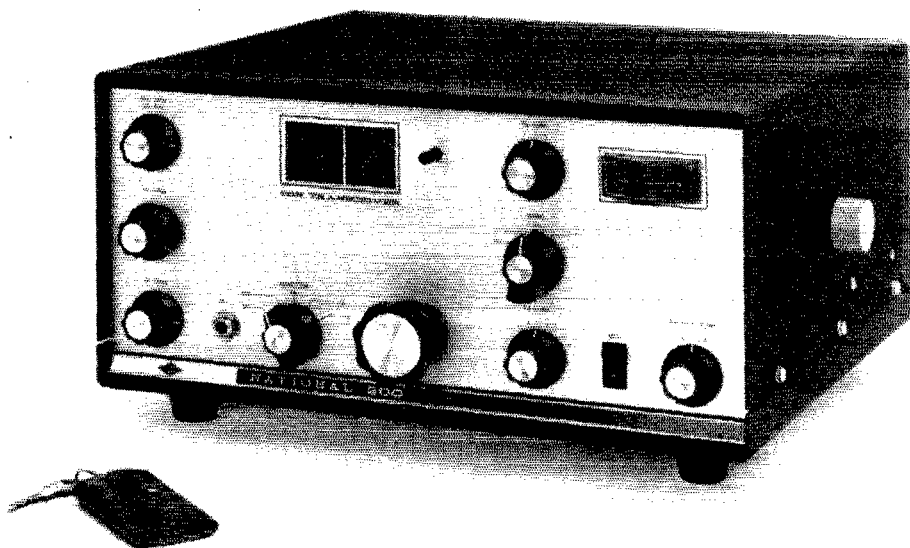
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Or... do you need a new rig for fixed-station use? Or a second or even third rig for vacation or even portable operation? Or a replacement for a single or tri-band transceiver? For that matter, the brand-new National 200 five-band transceiver, at only \$359, is a natural for *anything* that demands top-notch SSB, CW, and AM performance on the 80 through 10 meter bands with minimal investment. Traditional National Workmanship and our one-year guarantee are yours, in a five-bander priced even lower than a kit rig!

- Complete coverage of the 80 through 10 meter bands.
- 200 Watt PEP input on SSB, plus grid-block CW and AM.
- Separate product and AM detection plus fast-attack slow-release AGC in all modes.
- Crystal-controlled front end and single VFO gives high stability, plus identical calibration and tuning rate on all bands.
- Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent channel QRM on receive . . . plus solid-state balanced modulator for "set-and-forget" carrier suppression.
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- Extra features like: ALC; 45:1 planetary/split gear tuning drive; automatic carrier insertion in AM and CW modes; universal mobile mount included.

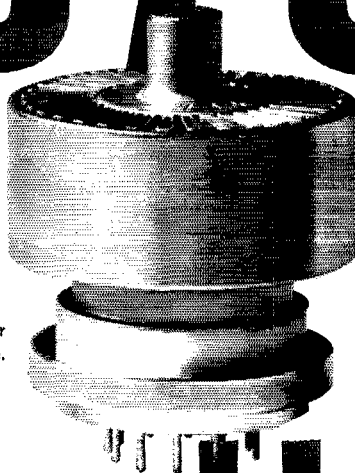
Your dealer has the National 200 in stock right now. See him today for a demonstration.

New National 200, of course.



NATIONAL RADIO COMPANY, INC., 37 Washington St., Melrose, Mass. 02176

570



RCA-8122 beam power tetrode shown actual size.

watts

output in Class AB₂

The RCA-8122 has power and reliability that's *hard to beat*—more than 50% greater dissipation capability than older tubes of comparable size. Used in the latest commercial equipment, or in your own project, the RCA-8122 can deliver power and efficiency with as little as 5 watts drive.

This low-cost forced-air-cooled beam power tube is designed with the builder in mind. . . . Use it with coaxial, strip-line, or conventional lumped tank circuit construction. Get broad-band neutralization, on upper frequencies with only a series-tuned capacitor in one cathode lead. Ceramic-and-metal construction and special electrode configuration eliminate mechanically-caused noise and provide extreme sturdiness even at high operating temperatures.

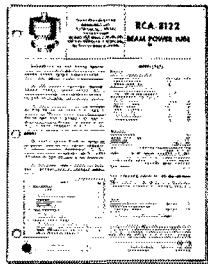
Whether you're planning to buy or build, make sure you take advantage of the latest advances

in tube technology with the RCA-8122—made by the people who gave you the 6146. On the amateur bands, it's years ahead!

Full CCS ratings up to 500 MHz. For use as rf power amplifiers; oscillator; regulator; distributed amplifier or linear rf power amplifier in fixed or mobile equipment . . .

- 380 Watts PEP Output at 30 MHz Class AB₁
- 570 Watts PEP Output at 30 MHz Class AB₂
- 300 Watts CW Output at 470 MHz Class C

For complete technical information, write to RCA Commercial Engineering, Harrison, N. J. for a copy of RCA-8122 Data Bulletin (Revised 6-66), and Application Guide ICE-300.



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