DON'T FORGET THE SWEEPSTAKES — CHECK THE RULES ON PAGE 48 OF THIS ISSUE
RME Dual Conversion 4350A Receiver
With 100 KC Crystal Calibrator

4301 Sideband Selector.
$75, Amateur Net

4302 Matching Speaker.
$17.50 Amateur Net

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You get everything you want and need in the RME 4350A Receiver! Dual Conversion, two-speed tuning for easy, smooth operation, high selectivity and rejectivity, 100 kc crystal calibrator. Designed for hams by hams, it is laboratory-engineered for maximum performance on SSB, CW and Phone, ideal for contests and DX under all receiving conditions. YET IT'S YOURS FOR JUST $249, Amateur Net! (Listed in Federal Civil Defense Equipment Catalog, Item #R-12.)

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RADIO MANUFACTURING ENGINEERS, INC.
DIVISION OF ELECTRO-VOICE, INC., BUCHANAN, MICHIGAN
World’s first complete two and six meter radio station... features transistorized, built-in power supply

**COMPLETE SPECIFICATIONS**

**General description:** The SR-34 is designed for either AM or CW and combines, for the first time in one compact package, the complete functions of a two and six meter radio station. It operates on 115-V. A.C., 6-V. D.C., or 12 V. D.C. and features a highly efficient transistorized power supply for the 6 and 12 volt operation.

**Exclusive features:** The perfect unit for short-range portable, fixed or mobile communication, the SR-34 meets—and exceeds—F.C.D.A. matching-fund specifications. The crystal sockets and transmitter tuning controls are concealed behind a panel which may be sealed to prevent tampering. Instantaneous selection of desired voltage possible and also “crossbanding” between the two and six meter bands. The specially designed cover has mounting clips for two-band antenna, owner’s microphone, and cords.

Both receiver and transmitter may be used for G.W.; key jack and adjustable B.F.O. are provided. Drip-proof case is specially designed for safe outdoor use.

**The transmitter** is crystal-controlled; up to four crystals may be switch-selected. A fifth position on this switch permits external V.F.O. operation. Band selection also is front-panel controlled.

**The receiver** is a double conversion superheterodyne, having a quartz crystal controlled second oscillator. This offers outstanding selectivity and high image rejection. Highest stability is obtained through separate oscillator and R.F. sections for each band.

All receiver functions provided—S-meter B.F.O., ANL, etc. Sensitivities average 1 microvolt on both bands. Transistorized power supply eliminates noisy, erratic operation encountered with vibrator-type power supplies.

**Front Panel Controls:**
- **Receiver:** Band Selector (49.54 mc., 143.5 to 148.2 mc.); Main Tuning; Sensitivity; Audio Volume; B.F.O. Pitch; Squelch Level; Headphone Jack. **Transmitter:** Function Switch (P.A., Rec., Cal., AM, CW); Power On/Off; Band Switch; Crystal Selector and V.F.O.; Oscillator Tuning; Doubler Tuning; Tripler Tuning; Final Tuning; Final Loading; Meter Switch.

**Power output:** 6 to 7 1/2 watts on 2 meter, and 7 to 10 watts on 6 meter AM or CW, 100% mod. negative peak clipping. **Rear Apron:** Speech input level control; key jack; P.A. speaker terminals; mic. selector (high Z or carbon); mic. input; A.C. and D.C. fuses; power plug.

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<td>Type Z-1, AIRCRAFT</td>
<td>3023.5 Kc., .005%</td>
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<td>27.256 Mc., .008%</td>
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<td>TV Marker Crystals</td>
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Section Communications Managers of the ARRL Communications Department

**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) directly to the SCM. The administrative ARRL official elected by members in each Section, however, may accept reports and provide for issuance of an QST. ARRL Field Organization STA and Station publications are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and FAM, where vacancies exist. All amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps task force for Form 7.

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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 West Hartford, Connecticut.

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BALANCE

What a fascinating hobby ours is! There are activities associated with amateur radio to interest practically everyone; there are rag-chewing, traffic-handling, DX-chasing; equipment to be built, wallpaper to be earned, contests to be won; emergency work, experimentation, mobile operation. Most of these come in several “delicious flavors”—a.m., s.s.b., n.f.m., c.w., RTTY; and on h.f., v.h.f., or even on u.h.f.

Hamming attracts all sorts and conditions of men. One out of every thousand Americans is a ham. Hams range in age from 6 to 96, including both sexes. Among our ranks are preachers and teachers, doctors, lawyers, and business men, school kids, housewives, engineers, truck drivers, and “professional loafers.”

Hamming stays interesting, too. We might rework a well-known commercial by saying, “We are talking while the flavor lasts.” There are thousands of hams who have been on the air for twenty years, several hundred who have been at it for forty years!

Is it any wonder, then, that occasionally a few of us go overboard, and lose our perspective toward amateur radio? Such a one is the man whose wife wrote Abigail Van Buren’s syndicated advice column: “He would rather talk to a stranger in Syracuse than to me. He spends all his time on this ham radio and I am getting fed up with being ignored. . . .”

More than thirty years ago, Paul M. Segal, ex-DEEA, penned words of wisdom called The Amateur’s Code, still in use as the frontispiece of The Radio Amateur’s Handbook, and we hope, in most ham-shacks. Point Five, especially: “The Amateur is Balanced — Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school, or his community.”

The ham who hears the XYL’s call to supper, but has to solder one more resistor on the new v.f.o., or waits for one more turn in the roundtable, or makes one more try at hooking HV1CN before answering, may inspire another “Dear Abby . . . signed, Ham Radio Widow!”

Even if she isn’t inspired to take pen in hand, she undoubtedly has strong feelings on the subject, hardly calculated to improve relations at home. The school-boy who neglects his studies to take more time out than he should to boost his country’s list isn’t helping his future. And so on. We like to see hams active and enthusiastic about our hobby. But keep that balance, OMs!

“WHAT DO I SAY?”

Perhaps the most widely enjoyed aspect of ham radio is the good, old-fashioned ragchew. Most of us have made RCC a hundred times over. We have no trouble at all finding things to talk about, and at great length, too. But can you remember back to the early days when you were first licensed? Were you somewhat tongue-tied — or should we say “fingertied?” Can you remember your first real ragchew? It seems the most natural thing in the world to experienced hams, but wasn’t it tough at first?

Maybe you’re in that stage now. Maybe you’re asking: “What do I say?” Or perhaps you’re in the next stage: “I like to ragchew, but how can I draw out these ‘579 — 73’ hams?”

Well, in the average QSO, most fellows start off with the standard stuff — signal report, location, name, rig and weather, usually in that order. This dope can be a handle for the development of the conversation. If the other guy is using the same kind of rig, receiver or antenna, then you have a “natural” — you spend the next five or ten minutes comparing notes. But this doesn’t happen too often. So what next? The other guy reports that it is raining. You can then chat for a little while about your own soggy weather, or envy him because the drought has wrecked your pansies, as the case may be. Somewhere along the line, drop a hint as to your age, directly if you’re under 20, indirectly perhaps if you’re older — “I just brought the junior ops back from a picnic.” You may well find common ground there. If it turns out you’re both teenagers, here’s your chance to gripe about your tough English teacher and be assured of a sympathetic audience! If it turns out you’re both fathers of bewildering offspring, you’re in orbit for the rest of the night! Have you been through the other ham’s hometown? Tell him so. Do you know someone there? Perhaps you’ll discover a mutual friend — and there’s a chance for your first crack at amateur message handling! Do you have other

(Continued on next page)
hobbies? Most hams do, and have a grand
time discussing them on the air. Sports cars,
photography, stamps, bird-watching, garden-
ing, spectator sports or active sports all are
fine topics. Sing in a choir or chorus? Play a
musical instrument? Just come back from a
trip, or going on one? Built a home, or bought
a car? Going fishing or hunting? Like camping?
Boating? Riding? Maybe the other fellow
does, too.

Try it out—have a real good rag-chew,and you’ll discover just why there are 182,000
of us, and more coming aboard all the time!

Hamfest Calendar

New Jersey — The Jersey City Amateur Radio Club
will sponsor a hamfest on Saturday evening, Nov. 22 at
8 p.m., at Greenville Gardens, 128 Danforth Ave., Jersey
City. Donation $2.00 per person. For tickets and further
info, contact W2ZAL, Dan Umhoitz, 332 Armstrong Ave.,
Jersey City. Phone Henderson 4-2180.

Strays

When KE6LMP recently had a few QSOs with a
solar-battery-powered rig running 75 milliwatts
input, some of the newspaper accounts reported
the transmitter power as 75 kilowatts. Someone.
must have called them on this, however, for they
soon corrected the story to read 75 milliwatts.

The Puerto Rico Amateur Radio Club tells us
that effective immediately the certificate WPR-50
is discontinued and that the WPR-25 will be the
only certificate issued, with stickers thereafter
for each additional 25 confirmations submitted.

This is the neat little rig used by W6TNS to Work All Con-
trients. Described in Popular Electronics for August, it runs
90 milliwatts input. Transistors, of course. OM Stoner
would like skeds with other fellows running very QRP.
His greatest DX so far has been with ZS6KD the long way,
which figures out to be something like 16,000 miles.

W3LHJ, communications officer of the CAE
squadron in York, Pa., reports that a Gotemt I1
two-meter 12-volt Communicator, serial No.
4511, was stolen from their emergency mobile
headquarters unit during the early part of Sep-
tember. He would appreciate hearing from any-
one who knows anything about this gear.

Join-a-radio-club Month is being sponsored by
the Chicago Area Amateur Radio Club Council
during November. A directory of local radio
clubs may be picked up at any of the amateur-
radio supply houses in the Chicago area, or a
copy may be obtained by sending a self-addressed
stamped envelope to Ray Birren, W9MSG, 702
Spring Road, Elmhurst, Ill. The directory lists
the clubs, meeting places, dates, officers, and
activities of the clubs. There are v.h.f. clubs,
mobile clubs, social clubs, and two for YLs (or
XYLs) only.

Game for another coincidence? K2PQS caught
an American Airlines flight from Chicago to
Buffalo and soon discovered that his seat partner
was W6JVB. After they had passed the time of
day about ham matters for a few minutes, a
fellow across the aisle leaned over and introduced
himself as K6CT. Perhaps if more of us wore
sign lapel pins or the League emblem we’d
have more of these impromptu personal QSOs.

Our training aids man, W1FGF, says that he
has come across the club with what he believes
to be the longest name of any on our lists — the
Amateur Radio Club of Westmont-Upper Yoder
High School. Any challengers?

Grand confusion on 75 phone (more than usual,
that is!). W1BSS and W1TSS called CQ at the
same time on the same frequency.

Feedback

Last month’s Bonus Converter for 21 Me.—
under the caption for Fig. 2 on page 34, the line
for L1, L2, L3, and L4 should be changed to
read “Made of No. 20 bare, 5/16-inch diameter,
16 turns per inch. (B&W Miniductor No. 3007).

Our Cover

Coming up in an early issue is this rig
designed, built and operated by W9MC.
No professional engineer (he’s in the pill
business) he nevertheless has built a linear
amplifier which is a thing of mechanical
beauty and which works real good. It is a
one-kw. job using an PL172 in AB1, which
he drives with an HT-32. It has many
interesting features which you will find of
interest (in a month or so). Makes a pretty
cover too, eh?
Medium- to High-Power Audio From 813s

Modulator Assembly with Screen Regulation and Negative-Peak Clipping

BY C. E. "JOHN" SIMMONS,* W6MDI

While pentode modulators are common in transmitters with power input capabilities up to around 200 watts, they are seldom found in amateur transmitters with power inputs much in excess of this. The reasons for this boycott include the difficulty of obtaining the regulated high voltage required for the screen grids, and the possibility of instability because of the high power sensitivity of pentodes and tetrodes. Other objections include possible poor fidelity and the fact that greater care must be exercised in adjustment of load impedance than with triodes.

The prime advantage offered by pentodes and tetrodes in Class AB service is, of course, that the required driving power is low. For example, if a comparison is made of available tubes for a modulator to deliver from 300 to 600 watts of audio power, it will be found that triodes will require from 5 to 10 watts of driving power while pentodes will require 1 watt at most. This results in a considerable saving in speech amplifier output power requirements, and consequently the speech amplifier can be reduced from something in the class of push-pull pentodes or tetrodes (6V6s or 6L6s), and associated power supplies, to something like a single 6AQ5.

Since only a relatively narrow portion of the audio frequency spectrum is required for effective oral communication, wide-band high fidelity is hardly a requirement in the amateur modulator. And with the multimatch modulation transformers commercially available the plate-load matching requirements of pentodes do not appear to be forbidding.

Stable operation of pentode and tetrode amplifiers employed in Class AB audio service may readily be obtained through the incorporation of a few precautionary measures. For example, there is a maximum safe value of control grid-to-grid impedance which should not be exceeded. It is also advisable to incorporate parasitic, or "de-Qing," resistors in series with all grids (except the suppressor grid in the case of pentodes). Of course, it is necessary to keep the plates loaded. Suitable techniques for satisfying these requirements will be presented in detail later.

The matter of regulating the screen voltage, which is usually quite high, is always a problem. The possible solutions include (1) a separate screen supply regulated with VR tubes or an electronic regulator; 1 or (2) a series dropping resistor, with VR tubes; 2 or (3) a series type electronic regulator from the modulator high voltage supply. 3 The first is expensive and cumbersome, while the second solution often results in poor regulation, especially at low audio output power levels. The third alternative, however, results in a compact and effective regulator, and is highly recommended.

813s can supply all the audio power needed for modulating a kilowatt — or they can be operated in a variety of ways at lower power for transmitters in the several-hundred-watts-input class. The modulator described in this article has a number of interesting features, including a simple but effective regulator system for stabilizing the screen voltage.

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1 Snyder, "1200 Volts Regulated," CQ, Nov. 1957, p. 58.
3 For detailed discussion on electronic regulators see The Radio Amateur’s Handbook, ARRL, power-supply chapter.

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would require a considerable amount of space. The second is satisfactory but requires 10 VR-150s, which are costly and require chassis space. The third requires, by comparison, a minimum number of components and will provide the necessary degree of regulation.

One desirable feature to have in an amateur modulator would be a method for extending the positive audio voltage peaks while holding the negative peaks to an absolute maximum. These systems permit obtaining more than 100 per cent modulation in the positive direction while not exceeding 100 per cent in the negative direction. The theory of operation and the circuit requirements are fully explained in the references.

Circuit Details

The modulator shown in the photographs was designed to furnish sufficient audio power to modulate a 500-watt input final. The 813s may be operated either Class AB1 or Class AB2 simply by adjusting the plate-to-plate load impedance to the proper value and satisfying the drive voltage requirements. In Class AB1 the tubes will deliver about 200 watts of audio with 1500 volts on their plates, or 335 watts with 2000 volts. The grid-to-grid driving voltage required is 160 volts peak, and the driving power is zero. In Class AB2 the tubes will deliver 455 watts with 2000 volts applied, or 650 watts with 2500 volts. The driving requirements for 455 watts out are 230 peak grid-to-grid volts at 0.1 watt, and for 650 watts out are 235 peak grid-to-grid volts at 0.35 watt. More detailed information may be obtained from the tube manufacturers.

In Fig. 1 the input circuit, consisting of $T_1$, $R_1$, $R_2$, $R_3$, and $R_4$, satisfies the requirements of impedance matching and stabilizing. The grid-to-grid impedance is established at 100,000 ohms by resistors $R_1$ and $R_2$; this is a safe value for avoiding oscillation. Input transformer $T_1$ matches this to the 500-ohm line. If the driving source is coupled through a 500-ohm line there will be no d.c. in the primary winding; however, if the input transformer is connected directly to the driver the d.c. plate current must be considered in the selection of $T_1$. Resistors $R_2$ and $R_4$ are "de-Quing" resistors and will aid in preventing parasitic oscillations.

Control-grid bias is obtained from a simple half-wave power supply. The rectifier may be a semiconductor, as shown, or a vacuum tube may be employed with the disadvantages of having to light the filament and find space for the socket on the chassis.

The screen-grid voltage, 750 volts, is obtained from the modulator high-voltage supply and is held constant by a 211 series regulator. The 211 control-grid "reference voltage" is taken from the bleeder network formed by $R_{16}$-$R_{23}$, inclusive, with $V_5-V_17$, inclusive. If the modulator high-voltage supply is 2000 volts, about 0.5 ma. will flow through this bleeder and the drop across each NE-2 will be about 54 volts. The total drop, all NE-2s plus the drop across $R_{25}$, which is provided for minor screen voltage adjustments, will be about 640 volts. This voltage minus the voltage across $R_9$, which will be about 750 volts, is equal to the bias on the 211. Under these conditions the 211 is operating near its maximum plate voltage. Resistors $R_3$ to $R_5$ are safety devices. In the event any or all of the NE-2s fail to fire, the bleeder is not opened and the screens of the 813s will still be near the required voltage, although the voltage will no longer be regulated.

 Resistors $R_5$ and $R_6$ are, like $R_3$ and $R_4$, "de-Quing" resistors and will help to stabilize the amplifier. Capacitors $C_1$ and $C_2$ are further precautions against oscillations, while capacitor $C_3$ is an audio bypass common to both screens.

The multimatch modulation transformer, a UTC CVM-I, is able to satisfy any combination of impedances likely to be encountered. Positive peak extension is accomplished through incorporating the system formed by $V_6$, $R_{4a}$, and $M_1$, suggested by John Reinartz. The diode $V_6$ must be capable of withstanding a peak inverse voltage equal to the final plate voltage for 100 per cent positive modulation, and proportionately greater inverse voltages if greater than 100 per cent positive modulation is desired. Also, $V_5$ must be capable of handling a peak forward current equal to the resistance of $R_4$ divided into the difference between the positive peak audio voltage and the final plate voltage. For this modulator a 6AU4 (TV damper) was chosen because it satisfies all the requirements and is available at a reasonable cost. One drawback, which would be eliminated by using high voltage semiconductor diodes, is the problem of lighting the filament. However, using a filament transformer with suitable insulation between its windings seems to be satisfactory.

The value of $R_{4a}$ should be equal to one half of the modulating impedance, as explained in the literature, and its power rating should be equal to at least $\frac{1}{4}$

where $I$ is the final plate current (in amperes) and $R$ is the modulating impedance.

Meter $M_1$ may be calibrated to indicate positive modulation percentage if desired, or it may simply serve as a monitor to show that $V_5$ is functioning. This modulator uses a Simpson 1-ma. meter shunted as shown, but a meter having a full-scale range somewhat greater than the maximum forward current of $V_5$ may be used.

A rather important point, which may not be immediately apparent, concerning the positive peak extension circuit, is that the final plate current causes an IR drop in the secondary of $T_a$, and if the plate of $V_5$ is tied to the power supply end of the secondary $V_5$ will be biased in the forward direction. Thus $V_5$ will conduct whenever the final supply is turned on, placing
Fig. 1—Circuit diagram of the 813 modulator. Dotted lines between Vs and V17, and between R11 and R30, indicate consecutively numbered components are to be similarly connected.

- **C1, C2**: 4700 µf. (or 0.005 µf.), 1000 volts.
- **C3**: 0.5 µf., 1000 volts.
- **C4**: 10-µf., 250-volt electrolytic.
- **C5, C6, C7**: See text.
- **CR1**: Selenium rectifier, 130 volts, 65 ma. (Federal 1002A).
- **F1**: 3-amp. fuse.
- **K1**: D.p.d.t. relay, 115-volt coil (Surplus BC-610 antenna change-over relay or Advance Type AT, 2C, 115-VAC).
- **L1**: Filter choke, 16 henrys, 50 ma. (Stancor C-1003).
- **L2**: Splatter choke, adjustable 0.02 to 1.5 henrys, 300 ma. (Chicago Transformer Co. SR 300).
- **M1**: 0-1 ma. d.c. (see text).
- **M2**: 0-500 ma. d.c.
- **R1, R2**: 50,000 ohms, 1/2 watt, 5 per cent tolerance.
- **R3, R4**: 1000 ohms, 1/2 watt.
- **R5, R6**: 10 ohms, 1/2 watt.
- **R7**: 10,000-ohm 4-watt potentiometer.
- **R8**: 180 ohms, 1/2 watt.

An undesired load on the secondary. The resulting audio power loss may be avoided if the plate of V5 is returned through the final supply bleeder (which must be equipped with a slider and the slider bypassed for audio) to buck out the HE drop.

The low-pass filter formed by L2, C5, C6, and C7 is incorporated as a precautionary measure. The values of the components for this circuit depend on the value of the modulating impedance. The manufacturers of commercial splatter chokes usually furnish complete data on the proper values of these components.

Relay K1 serves the dual purpose of (1) removing high voltage from the 813s and disconnecting the secondary of the modulation transformer for slow operation, and (2) providing a spark gap to protect Ts from excessive secondary voltages. The one chosen for this job is an antenna change-over relay used in some military trans-
mitters such as the BC-610.

**Construction**

As is evident from the photographs, the parts layout is not critical. The modulator pictured was constructed on a 17 × 13 × 3-inch aluminum chassis. The panel is 10 × 12 3/4 × 1 1/2-inch aluminum. The two are assembled together with 10-32 screws and steel mounting brackets. Since this modulator is intended to be suspended in a standard rack, these brackets are very important.

Modulation talk-back caused by mechanical vibration of the chassis may be minimized by using a steel chassis or adding a steel reinforcing plate to the aluminum chassis. Although neither of these precautions was taken with the original modulator, it may be rewarding to consider steps to minimize talk-back caused by mechanical instability.

The parts layout shown is suitable for audio power outputs up to 300 watts. If it is desired to run the 813s to their limits it will be necessary to use higher power level components, and a double chassis arrangement may be required.10

A few other precautions may result in a considerable saving in time. First, resistor R21 must be well insulated from the chassis. In this unit, cone stand-off insulators of suitable diameter (one inch at the large end) were inserted into each end of the resistor. L-shaped brackets were constructed and the insulators mounted on one arm and the other was then mounted on the chassis. This assembly holds the resistor a safe distance (one inch or so) away from the chassis. The same consideration should be observed in mounting the socket for V5. In this case a TV high-voltage stand-off type socket assembly was used.

The NE-2s may be mounted in a block of insulation material. The dimensions of this block should be about 3 × 1 × 1 1/2 inches. If 1 1/4-inch holes are drilled in the block so that one NE-2 may be inserted into each hole, the arrangement will serve satisfactorily as a mounting fixture. The NE-2 leads can be attached to terminal strips or a string of stand-off terminals.

Care must be taken in the selection of the wire for the high-voltage circuits. The wire used in this modulator is 18-strand copper with extruded Teflon insulation. This wire is good for well over 10 kv., provided sharp bends are avoided and the wire is not dressed near any sharp metallic (grounded) edges.

**Testing**

After completion of the wiring and complete continuity testing with the old reliable ohmmeter, the first phase of smoke testing begins. With all tubes except the VT-90 removed from their sockets, it should be safe to apply power to the primaries of transformers T1, T3, T4 and T5 (a blown fuse indicates the need for further continuity testing). It is advisable at this point to check all filament voltages and the bias voltage for the 813s.

The next step is to check out the screen voltage regulator. During this test it would be well to have the primary center tap of the modulation transformer disconnected for protection, and the 813s removed from their sockets. Plug in the 211 and apply the modulator high voltage. The NE-2s should glow and the voltage at the center tap of transformer T5 should be around 750 volts. If it is off by 20 volts or less it should be possible to adjust it to exactly 750 volts with R25. However, if it is off by more than 20 volts it will be necessary to add NE-2s if it is low, or short out NE-2s if it is high. The amount of alteration which will be required will depend on (1) the value of the high voltage, (2) the value of R10, (3) the condi-

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tion of the 211, and (4) the condition of the 
NE-28.

Once the correct voltage has been obtained under no-load conditions, a check at maximum-
signal screen current as given by the manufa-
curator's typical operating conditions should be 
made. For example, if the rated maximum screen 
current is 55 ma., a 13,000-ohm resistor (having 
50-watt power dissipation ability) connected 
between ground and the center tap of \( T_4 \) will 
provide the correct load. The regulated output, 
measured from the center tap of \( T_4 \), should be 
750 volts plus or minus a few per cent.

With the screen supply functioning satisfac-
torily, the audio input circuit may be next tested. 
In all probability it will be this circuit and its 
associated driver which will cause the most 
trouble. First, it is advisable that a good audio 
signal generator and oscilloscope be available for 
testing these input circuits. Actually, it is only 
necessary to make certain that the peak grid-to-
grid audio voltage is sufficient and not distorted.

Only the secondary circuit of \( T_6 \) remains to 
be tested. The procedure here is first to connect 
a resistive load, equal to the modulating im-
pedance of the r.f. amplifier, between the "hot" 
end of the secondary of \( T_6 \) and ground. This 
resistor should be capable of dissipating the ex-
pected d.c. power input to the final plus the 
extected audio output power of the modulator. 
With the 6AU4 removed from its socket and the
lead to the final plate disconnected, the modula-
tor and final high-voltage supplies may be turned 
on. The total 813 plate and screen current, with 
no signal input, should be about 50 ma. This 
current may be adjusted slightly with \( R_2 \).

By providing a tap near ground on the load 
resistor for \( T_6 \), the wave shape of the output 
signal may be examined with the aid of an 
oscilloscope. At this point it may be well to 
measure the audio output voltage as well as the 
audio-frequency band pass.

The following world charts are available from 
the U. S. Navy Hydrographic Office through the 
Government Printing Office. These are all ap-
nproximately 25 \( \times \) 28 inches, priced as noted:

a) No. 5100a, centered on San Francisco, 30\$. 
b) No. 6700, centered on Fairbanks, Alaska, 
40\$.
c) No. 6701, centered on Seattle, 40\$.
d) No. 6702, centered on Honolulu, 30\$.
e) No. 6703, centered on Guam, 10\$.
f) No. 6704, centered on Adak, Alaska, 40\$.
g) No. 6705, centered on Kodiak, 70\$.
h) No. 6706, centered on Moscow, 40\$.
i) No. 6707, centered on New York City, 40\$.
j) No. 6708, centered on Eniwetok, 70\$.
k) No. 6709, centered on New York City, 40\$.
l) No. 6710, centered on New York City, 40\$.
m) No. 6711, centered on New York City, 40\$.

Field Day results will be in the December 
issue of QST.

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Cheap and Simple R.F. Indicators

Some Uses for Flashlight Lamps

BY LEWIS G. McCOY,* W1ICP

Until some genius invents a woolly dust that makes r.f. visible to the naked eye, the next best thing is the common garden variety of dial lamp. This article describes a pair of uses that still find application after several-score years.

If you are just getting started in ham radio and plan to build your own transmitter, from kit or scratch, you’ll probably need some auxiliary gear before you’re through. These will be instruments or indicators of one kind or another that tell you how the transmitter, or a portion of it, is working. You can of course spend a lot of money for such things, but the intent in this article is to get you off with an outlay of only a few pennies and minutes. However, despite the low cost, the devices can be of invaluable assistance in getting your rig working and in putting a signal on the air.

Your transmitter is designed to generate and amplify a radio frequency (r.f.) signal. The purpose of the various devices described in this article is to show you when r.f. is present in the rig and when it is actually traveling up the feedline to the antenna.

**Tune-Up Indicator**

The use of flashlight or dial lamps as r.f. indicating devices is almost as old as amateur radio itself. Probably the first such device was a “tune-up loop.” This consists of a single loop of wire with a flashlight lamp connected in series with the wire. Such a unit is shown in Fig. 1. When the loop of wire is brought near a transmitter coil through which r.f. is flowing, some of the r.f. is induced into the loop. If the r.f. is sufficient, the filament in the lamp will light up. Thus, we have a simple r.f. indicator.

As you know, or will find out when you build your first transmitter, there are coil-capacitor combinations, or “tuned circuits,” in the rig. If the tune-up loop is coupled to such a circuit the lamp will light only when the circuit is in resonance. One can quickly see that such a device will be a very handy tool to have when building or testing a transmitter. This should not be confused with a wavemeter that shows the frequency of the r.f. in a circuit. A wavemeter is a more complicated device. However, the tune-up loop is a valuable aid to show you when a circuit is “in tune.”

If a continuous check of a circuit is desired, such as monitoring the grid drive to an amplifier, the tune-up loop can be mounted permanently near the coil to be checked. The dial lamp can be mounted in a half-inch diameter rubber grommet which can be installed on the chassis or panel front. Two leads of wire connect the lamp to the coil.

When checking any stage one should be careful not to couple too tightly or the bulb may burn out. For very low-powered stages, such as multiplier circuits at v.h.f., a 2-volt 60-milliamper type (pink bead) bulb may be used. This size of lamp is ideal for checking circuits containing small amounts of r.f. For higher power, use a 6-volt 250-ma. bulb (white bead).

Notice in Fig. 1 that the wire ends are soldered directly to the side and base of the lamp. If the user desires, the wires can be connected to a dial lamp socket, but this is only frosting on the cake. Use a stiff wire for the loop, one that will hold its shape. The wire should be insulated. For checking circuits in a transmitter where dangerous voltages are present (which means practically all transmitters!), it is a good idea to mount the loop on an insulated rod. A short length of wooden dowel rod will do. This will help you to keep your hand away from “hot” circuits.

**Output Indicators**

Another excellent use for dial lamps is as output indicators. One of the problems that beginners have trouble with is that of getting power from the rig to the antenna. And, what is just as important for peace of mind, knowing that r.f. is flowing up the feedline to the antenna.

The drawing at Fig. 2 shows one method of coupling a dial lamp to the feedline. When r.f. flows up the feedline a certain amount of the power is shunted through the dial lamp, causing

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Fig. 2 — The Output Indicator. The distance \( d \) will depend upon the available power and the amateur band. Low power and low-frequency operation will require a greater length \( d \) than will high power and a high frequency. Where a tuned line is used (high s.w.r.), the position on the line (high-voltage or high-current point) will also influence the proper \( d \). A greater length is required at a high-voltage point than at a high-current point. By using a distance \( d \) of 1 foot for the first attempt, and slowly loading the transmitter (to avoid burning out the bulb), you can tell if \( d \) should be increased or decreased.

it to light. If you think about it for a moment you’ll realize that the brighter the light becomes, the more power you’re putting into the antenna.

As we mentioned with the tune-up loop, you must be careful not to burn out the lamp. In other words, “creep up” on your adjustments of the transmitter and antenna coupler. If you find that the lamp is getting too bright, tap across less of the feedline. A little experimentation will show you the optimum setting for the available power. The indicator consumes such a small amount of energy that it can remain connected to the feeders, providing a continuous output indicator.

This method of coupling the indicator can be used on nearly all types of feedlines. For coax, the writer described a simple indicator in a previous issue of QST.

As mentioned earlier, these gadgets cost only pennies and take only minutes to build, but they are valuable tools to the user.


- New Apparatus

Johnson Type U Variable Capacitors

A new subminiature variable capacitor recently introduced by the E. F. Johnson Company requires less than two-tenths of an inch for chassis or panel mounting space, making it the smallest variable capacitor for its range yet produced in quantity. It is available in two plate spacings, with breakdown voltages of 850 and 1300 volts.

Six models are supplied in the 0.01-inch air gap, with maximum capacitances from 3.5 to 13 \( \mu \)F. The 0.016-inch air-gap type has maximum capacitances of 4.1, 6.7 and 8.9 \( \mu \)F. Structurally they are of interest, in that the rotor and stator assemblies are precision machined from individual blocks of brass, rather than assembled from small parts in a complicated soldering operation. The end plate of the rotor is left about three times the thickness of the inner plates, thus giving the completed capacitor a considerable resistance to plate misalignment through handling.

Mounting of the capacitor is done with "loctabs," small fingers of silver-plated brass. These are run through the mounting surface (No. 44 drill), bent over flat, and then soldered together. Adjustment of the capacitor is done by means of a machined slot in the end rotor plate. Exceptional uniformity, mechanical stability and low cost are claimed for the new capacitor.

— E. P. T.
Building power supplies is perhaps the simplest construction in the field of radio. However, while components are few in number, the considerations that go into the best design of a power supply often can be complicated. Such complexities are the subjects of other articles; this paper only deals with some simple steps that make the layout and construction of power supplies more understandable and less troublesome.

The Chassis

Power supplies are ordinarily made up of heavy chokes, transformers, and capacitors. This requires, as a first consideration, that the chassis be strong. Strength in a chassis can be achieved either through use of strong material or careful bracing, or by both in combination. The amateur usually must rely on the chassis and other cabinet hardware available through the radio distributor, for most amateurs do not have sheet metal shops of their own nor are they close to shops that can do an economical job of radio metal work.

The strongest chassis material commonly available is sheet steel, although this material is hard to work unless a fair supply of punches and special tools is available. However, the purchase of a heavy-gauge steel chassis is no guarantee that power-supply components will be adequately supported, because rectangular chassis themselves have relatively little strength even if welded. A base plate should always be purchased with the chassis, since a tightly-screwed-on base plate always strengthens a chassis.

Chassis have an electrical effect on the operation of a power supply. Steel is magnetic and all metals will conduct electricity; both factors may affect the life of the power supply or its ripple output. These factors are considered later in the section on layout.

No really good protective finishes are available for purchased common chassis. Electro-zine on steel, and various surface finishes for aluminum, are not very good protection because the finishes that offer the best protection are very poor electrical conductors. For example, an enameled finish has to be pierced before a chassis ground can be made, and there is then no protection against rust or corrosion at that point. Similarly, any finish that may be soldered is to some extent dissolved by the solder or flux. Hence, only careful handling with clean hands at all stages of construction will result in a virginial finished chassis. Light waxing or wiping with a rag, damp with clean oil, is used occasionally for protection against rust or corrosion at that point. Similarly, any finish that may be soldered is to some extent dissolved by the solder or flux. Hence, only careful handling with clean hands at all stages of construction will result in a virginial finished chassis.

Some Notes on Power-Supply Construction

If you've been in ham radio long enough you've probably learned, the hard way, to appreciate some of the points brought out in this article. (At that, there may be a few you've missed.) Beginners, though, needn't make the same mistakes—provided they absorb the ideas presented here.

BY DAVID T. GEISER, WA2ANU

Fig. 1—Two features not often given much thought are the use of a base-plate for strengthening the chassis and the installation of handles, front and rear, for carrying heavy units. The triangular brackets shown can be replaced by types that bolt to the sides of the chassis if desired.

Chassis Support

Power supplies are frequently mounted in racks or cabinets by being hung from front panels. The technique of securing the chassis to the panel only by bolts through the front edge of the chassis is rather common, but with a heavy chassis this procedure will twist the panel out of shape if the weight of the chassis is not otherwise supported.

The weight at the rear of the chassis acts like a powerful lever with all of its force concentrated on the mounting screws. Chassis support brackets are often required. These attach to the sides or top of the chassis and transfer some of the rear weight to the upper portions of the front panel. Being located, usually, at the panel sides where the panel is supported by the cabinet, brackets greatly reduce the force tending to distort the panel.

Both on initial installation and on later servicing it becomes necessary to handle heavy chassis.
Accidents and strain are much less likely if handles are installed on both the front panel and on the rear edge of the chassis at the time of building. While plastic handles are decorative and screen door handles are cheap, only wide comfortable metal handles should be used, secured with bolts and nuts. These precautions prevent badly cut hands and scraped knuckles.

First installation of a chassis in a cabinet is important, for the greatest danger to the appearance of the finished product occurs at that time. The best procedure is to work slowly and have help. The first step with any new rack or cabinet should always be to run the panel bolts into their holes, all of them. This locates any faulty threading in the holes in advance of holding the chassis in the air, and makes the proper installation of the bolts easier. The first panel-mounting bolts should be installed in the two bottom corners of the panel. The weight of the chassis will then tend to swing the panel toward its mounting rather than away from it. If the two top bolts are secured first, it is not only more difficult to install the other mounting bolts but there is also considerable danger that a permanent bend will develop in the panel toward its mounting rather than away from it. If the two top bolts are secured first, it is not only more difficult to install the other mounting bolts but there is also considerable danger that a permanent bend will develop in the panel toward its mounting rather than away from it.

Fastenings

Self-tapping sheet-metal screws should never be used where mechanical strength is important. The holding strength of any screw or bolt is determined by the number of threads engaged and by the diameter of the bolt. Sheet-metal screws rarely have more than two threads, and their holding strength is small. As they must tear the shape of their threads out of the metal to which they are attached, the strength of the metal in which the screw rests is also minimum. It is much better to use machine screws (bolts) with nuts and washers to mount heavy items. Washers distribute the load evenly across the flange of the mounted part and the chassis metal. Screws of the right diameter for the mounting holes in the components should always be used. This sometimes seems to be an inconvenience, but if the chassis holes (of corresponding size) are accurately drilled the parts will always mount more firmly and there will be less tendency for the mounting bolts to loosen. Screws of the right length are also important for personal safety. Bolts and machine screws are precision parts and do have sharp edges. A bolt just barely long enough to protrude from the tightened nut is best, as cut hands and possible interference with other mounting are avoided.

Use of lock washers or lock nuts is desirable on any power supply. Medium- and high-wattage power transformers frequently vibrate in service. This vibration not only tends to loosen the transformer’s own mounting but also has a loosening effect on every other nut on the chassis. Drilled holes and cutouts in the chassis should always be deburred, not only for safety but also to prevent cutting through the insulation on any wiring that may go through. Even so, while a smoothly deburred hole is no mechanical hazard to wires that pass through it, the possibility that eventual insulation wear will cause breakdown makes use of insulating grommets desirable. If voltages higher than a few hundred volts are being passed through a chassis hole, a feed-through insulator should be used. These insulators keep plenty of air or other insulation between the conductor and the chassis. The usual ceramic types, however, must be handled carefully during installation. As ordinarily purchased, the feed-through comes with two small cork or lead washers whose function is to make an evenly-loaded surface for the mating parts of the insulator. Cardboard or paper washers may be used in a pinch, but in any event soft washers are necessary to prevent cracking the insulators.

Chassis Layout

Physical layout of parts on a chassis depends on the final use, both mechanical and electrical, of the power supply. If the supply is to be frequently carried, for example, the parts should be placed to give good chassis balance. Conversely, equipment intended for stationary rack use should have the weight crowded as near the front panel as possible.

Electrically, however, the parts will affect both the hum output or ripple of the power supply and the electrical life of the components. Specifically, the high-temperature components such as tubes and bleeder resistors should be as far as possible from the other parts of the supply to prevent heat from affecting the insulation of the transformers, chokes, and capacitors. The resistance of insulation drops sharply with temperature, and destructive leakage currents may cause shorted insulation.

It is sometimes good to plan initially to shield
mercury vapor rectifiers, because this type of rectifier is capable of producing severe radio interference. Even though the shielding may not actually be installed initially, planning for it first will make its installation possible and convenient later.

In the higher-power supplies, often the most practical approach is to locate the power transformer and rectifiers (with their filament transformer) on a separate chassis to give more room and to provide physical separation between the output portions of the circuit and the intense magnetic and electric fields of the input. Steel chassis carry magnetic flux, and sometimes there just isn’t enough layout flexibility in a single chassis to prevent magnetic coupling between the transformers and chokes. If separate chasiss are used, it is often advisable to hold them together with nonmagnetic brackets. Incidentally, there is no reason particularly to make separate chasiss the same size, and considerable cost savings may result from the use of minimum-size chasiss.

If all the power supply components are to be on a single chassis, it is often desirable to position the chokes, either in location or in orientation, for minimum magnetic coupling to the transformers. This may be done with the transformers alone bolted down and energized (with no other part of the circuit connected, and transformer high-voltage terminals covered with heavy insulation) while moving the filter chokes around on the chassis to find the position of minimum hum pickup. This pickup can be checked by connecting the chokes to headphones.

**Power-Supply Circuits and Components**

Conventional amateur supplies use either full-wave center-tap or full-wave bridge rectification. It is not safe to use just any power transformer for full-wave bridge operation, for many center-tapped power transformers were designed to be operated with the center tap grounded. Since the bridge rectifier connection does not ground the center tap, high voltage not anticipated in the transformer design appears at this point. Corona may start and the winding may short to the frame. (This has happened to the writer.) For the same reason, the filter choke should not be in the center-tap return of a full-wave center-tap rectifier unless it is known that the transformer is insulated to stand such service.

Use of a filter choke in the center tap of the high voltage transformer also gives slightly less filtering than when placed in the common connection to the rectifiers.

Chokes are often considered to have only inductance and direct current ratings. Before construction of a power supply it is often well to take a good look at the insulation rating. A figure three times the desired output voltage is a good sign, but the question is really more fundamental. An a.c. voltage almost equal to the ripple voltage in the output of the rectifier develops across the terminals of the first choke in a choke-input filter. In the case of high-voltage supplies this may be a few thousand volts, and a rating that includes only current and inductance does not necessarily specify a good high-voltage filter choke. In many cases a physically larger choke than anticipated will be required.

This a.c. voltage is in addition to the d.c. voltage on the winding. The sum of both voltages will be applied between the winding and core if the frame of the choke is bolted to the chassis. Mounting the choke on insulators of suitable length and material will eliminate the d.c. voltage requirement, but this procedure is not recommended if there is the least chance that the choke frame can be touched while voltage is present on the supply. Choke insulation is usually rated for the sum of the maximum allowable d.c. and a.c. voltages, plus a safety margin of 500 to 1000 volts.

Resistors also have voltage ratings. Power resistors are usually specified by their maximum wattage, and Ohm’s Law tells what maximum voltage may be applied. This rating cannot be used where less than a cubic foot of air surrounds the resistor, for under such conditions the resistor may become hot enough to melt the solder off its terminals. It is therefore advisable to run a power resistor at less than half its power rating (or 70 per cent of its nominal Ohm’s Law voltage) if reasonably cool operation is desired. This again requires more space than expected.

Other parts also generate heat, and there should be clear air space around each part, the amount depending on the power that is being handled by that part. Although in chokes and capacitors this power is stored, these components lose some of the energy stored in them as heat also. To get the greatest possible cooling, as well as mounting flexibility, it often helps to use a few smaller chokes or capacitors rather than a single unit where a single unit is called for.

On the other hand, use of several small transformers instead of a single unit is not recommended. With a bridge rectifier it may be done
without any penalty except possible insulation breakdown, but the use of two series transformers rather than a single center-tapped transformer in the full-wave center-tap rectifier connection can heavily overload the transformers because each then sees a half-wave load.

**Insulation Problems**

Power supplies are plagued by problems of insulation within the parts, between wiring, and of safety of operation. The hundreds of wraps of insulated foil in paper capacitors and the thousands of turns of wire in chokes and transformers are each natural moisture traps, as are the turns of wire in a bleeder resistor. Frequent use (with accompanying heat generation) is probably the best protection for transformers, chokes, and resistors. Fortunately, all modern filter capacitors are sealed.

Wiring flashovers in low-voltage power supplies are quite infrequent because of a phenomenon in physics known as Paschen's Law. This law basically states that below about 300 volts there is no possibility of voltage flashover in air. Above this voltage, however, some combination of air pressure and spacing between conductors will always permit flashover. For this reason, high-voltage conductors should be well spaced from all other conductors and the chassis. Half an inch is a reasonable minimum distance.

While this comforting law takes care of the problem of flashover in air, another kind of breakdown can and does occur. This is surface flashover. The accumulation of dust plus moisture will form a conducting path across any insulating surface, no matter how long the path is. The design of ribbed insulators is only the result of effort to create the longest practical path in the smallest space. Terminal strips and military connectors have similar barriers to lengthen "creepage" paths to minimize chance of flashover. Blowing the dust out of a power supply is a reasonable way to lengthen power-supply life.

Automobile ignition wire is often considered for the high-voltage wiring of power supplies. While it does have good high-voltage characteristics, it is often made of iron or other high-resistance material and should never be used in the filament circuits of the rectifier tubes because it will usually cut filament voltage to the danger point. Wire used for filament connections should be copper of ample cross section for very low voltage drop. If its insulation does not appear to be adequate in itself either insulate it by means of stand-offs or run it through high-voltage flexible tubing.

Insulation for safety of operation is terribly difficult, for no one can completely eliminate danger in a design. The best rule is to put all wiring behind locked doors which, on unlocking, auto-

2 Transformers without wire leads may deliver slightly more than normal filament voltage to allow a small drop in the connections to the socket and in the socket itself. Filament transformers with wire leads usually deliver rated voltage and current at the ends of the leads, and shortening the leads possibly may raise the filament voltage excessively.

November 1958
Recommended Tube Types for Amateur Short-Wave Receivers

BY LEE AURICK,* W2QEX, AND PAUL BOIVIN,* W1ZXA-K2SKK

Have you ever wondered why there are so many tube types from which to choose when you're looking for a tube to fill a particular job? If you have, then you also may have reasoned that the number of types available suggests duplication of purpose and application. Without attempting to apologize for this situation, the writers believe that the long-suffering amateur at least deserves an explanation.

Although many of the tubes that have found their way into general use in amateur equipment are nearly identical in design, there are significant differences between them which require that each be identified by a distinguishing type number. When a “conventional” tube is altered to meet special requirements, it ceases to be “conventional” and must be distinguished by a new type number, despite the minor extent, from the ham viewpoint, to which the electrical characteristics may have been changed. The reason for this procedure is obvious. It affords each of us the protection and assurance that a replacement tube will function, within narrow design limitations, exactly like its predecessor.

The need to satisfy many different though related design problems has resulted in the development of entire families of tubes, each type differing from its prototype in one or more significant but not always obvious aspects. At last count (who's counting?), nearly 2000 receiving-type tubes were generally available to amateurs, and the number is increasing.

As a result, it must be admitted that this situation leaves the “do-it-yourself” amateur wondering which tube will perform best in any given application and, incidentally, remain relatively immune to obsolescence.

Since 1940, RCA has published a chart for radio and television receiver manufacturers indicating RCA Preferred Tube Types. This preferred list indicates those types that are in volume production and high demand because of their technical merit and which, therefore, are readily available and have a much better than average chance of being available for an extended period of time.

It is our thought that a similar chart prepared for amateurs would be of help to those hardy souls who “roll their own” in receiver or, for that matter, in any amateur application in which receiving-type tubes might be used. Accordingly, we have prepared a list of “recommended types” for amateur short-wave receivers.

The types contained in this list benefit by the economies that result from mass production and concentration on those tests which apply to the particular applications for which the tube is intended. For example, the 6AV6 is similar to the 6AT6 and may be used to replace it in some applications. The difference between the two types is that the control grid of the 6AV6 provides a higher amplification factor ($\mu = 100$)

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*Emerald Tube Division, Radio Corporation of America, Harrison, N. J.

Ref. inside back cover, RCA Receiving Tube Manual RC-18.
than that of the 6AT6 ($\mu = 70$). This difference in gain will not be noticeable in many practical circuits. The 6AV6 is the "recommended" type because it is in greater demand than the 6AT6, is produced in higher volume, and also costs less.

Before the composition of the list is discussed, something should be said about the fact that no glass or metal octal types other than rectifiers are included. This omission may come as a shock to some of the old-timers in ham radio. Well, none of us is getting any younger either, and these worthy veterans have been replaced by space-saving 7- and 9-pin miniatures, often with improved electrical performance. As a result, the demand for octal types is diminishing each year except for applications requiring unusually high plate dissipation. However, some caution must be exercised in replacing metal and octal types directly with miniature tubes having a similar design. They can be directly interchanged only when plate and transfer characteristics are identical. In most instances where differences in tube characteristics do exist, they are slight and require only minor changes of value in the associated circuit (i.e., grid resistor, by-pass capacitor, and plate resistor).

### Composition of Chart

Four receiving types are suggested for use in i.f. and r.f. amplifiers and a.v.c. amplifier applications. The three pentodes provide a choice of sharp, semi-remote, or remote cutoff control-grid characteristics. The choice between these three depends on the designer's provisions for a.v.c. and gain requirements. The 6BZ7 twin-triode is included for v.h.f. and u.h.f. (6 meters and down) receiver applications.

For receiver local oscillators and mixers at frequencies up to 30 megacycles, the 6B6E, high-volume pentagrid converter, is recommended for all amateur receivers. It can be used by itself, or in conjunction with a separate oscillator which utilizes the 6C4 triode. At frequencies above 30 megacycles, the 6US-A triode-pentode is recommended. The triode section is used as the oscillator and the pentode section as the mixer. When separate tubes for the oscillator and mixer are desired, the 6C4 in conjunction with the 6AU6 may be used.

The 6AL5 twin-diode or the two diodes of the 6AV6 are recommended for detector applications. In amplifier, detector, and oscillator applications in which the older types 6J5 and 6SN7GT were used, the 6CG7 twin-triode is recommended. Uses for the 6CG7 include the product detector for single-sideband reception, the new synchronous detector developed just a short time ago, and the more conventional triode detector. The 6CG7 is also highly recommended for use in i.f.o. applications. It can handle a high amount of power and, therefore, has a high degree of reliability.

Audio stages usually require triode voltage amplifiers and at least one power pentode to drive a speaker. For the voltage amplifier, the 12AX7 will perform the task, as well as the triode section of the 6AV6. For the driver stage, the 6AQ5-A beam-power tube can be used as a replacement for the 6V6 and, within its ratings, will perform equally as well with regard to power output and distortion.

The remainder of the chart is self-explanatory. In most cases, a choice of tubes has been provided to fulfill a particular receiver function, but the writers fully realize that arguments will arise as to the choice of one tube over another. Each individual has his own idea as to what characteristics he considers best for his receiver design.

(Continued on page 160)

![List of Recommended Receiving-Tube Types for Amateur Short-Wave Receivers](image-url)

**Application** | **Tube Type**
--- | ---
Intermediate-frequency amplifiers | 6B6E Semi-remote-cutoff pentode
Radio-frequency amplifiers | 6CR6 Sharp-cutoff pentode
Automatic volume-control amplifiers | 6LG7 Medium-$\mu$ twin triode
High-frequency oscillators | 6BE6 Pentagrid converter
Mixers | 6US-A Medium-$\mu$ triode sharp-cutoff pentode
Converters | 6AU6 Sharp-cutoff pentode
Detectors (including product and synchronous) | 6C4 Power triode
Automatic volume controls | 12AX7 High-$\mu$ twin triode
Noise limiters | 6AV6 Twin diode high-$\mu$ triode
Audio amplifiers | 6AQ5A Beam power tube
Rectifiers | 6X4 Full-wave
5Y34GT vacuum | 6U7-4B rectifiers
6US-A Medium-$\mu$ triode sharp-cutoff pentode
6AU6 Sharp-cutoff pentode
6CG7 Medium-$\mu$ triode
Voltage regulators | 0J32 (110 volts)
0A2 (150 volts)
Amplifier power tubes | 6CG7 Medium-$\mu$ triode
(4-multipliers i.f. stage) | 12AX7 High-$\mu$ twin triode
This article describes a novel method of feeding the driven element of a Yagi antenna.

When used in the manner to be described, it offers advantages not found in the more conventional methods of feed such as the ratio folded dipole, gamma match, delta match, trombone T, quarter-wave coax stub, and half-wave balun. The feed system offers a perfect untuned impedance match, with balanced-to-unbalanced line transformation. It prevents r.f. currents from flowing on the outside of the feed line, and it adds no wind loading. These aims are achieved by inserting a coaxial stub within and concentric with one side of the folded dipole driven element.

The manner of feeding the driven element is shown in Fig. 1. A hole is cut in the center (r.f. ground) point of the folded dipole, and a three-quarter-wave coaxial line is inserted in one half of the element. The center conductor of the coax continues through what would normally be the feed point and connects to the other half of the dipole. The outer insulation of the coax is removed from each end of the stub, so that the outer conductor or braid makes contact with the inside of the tubing at each end of the stub. This system is used by several commercial manufacturers in feeding their antennas.

The characteristic impedance of the three-quarter wave stub required to properly match the balanced dipole to 50-ohm coax was determined by measuring the radiation resistance of a 5-element Yagi. The impedance at the balanced terminals of the driven element was found to be 175 ohms. The spacing was 0.25 wavelength from driven element to reflector and 0.2 wavelength between directors. Using the formula for a quarter-wave stub, \[ Z_0 = \sqrt{Z_1Z_2}, \] where \( Z_1 \) is 175 ohms and \( Z_2 \) is 50 ohms, the stub should be made of 93-ohm coax. RG-133/U, which is 95-ohm coax, is presently the only line which has all the characteristics required for the concentric feed. This cable is available from only one known manufacturer in the U. S.

At this time a particular problem must be considered. The distance around half a folded dipole is one-half wavelength; i.e., one fourth out to the end and one fourth back to the feed point. We thus have the problem of inserting a three-quarter wave stub inside a half-wave piece of tubing. However, when we consider the velocity of propagation (66 per cent for the coax we are using), we see that a physical half wave length of the coax is really three quarters of a wavelength long electrically: \[ \frac{0.5}{0.66} = 0.75. \] One quarter wave is the stub and the remaining half wave is a repeating transformer with 1 to 1 transformation. The coax line used must satisfy two conditions: it has to have the proper characteristic impedance (in this case 95 ohms) and it must have a propagation factor of .65. If the propagation factor is greater than this, the stub will have to be longer and it will not fit inside the driven element.

There can be no r.f. current flowing on the outside of the feed line because it enters the element at r.f. ground. Any current flowing on the outside of the stub is inside the driven element where it cannot cause any unbalance to ground on the feed line. The Yagi is fed with any 50-ohm coax and the resulting s.w.r. is less than 1.1 to 1 at the

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1 Technical Appliance Corp., Sherburne, N. Y.
2 All Products Co., Mineral Wells, Texas.
3 Progress Electronics Co., 296 Broadway, New York 7, N. Y.
design frequency. A standing-wave ratio plot is shown in Fig. 2.

When it is desired to stack two of the Yagis and still maintain 50-ohm feed, the propagation "fudge factor" can be used again to produce a three-quarter-wave stub. When bays are stacked 0.6 wavelength apart, the feed point will be 0.3 wavelength from each antenna plus the 0.2 wavelength from the stacking mast to the driven element. This half-wave physical dimension again becomes three quarters of a wavelength electrically. The 50-ohm feed of each antenna then runs through a three-quarter-wave stub and is transformed up to 100 ohms, if coax of about 75 ohms impedance is used for the phasing line. Two such stubs are then paralleled by the use of a "T" connector and a 50-ohm feed system results. This scheme allows both the single and stacked antennas to be fed with 50-ohm line. If an array of 2 high and 2 wide is desired, it would only be necessary to transform the 50 ohms of each pair of Yagis up to 100 ohms and again parallel the two with a tee down to 50 ohms. The length of line required to do this would depend upon the horizontal spacing between the two vertical stacks.

The coax line required for the stubs (any odd quarter wave) is $\sqrt{50 \times 100}$ or 71 ohms. Both RG-11/U (75 ohms) and RG-59/U (72 ohms) can be used. RG-11/U is to be preferred because of its higher power capability. The s.w.r. of the stacked array is shown in Fig. 2 as a dotted line.

Gain of the single 5-element Yagi is 10 db. and of the stacked array about 13 db. above an isotropic radiator. The array of four would provide a gain of almost 16 db. (That 100 watts would sound like 4 kw.!) Frequency response of the antenna is quite broad. It can be used over 1.5 Me. with an s.w.r. under 1.5. For an s.w.r. of 2 (mismatch loss will never exceed 0.5 db.) the bandwidth is over 2.5 Me. for the single Yagi.

This type of feed, since it requires a folded driven element, is practical only at the higher frequencies. A folded dipole at 21 or 14 Me. would be rather bulky, but for 50 Me. and higher it really comes into its glory. A word of caution must be given regarding stacking antennas in any manner. For vertical stacking the sides of the dipoles with the concentric coax must be placed on the same side of the stacking mast. Which side of the stacking mast does not matter, so long as they are both on the same side. For horizontal spacing, the same sides of the driven elements must all point in the same direction. Failure to observe this will result in the antenna pattern null in the forward direction. For those interested in direction finding, the above technique could be used with horizontal spacing to provide a sharp null in the azimuth plane.

The neat, clean lines of a commercial five-over-five antenna system using concentric feed are obvious in the photograph.

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**Fig. 1**—Concentric feed for the folded dipole in a Yagi array.

**Fig. 2**—Standing-wave-ratio plot for single and stacked 5-element Yagi arrays described in the text.
In view of the current popularity of s.w.r. indicators of all varieties, we thought we might as well throw this little piece of gear into the ring. Because the instrument lends itself to a compact mounting box we were about to name it "Minimatch," but that seemed rather common so we took the next name that came to mind — Mickey.

Enough of that. Little Mickey is just an off-spring of the Monimatch. We started out to make the Monimatch originally, but couldn't find a piece of sheet metal of the proper dimensions around the shack. Discouraged, we sat down and cogitated. Suddenly the light dawned. The pick-up trough of the original Monimatch is really nothing but a piece of coax with one side missing to let some r.f. out. Now, if you could just take a plain ordinary piece of coax and slide an insulated wire under the shield, it would pick up r.f. just like the old Monimatch line.

It worked. In fact, as the final design took shape this one modification led to several other design short cuts that add up to an extremely simple, and surprisingly accurate, s.w.r. indicator. To enumerate: since coax is flexible, and the field entirely confined inside the shield, the pick-up section can be rolled up and put in a small box of common dimensions. When rolled up, the input and output connectors can be placed close to each other, and the two end leads from the pick-up line can be brought out near each other. In the final version these leads are brought directly to a switch, kept short, and the r.f. is switched. Exit one crystal diode, and with it the problem of matching diodes — a single diode detects both forward and reflected power.

One other modification was the clincher. A later version of the "daddy" Monimatch uses a fixed line-terminating resistor, and the impedance of the pick-up line is adjusted by varying its proximity to the main conductor until the impedance equals the value of the resistor. With the Mickey-Match, it is obviously impossible to vary the spacing in this manner, but the resistance is varied instead; i.e., the pick-up line is terminated in a potentiometer which is adjusted to equal the impedance of the pick-up line.

Construction

The unit pictured and described here is designed for power levels between 10 and 200 watts and uses 73-ohm RG-59/U, although a 53-ohm version, using RG-58/U, could be built in exactly the same manner. Parts required are listed under the schematic diagram, Fig. 1. The components are mounted in a 3 × 4 × 5-inch aluminum Mini-box, with the meter and selector switch on top, the sensitivity potentiometer on one end, and the two coaxial connectors on the other end, near the switch. The terminating potentiometer is mounted inside on a bracket, since it only has to be adjusted once, during calibration.

Construction of the pick-up section is shown in Fig. 2. To make it, use a piece of RG-59/U...
Fig. 1—Circuit of the coaxial-line s.w.r. indicator.

$C_1$—Disk ceramic.

$C_R_1$—1N34 or equivalent.

$J_1$, $J_2$—Coax chassis receptacles (SO-239 with CG-177 'U' hood)

$M_1$—0-200 microammeter, or other range depending on sensitivity desired.

$R_1$—200- or 250-ohm carbon variable (Centralab AB-2, IRC Q11-201, or Ohmite CU2511).

$R_2$—Potentiometer, linear or log taper.

$S_1$—D.p.d.t. "tone-control" switch (Centralab 1462).

(Note: Values as high as 500 ohms may be used for $R_1$ if lower values are not readily available, but the higher the value the more critical the adjustment.)

Fig. 1

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Fig. 2—Construction of the line section. If enameled wire is used, be careful not to scrape off the insulation when the wire is drawn through the braid. Length "L" can be varied to suit power level; sensitivity increases with frequency and with increased length of line section. The instrument shown in the photographs uses a 16-inch length for reasonable sensitivity over the 3.5-30 Mc. range with power levels of 10 to 200 watts.

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Fig. 2

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Fig. 3—Installation of the line section. R.f. leads should be kept as short as possible, but d.c. leads can be as long as desired. Longer line sections can be installed by wrapping more turns around the meter.

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Fig. 3

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This inside view shows the coax line section looped around the body of the microammeter. The forward-reflected switch, terminating potentiometer, and crystal diode are between the two coax fittings at the top. The variable resistor at the bottom is the sensitivity control.

with the by-pass capacitor connected straight to the ground lug. We removed the back cover from the terminating potentiometer to reduce internal capacitance and it helped reduce residual reactance, particularly on ten meters.

Before the completed unit can be checked out, you'll need a dummy load. We made a 70-ohm load by soldering a tremendous quantity (80, to be exact) of 330-ohm, 2-watt resistors in a series-parallel arrangement that came out to 70 ohms. We happened to have a basket full of the things and they worked well, but any combination of carbon resistors that adds up to 50 or 70 ohms, as the case may be, and that, in toto, will handle the power output of your transmitter, will do the trick. Noninductive loads also are available commercially. Don't try to calibrate with a light bulb — it "just don't work." Light-bulb filaments vary all over the lot in resistance, and they have a ten-to-one or better ratio of hot resistance to cold resistance.

**Adjusting R₁**

The forward-power switch position is labeled "Calibrate" and the reflected-power switch position "Read" (meaning, "Read s.w.r. in this position"). To adjust \( R₁ \), leave the cover off the instrument. Attach the dummy load to the antenna connector, and the transmitter output to the transmitter connector. Set the selector switch to the "Calibrate" position. Energize the transmitter on 10 meters, or the highest band used, and load the transmitter into the dummy. If the meter goes off scale, and it probably will, turn the sensitivity control \( R₂ \) until it comes back on scale.

Now switch to the "Read" position, and adjust the sensitivity control for as high a reading as possible, keeping the needle on scale. Turn the terminating potentiometer \( R₁ \) for a null in the meter reading. If your dummy load is reasonably good the null will be extremely deep — the meter reading should drop almost to zero. The unit pictured nullled out to less than 5 μA on 10 meters with the sensitivity potentiometer full out, and with 50 watts of r.f. in the load. The setting where the null occurs will vary all the way from 20 ohms to 150 ohms, depending on the size of the pick-up wire and dielectric constant of its insulation. The setting of this resistor (at the null) is the characteristic impedance of the pick-up line. The higher this final impedance, the more sensitive the instrument. The version pictured, using No. 30 enameled wire, nullled out at about 90 ohms, and the sensitivity is about the same as earlier versions of the Monimatch.

To check out the over-all balance of the instrument, turn the switch back to the "Calibrate" position and adjust the sensitivity control for a full-scale reading. Switch back to the "Read" position and recheck to make sure the null is still complete. Then connect the transmitter to the antenna jack and the dummy load to the transmitter jack. The null reading should now occur with the switch in the "Calibrate" position, and the full-scale reading should occur with the switch in the "Read" position; i.e., the functions reverse. If the reversed readings exactly (or almost exactly) equal the original readings, the instrument is in good shape. There was no detectable difference in these readings with the unit pictured.

With this adjustment, replace the cover, and you can use the thing to adjust antennas with no further ado.

**Operation**

In actual use, it is only necessary to set the switch to the "Calibrate" position, rotate the sensitivity control for a full-scale deflection, and switch to the "Read" position. To use the instrument while adjusting or pruning antennas, or for adjusting link-coupled antenna tuners, you don't need any graphs (although it is possible to calibrate for s.w.r. and power). Just set the switch to the "Read" position and, with power in the antenna, adjust the antenna or the tuner for minimum meter reading.

If you want to make a kilowatt version, use a bigger box and RG-8/U or RG-11/U. The meter can be less sensitive (a 0–1 ma. meter will work well), or the pick-up section shorter, but the

(Continued on page 108)
A Variable Frequency Oscillator

C
are to build your own v.f.o.? Well, here you'll find an idea or two that you may want to incorporate in your next project. Of course, your requirements may not match mine, and so you may not want to include everything here suggested.

For example, my previous v.f.o. had a very smooth-acting vernier dial, but the dial pointer was exposed. This was an irresistible attraction to one of my junior ops, and so for many months I had been operating a v.f.o. without a pointer on the dial. Thus, the change to the type of dial shown in the accompanying photographs.

For ease in zeroing the v.f.o. when chasing DX, or during contests, I have put a push-button switch on the front panel, slightly modified, so that while thumb and two fingers are rotating the tuning knob, the little finger can, with great grace and facility, hit the "zero" switch. This allows the v.f.o. signal to be heard in the receiver, but does not key the rest of the transmitter. In other words, no swishes across the band.

Good keying is a must, and is accomplished in the now-customary manner of turning the oscillator on slightly before and turning it off slightly after the rest of the transmitter. The particular circuit, described in QST a couple of years ago by Puckett, was adopted without change. The clamping-tube action of the 6BX7 is applied to the screen of a 6AK6 in an exciter, and with proper adjustment of the make and break cens.

If you are looking for a v.f.o. and are in the mood to build your own, this one has a couple of features that warrant your consideration. First of all, the keying system permits a smooth clean signal on the air (assuming, of course, that the succeeding stages in your transmitter won't mess up the signal). Secondly, the method of turning on the oscillator only while zeroing the v.f.o. with another signal is very convenient for both DX operating and contests.

Above: Front view of the v.f.o. There's not much to show here, except the paddler switch at the left, and the "zeroing" switch at the right. This latter is simply an s.p.s.t. switch which turns on the oscillator only. The poker chip is used merely to give a large "push" surface so that the little finger doesn't have to be aimed too carefully. The cabinet is a Bud C-1747, while the dial is a Millen 10035.

Combining Operating Convenience and Good Keying Characteristics

BY RICHARD L. BALDWIN,* W1IKE

If you are looking for a v.f.o. and are in the mood to build your own, this one has a couple of features that warrant your consideration. First of all, the keying system permits a smooth clean signal on the air (assuming, of course, that the succeeding stages in your transmitter won’t mess up the signal). Secondly, the method of turning on the oscillator only while zeroing the v.f.o. with another signal is very convenient for both DX operating and contests.

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Fig. 1 — Circuit diagram of the v.f.o., with its power supply and the keying system. Except as otherwise indicated, fixed resistors are 1/2 watt, capacitances are in 
µF, resistances are in ohms. Capacitors marked with polarity are electrolytic.

$C_1, C_5 — 75-µF$ variable (Hammarlund APC-75).
$C_3 — 100-µF$ variable (Hammarlund APC-100).
$C_4 — 25-µF$ variable (Millen 20025).
$C_6 — 50-µF$ (Hammarlund APC-50); see oscillator compartment photo caption.
$C_7 — 0.015 µF$.
$C_8 — 0.01 µF$.
$C_9 — 0.1 µF$.
$J_1 — Coax connectors, chassis mounting.
$J_2-J_5, inc.—$ Phono-type connector.
$K_1 — S.p.d.t. relay, 200-ohm coil (Advance MK1C12VD).
$L_1 — 30$ turns No. 16, 1 1/4 inch diameter, 10 turns/inch (Airdux 1410T).
$L_2 — 72$ turns No. 22 enam., close-wound on 3/4" diameter slug-tuned form (Waters CSA-1012-1-WH).
$L_3 — 10$ turns, wound on cold end of, but insulated from, $L_1.
$L_4 — 10$ hy., 50 ma. (Triad C-3X).
$L_5, L_6 — 12$ hy., 75 ma. (Triad C-5X).
$S_1 —$ Miniature rotary, 2-position (Centralab PA-2001).
$S_2 —$ Push-button switch (Switchcraft 1001 modified with a longer shaft so as to extend through the main dial housing).
$T_1 — 700$ v. c.f., 90 ma.; 5 v., 3 amp.; 6.3 v., 3.5 amp. (Triad R-11A).

V. F. O.

CATH. FOL.

AMPLIFIER

KEYER

POWER SUPPLY

QST for
In this top view the aluminum box holding the frequency-determining components is at the center, with power-supply components at the left and r.f. and keying components at the right. Along the back edge of the chassis are the a.c. power connector (the on-off switch is incorporated in a separate control panel), a phono connector for the relay contacts which mute the receiver, a connector for a “zero” switch which is a foot-operated duplicate of the push-to-zero switch on the front panel, the phono connector for the key leads, the phono connector for supplying the clamping voltage which is applied to the screen of an exciter stage, and the r.f. output coax terminal. The 12AT7 v.f.o. and cathode follower is directly behind the panel at the right, followed by the 5763 amplifier and the 12BH7 and 6BX7 keyer tubes. Over on the power supply side, the OA2 regulator is the one to the left of the 6X5 and next to the panel. The filter choke Ls is mounted above the chassis, directly in front of the power transformer. The other choke, L1, is mounted below the chassis, using the same mounting holes and hardware.

Since the keying is chirpless and clickless, the back contact on \( K_1 \), Fig. 1, is taken out through \( J_3 \) and is used with an additional potentiometer in the receiver to reduce its gain and monitor the transmitted signal.

The v.f.o. circuit itself is the Vackar,\(^3\) and has been entirely satisfactory. The reason for the conglomeration of capacitors in the grid circuit is that I wanted to have as much bandwidth as possible on the higher frequency bands, while still covering all of the 3.5–4.0 Mc. band. A two-position switch changes grid combinations on the two ranges to satisfy the above requirements. In the 3.5-Mc. position \( C_a \) is shorted out, leaving \( C_b \) in parallel with the tuning capacitor \( C_t \). This allows coverage of the entire 3.5-Mc. band with a fairly respectable tuning rate. In the second (7–28) switch position, \( C_a \) is in series with \( C_i \) and \( C_b \) in parallel, and \( C_t \) is in parallel with this combination. With proper adjustment of \( C_i \) and \( C_t \), this permits the v.f.o. to tune 3500–3650, giving scale calibrations of 7000–7200 kc. and corresponding multiples of 3500–3650 on the higher bands. The bottom view of the v.f.o. shows the mechanical expedients that were necessary in order to bring the switch control out to a panel position that was symmetrical with the other knobs.

### Heat and Drift

Once the v.f.o. had been fired up, it became obvious that this was an apt expression — plenty of heat was being radiated from (especially) the tubes and the transformer. The configuration of the cabinet was such that there was no easy path for the heat to flow away from the shield can in which the frequency-determining capacitors and inductor resided, and so the whole works just heated up and drifted.

A satisfactory solution was reached by ventilating the lid of the cabinet, which was done by cutting some rectangular holes, as large as possible, right over the heat-generating units. These holes were then decorated with some of the Reynolds perforated stock that is readily available. Also, a few \( \frac{3}{4} \)-inch holes were drilled in the chassis around the power transformer and filter chokes. This allowed a nice column of air to rise past the tubes and out the holes in the cabinet lid. The results of this maneuver are shown in the accompanying graph, Fig. 2, with drift plotted as a function of time. This graph also shows the advantage of having the equipment stay warmed up. From a cold start, under the worst conditions, the drift for an hour was at an average rate of 40 cycles per minute, while under the best conditions, with v.f.o. warm, the average rate of drift was 3½ cycles per minute over the same period.

Even greater heat insulation of the coil-capacitor box could be achieved by installing an aluminum baffle between each side of the box.

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\(^3\) "Technical Correspondence,” QST, November, 1955.
This close-up of $L_1$ and its associated capacitors shows everything that is to the left of the dotted line in Fig. 1. The small variable (C5) just to the rear of the silver-mica fixed capacitors is an air capacitor in the interests of stability. (See the Vackar reference in the text.) The exposure can be considerably improved by strengthening each side with lengths of $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$-inch aluminum angle. Additional firmness can be achieved by increasing the number of screws used to fasten the cover plates. In the left foreground, protruding through the large chassis, is the shaft of the 10K variable resistor in the cathode circuit of $\text{V}_3A$, and in the center, partially hidden by the socket for the 5763, is the tuning slug shaft of $L_5$.

At the upper left is the filter choke $L_4$, while below it and to the right is the choke $L_6$ that was mentioned in the caption for the top view. Switch $S_1$ is controlled by means of a flexible shaft coupling and a right-angle drive. This is not the best arrangement mechanically, but works well enough for this application. Relay $K_1$ is mounted at the edge of the chassis at the right, suspended by its own leads so that noise and vibration are minimized.

Note the stiffeners made of aluminum angle. These were installed after the wiring had been completed. If you build this, do it first—the chassis definitely needs to have additional strength in order to keep it from vibrating.

and the adjoining tubes and transformer, leaving perhaps a half-inch air space between haffle and box.

**Mechanical Stability**

With such a low-$C$ circuit as this, mechanical stability is a problem. A greater measure of such stability was achieved in this unit by reinforcing both the chassis itself and the coil-capacitor box with some lengths of $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$-inch aluminum angle. Before this reinforcing was done, pounding the table on which the unit reposed would set up a shimmy in the v.f.o. that would last for some appreciable length of time (a couple of seconds or so) and would, of course, cause the frequency to shimmy accordingly. Using a couple of lengths of aluminum angle along the underneath side of the chassis, and along the top and the cover plates of the coil-capacitor box, the shimmy was reduced to where a sharp blow on the table produced a barely-noticeable momentary wigglo. The inductor is mounted on a piece of Lucite to give it mechanical stability and to keep it away from the walls of the box.

**Construction**

This unit is built on a $7 \times 12 \times 2$-inch chassis, with the parts laid out as shown in the photographs. The frequency-determining components are mounted in a $4 \times 5 \times 6$-inch aluminum box which is positioned as shown. With the dial centered on the front panel, the locations of the various components are readily determined, and no detailed instructions are necessary. The switch for changing padders, $S_1$, is located so that direct fairly short leads may be run to the various capacitors. A National R.A.D right-angle drive and a flexible shaft coupling permit the front-panel knob controlling the switch to be brought out to the panel in a symmetrical arrangement. One point to remember is that after the major components are mounted, aluminum angles should be used to stiffen the chassis.

The points were used freely to support components, and National type TPB poly feed-throughs were used to bring the leads down from the shield box.

The band-set capacitor $C_3$ was submounted below the cover of the shield box because its rotor is above ground. If not sub-mounted, the rotor shaft sticks out into unshielded territory and the capacitance then is affected by movement of any metal such as the cabinet lid.

*Continued on page 100*

**QST**
Sporadic-\(E\) Skip on 200 Mc.?  
A Study of Extra-Density \(E\)-Layer Formations Through TV DX Loggings  

BY ROBERT B. COOPER, JR.,* K6EDX

Much effort is being spent during the International Geophysical Year in the collection of data on the propagation of v.h.f. signals by reflection from the ionosphere. One segment of this work concerns the sporadic ionization of the \(E\) region; when and where it occurs, and how intense it is. Results of this study will be of great interest to amateur v.h.f. enthusiasts, and much of the information being gathered may, in fact, come from their observations. The information presented here comes from amateurs of a different sort — those interested in long-distance reception of television signals.

Through the writer’s Television DX column appearing in Radio Electronics, information on many thousands of DX loggings is available. These show that sporadic-\(E\) DX on TV channels 2 through 6, 54 to 88 Mc., is much more common and widespread than most people outside of amateur radio realize. Occurring most often in the early summer months, this form of propagation makes possible low-band reception over distances from 100 to 2500 miles or more.

Use of sporadic-\(E\) was first made by v.h.f. amateurs in the spring of 1934, when stations in New England worked others in the western Great Lakes states. The band was then 56 to 60 Mc. In the more than twenty years since, sporadic-\(E\) propagation has intrigued amateurs and scientists alike. Much time and thought have been expended in its study, and many theories have been formulated to pin down the exact cause of this unusually high concentration of ionized material in the \(E\) region of the ionosphere.

Through study of amateur-band and TV DX reports, researchers at the National Bureau of Standards and elsewhere have been able to piece together many patterns of occurrence that the \(E\)-layer formations seem to follow. For instance, it is known that the \(E\) layer ionizes in cloud-like formations at heights from roughly 55 to 125 miles. When very high densities develop, ionospheric sounders record vertical returns on frequencies as high as 25 Mc., the upper frequency limit of most present sounding equipment. Such returns are very rare, however, and a 15-Mc. maximum frequency for vertical sounding returns is much more the ordinary. Of the total number of extra-density formations (extra density denoting formations capable of oblique reflections at frequencies above 50 Mc.) perhaps only 3 per cent exceed 15 Mc. An estimated 0.1 per cent may reach 25 Mc.

A vertical return at 25 Mc. is considered to indicate a capability of reflecting signals at 150 Mc. over a path of 1200 miles in length. With v.h.f. TV currently operating between 51 and 88 Mc. and 174 to 216 Mc., it can be seen that only the low band is likely to be affected by extra-density \(E\)-layer formations. On occasions when the critical frequency exceeds 15 Mc., f.m. broadcast signals (88 to 108 Mc.) find their way to distant points via skip paths. All this is fairly common knowledge. While we do not know the cause of this extra-density ionization, further discussion of this phase of the phenomenon is not necessary at this time. What we are interested in is the 0.1 per cent of the extra-density formations that reach an \(f_{0}E\), of 25 Mc. or higher.

**Ionospheric DX in the High Band?**

It is a fairly widespread opinion that any reception of high-band v.h.f. TV signals (174 to 216 Mc.) at distances beyond a few hundred miles is the result of a rare form of ducting, involving only the layer of the atmosphere closest to the earth’s surface, called the troposphere. Such propagation occurs most commonly in the warm months, June through October. It is relatively simple to recognize in mass reports, for it develops in connection with stable weather patterns over large areas, and may last for days on end. Surface conditions associated with it are plainly seen on daily weather maps.

Out of more than 100 examples of high-band reception over distances beyond 700 miles now on hand, I have attempted to eliminate tropospheric reports from the loggings to be studied. This was done by study of other reports for the same period and the weather conditions known to have prevailed during the periods under consideration. After careful sitting of reports in this way, we still have about 25 high-band DX reports for the period 1954 through 1957 which are deserving of further study. As a further precaution, we will use reports only from thoroughly reliable observers, and only those which can be substantiated through verifications from the stations concerned. We thus narrow the list down to 9 reports, but these may be of first importance to propagation-minded amateurs who use the 144- and 220-Mc. bands.

An \(E\)-layer formation capable of reflecting a Channel 7 TV signal back to earth at a point 1200 to 1400 miles from the transmitter should have an \(f_{0}E\), of at least 30.5 Mc., according to present theories. To the best knowledge of the author, such a frequency has never been recorded.

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1. \(f_{0}E\) is the term used to represent the top vertical incidence reading obtained from the \(E\)-layer on an ionospheric sounder. According to present theories this reading should be multiplied by 6 to give the \(E\)-layer m.u.f., for a 1200 mile path, with the sounding station at the midpoint.

by an ionospheric sounding station, but this does not preclude the possibility of such an occurrence. Ionization density this high would develop only in a very small area at any one time, if at all, and the chances of its happening directly over an ionospheric-sounding station are not great. Furthermore, all ionospheric records prior to the 1GY, at least, were made with equipment having an upper frequency limit of 25 Mc.

Of the nine reports under study, eight occurred south of latitude 34; this despite a concentration of observers almost 4 to 1 in favor of latitudes north of 34. Four reports involve a basic north-south path, while the remaining five were over east-west paths. Eight loggings occurred in the summer months, and one in January. Due to space limitations, only one group can be presented in detail. These involve the greatest number of observations made in a single day, June 9, 1955.

One Big Day

To television DXers along the Gulf Coast, reception of low-band Cuban stations during the morning hours is very commonplace. E-layer formations appear over this area often around 1000 EST, and TV signals skip from Cuba to Texas with little effort. But the morning of June 9, 1955, seemed just a bit strange to the more alert observers. Abrupt fading and sudden changes in the areas being received via E, were not in keeping with the normal skip patterns. In the chronological list of observations to follow, times are all given in EST. The frequencies given are the upper limits of the channels reported. This may or may not be the actual m.u.f. for the path, due to uneven spacing of TV stations as to geographical location and frequency assignment.

Skip was first observed at 0730, when Buffalo, N. Y. (60 Mc.) was received in Temple, Texas. At 0740 the skip was spreading and the m.u.f. rising, as Syracuse (66 Mc.) and New York City (72 Mc.) were seen in Temple. By 0750 Detroit (72 Mc.) was seen in Temple and Pittsburgh (60 Mc.) was logged in Hamlin, Texas. At 0800 the cloud appeared to be moving northwest; Buffalo was logged in Hamlin, Minneapolis (72 Mc.) and Green Bay, Wis. (60 Mc.) were seen in State College, Miss. At 0820 Chicago (60 Mc.) was in at Temple. Signals disappeared at all reporting stations around 0830, with nothing more noted until 1030.

At 1030 Eastern Cuba (70 Mc.) was logged in Boston, Ga., 930 miles. Detroit (60 Mc.) and Cedar Rapids (60 Mc.) were logged in Odessa, Texas, at 1100. Skip shortened at 1116, bringing Havana (72 Mc.) into Boston, Ga., 650 miles. The skip widened at the southern end at 1120, bringing Santa Clara, Cuba (66 Mc.) into Boston, Ga. A rise in m.u.f. over the same path occurred at 1125, bringing an 82-Mc. station in Santa Clara in at Boston. An 88-Mc. signal from Havana was logged at Boston at 1130. The skip opened from Western Cuba (72 Mc.) to Temple at this time.

The m.u.f. rose slowly over this path and around noon Eastern Cuba (82 Mc.) was seen in Temple. That the ionization density was rising was shown by a 1205 logging of Havana (90 Mc.) in Lakeland, Fla., a distance of only 335 miles. Signals were strong, but with violent fading. At 1220 conditions across the Gulf had improved markedly with Havana coming through in Temple on Channel 6. At 1233 Santa Clara (66 Mc.) was coming into Lakeland, 350 miles.

The first reception from the west developed in Reception of Channels 2 and 3 over the short paths between Cuba and Lakeland, Florida, 335 and 375 miles, preceded the high-band reception over the much longer paths to Temple and Odessa, Texas. Ionization density required for both types of propagation is about the same, indicating a westerly movement of a high-density cloud.

QST for
Temple at 1300, with the appearance of Los Angeles (60 Me.). At 1315 came the first high-band break, with Central Cuba (204 Me.) received at Odessa. All Cuban channels through 11 were received at this time in Odessa, with strong signals on 2, 3, 4, 5, 6, 7, 9 and 11, at distances of 1400 to 1700 miles! Los Angeles (72 Me.) was also received. The high-band Cubans lasted until 1330.

At 1320 Temple received Los Angeles (72 Me.), Baltimore (60 Me.) and Tulsa (60 Me.) were seen in Lakeland at 1330. Santa Clara (82 Me.) was logged in Odessa. Miami (72 Me.) was seen in Bradford, R. I.; Buffalo (72 Me.) in Lakeland; Phoenix, Ariz. (66 Me.) in Independence, Kan.; Detroit (60 Me.) in Boston, Ga., all at 1430. Boston, Mass. (60 Me.), Philadelphia (66 Me.), and Springfield, Mo. (66 Me.) were seen in Lakeland. Boston, Mass. (60 Me.) and Emid, Okla. (82 Me.) were seen in Boston, Ga. at 1425.

Temple reported Salt Lake City (72 Me.) and Cedar Rapids (60 Me.) at 1500. Houston, Texas (60 Me.) and New York City (60 Me.) were seen in Lakeland, and Chicago (60 Me.) was logged in Boston, Ga. at 1525. 1530 brought Green Bay (60 Me.) to Boston. Spotty loggings continued throughout the day, with two short ones at 1630 between southern Kansas and southern Texas (82 Me.) the only notable events.

From this one-day summary of E, it is possible to see the effects of rapidly changing conditions, with the absence of any substantial or stable opening. It appears that small spotty E-layer patches ionized for short periods of time, rapidly oscillating from one area to another during the 8-hour period covered. Other than the high-band loggings between Cuba and central and western Texas, the principal unusual feature of the day was the extremely short skip that developed between eastern Cuba and southern Georgia and central Florida. Channel 2 skip over a distance of 350 miles would indicate an ionization density every bit as high as would be needed to produce Channel 7 skip over a 1200- to 1400-mile path.

It appears that this high-density cloud also extended somewhat westward at the same time that the skip moved in as short as Lakeland, Fla. However, the western edge of the cloud appears to have cut off very sharply, as the path midpoint between Temple and western Cuba did not reach 88 Me. until 1220, or 15 minutes after the Lakeland-Havana path of 335 miles opened on Channel 2. It is also interesting to see that the first high-band reception noted between Odessa and western and central Cuba developed very suddenly, the m.u.f. moving from below Channel 2 to Channel 11 in just a few minutes time.

Some interested observers will argue that such a path over salt water, particularly the mild-mannered Gulf of Mexico, indicates tropospheric propagation. It is admitted that tropospheric reception across the Gulf is possible; in fact, it has been recorded many times, both in TV DX and amateur v.h.f. communication. But in this instance all the factors: violent fading, short-term reception with quick fades in and out, and the general widespread reception of Cuban stations on all the low channels, certainly point to E-layer propagation. The time of day is also one at which tropospheric propagation would be most unlikely.

It should be noted that the Temple observer was not aware of the Channel 7 DX until it appeared to be fading out. A local station on the same channel, and other locals on the other high-band channels, prevented positive checking on the high band earlier. The possibility exists that Channel 7 reception might have been possible earlier than 1413. (This DXer, having read the usual information about E skip being exclusively a low-band phenomenon, was switching only across Channels 2 to 6!)

**Amateur Possibilities**

When such a form of propagation is brought up in conversation among v.h.f. amateurs, the reaction is likely to be “Sure wish someone had been on 220 Me. during that opening!” The chances that 144-Me. amateur signals might have made the grade over a similar path are probably very good and the possibility of 220 Me. making it may be at least fair, but I think that we might approach such extra-density ionization opportunities with a different viewpoint. This involves 220-Me. work by meteor scatter. Two-meter operators have just about mastered meteor-scatter techniques. The chance for similar work on 220 during normal meteor showers is slight, due to the logarithmic loss factor with increasing frequency, but another possibility seems open.

Suppose the path is one over which extra-density formations are fairly frequent during the summer months. With an m.u.f. of 90 to 100 Me. due to sporadic-E, the remaining difference in frequency might be made up by meteor-scatter action. This would require coordination of a high order at both ends of the path, to make the most of times when favorable E-layer conditions coincide with meteor showers in the summer months. Such coincidence just might help two enterprising amateurs to make 220-Me. history. There may be other ways to break the 220-Me. record than waiting for the right tropospheric conditions over long paths! (Continued on page 162)

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Fig. 1—Two-element circular antenna. Using the dimensions given in Fig. 2, this antenna can be fed directly with 75-ohm line.

Circular Antennas for 10 Meters

Full-Wave Loops in Two- and Three-Element Beams

BY ARCHIBALD C. DOTY, JR.,* K8CFU

Although very few amateurs are apparently aware of the fact, loop or circular antennas having a circumference of one wavelength are neither new nor novel. They have been described in one form or another by Kraus, Rider, Noll and Mandell, and others. In addition, the *ARRL Antenna Book* has, for many years, included a summary of the properties of single-turn loops.

Since 1947 the writer has been building circular antennas for one purpose or another, and they have consistently proved to combine excellent performance with simplicity of construction.

In 1956 work was started on the design of multielement circular arrays for use on the higher amateur bands.

Experience with the antennas which have resulted has shown that they have considerably higher gain than conventional beam antennas: they provide low-angle radiation that is advantageous for DX contacts; and they produce elliptically-polarized waves, which makes them excellent for contacting mobiles or other stations using vertical polarization.

Two interesting 10-meter circulars which have been thoroughly tested are shown in Figs. 1 and 4. The first of these is a two-element circular using a 9-foot boom. It may be directly fed with coax. The s.w.r. of this antenna with 73-ohm cable is low across the entire 10-meter band. The total cost of materials was under $20.

The higher-gain three-element circular shown in Fig. 4 has a boom length of 12 feet, and is omega-matched to coax feed. The s.w.r. curve for this antenna is shown in Fig. 6. Total cost of materials was just over $30.

**Element Length**

If the dimensions specified are followed rather closely, excellent operating results should be obtained without making any changes from the lengths shown. These dimensions, which are those giving maximum forward gain, are derived from the following formulas:

\[
\begin{align*}
\text{Driven element } L &= \frac{1007}{f} \\
\text{Reflector } L &= \frac{1078}{f} \\
\text{Director } L &= \frac{948}{f}
\end{align*}
\]

Where \( L \) is the circumference or length of element, in feet; \( f \) is the desired operating frequency in megacycles.

If antennas are desired which will give maximum front-to-back ratio rather than maximum forward gain, a change will have to be made in the lengths of the reflector and director. Although it is not ideal from a theoretical standpoint, the test setup shown in Fig. 8 has been used very successfully to tune the elements of circular antennas. This arrangement is convenient as it

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allows element length or spacing changes to be made on the antenna under test without having to turn off the transmitter. Also, the effect of changes made can be immediately observed on the field-strength meter.

Element Diameter
In order to give both structural rigidity and broad-band characteristics to the antenna, a length-to-diameter \((L/D)\) ratio of approximately 650 has been used.

Element Spacing
Spacing of one-quarter wavelength, or 8 feet 8 inches, between elements is used for the two-element circular. This provides wide band width as well as a convenient impedance match to 73-ohm coaxial cable or transmitting type Twin-Lead.

On the three-element circular the spacing is that which will give maximum forward gain with a boom length of 12 feet. The dimensions are given in Fig. 5.

**Impedance Matching**
If desired, the two-element circular may be directly fed with RG-11/U or RG-59/U coaxial cable. However, when such an arrangement is used (feeding a balanced antenna with unbal-

Fig. 4—The three-element circular is also coax fed, but uses an omega matching section to transform the low antenna input impedance up to the coax line impedance.

The antenna dimensions are given in Fig. 5.
Fig. 5—Principal dimensions of three-element antenna.

Fig. 6—Standing-wave ratio vs. frequency; three-element antenna with matching section.

Fig. 7—Omega matching section for driven element of three-element antenna.

The three-element circular has relatively low impedance, which makes it necessary to use some type of impedance-matching device between the

anced feed) "antenna currents" are induced on the outside braid of the coax, and a 1:1 standing-wave ratio can not be achieved at any frequency.1

If this feed arrangement is used it is important that the effective feed-line length be a multiple of one-half wavelength at the operating frequency. The correct length of line for minimum s.w.r. can be determined most conveniently through the use of an s.w.r. bridge inserted in the line at the transmitter. With this arrangement the original feed-line length should be made at least 6 feet longer than required, and then "pruned" approximately 6 inches at a time until minimum s.w.r. is achieved.

If the two-element circular is fed through a balun located at the antenna, or by a balanced line, no feed-line "trimming" will be necessary, of course.

1 If there be any misunderstanding of this point, as well as the line pruning mentioned in the subsequent paragraph, it should be emphasized that what the author is discussing does not in any way contradict the fact that the s.w.r. on a transmission line is determined only by conditions existing at the load end and (except for the effects of normal line losses) is not affected by the line length. When terminated in a balanced antenna, the cable sees a load consisting of the actual antenna plus the outside of the coax. The component of the load impedance contributed by the latter depends on the length of the coax in terms of wavelength, and the relationship of the cable to nearby objects. To minimize this "antenna effect" it is necessary to detune the outside of the line at the operating frequency, and one method of detuning is to adjust the line length by pruning. Decoupling through a balun at the antenna is also effective.

— Ed.
driven element and the feed line. The antenna shown uses an omega match, which is simple to construct and easy to tune. Specifications of this omega match, which is built in a 4 x 5 x 6-inch aluminum box, are:

- Omega capacitor — 15 μF, max.
- Resonating capacitor — 45 μF, max.
- Omega rod length — 23 inches
- Omega rod diameter — 1/4 inch
- Spacing from omega rod to driven element — 4 inches.

Once the antenna has been constructed, tuning of the omega match will take only a few minutes. With an s.w.r. bridge in the feed line at the transmitter, the omega and resonating capacitors are successively tuned for minimum s.w.r.

Experience has shown that circular antennas can be tuned with the lower boom 8 to 10 feet from the ground and will remain substantially in tune when raised to operating height.

Construction Details

Soft aluminum tubing has been found ideal for use in the construction of the circular elements, as it is light in weight and easy to form into shape.

If you are lazy, and don't mind spending a few extra dollars on materials, the elements can be made of one-piece construction from continuous lengths of tubing of the type stocked by aluminum warehouses. Tubing of this type (Alcoa "Utilitube", for example) is available in 50- and 100-foot lengths in 1/8- or 1/4-inch outside diameters.

The industrious but thrifty auk make their elements from standard 12-foot lengths of soft-temper tubing available from any surplus metal supplier. Five-eighths-inch tubing telescoped into 5/8-inch tubing results in excellent light but rigid elements. One circular antenna using 1/2-inch and 5/8-inch tubing stood up in winds in excess of 60 miles per hour, but the larger diameters are much easier to handle during construction.

Table I gives the sizes and lengths of tubing needed for the two- and three-element circulars. To assemble the elements, the individual pieces of tubing are first laid out in a straight line as shown in Fig. 9. The sections of tubing are then

Table I

<table>
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<th>Antenna Model</th>
<th>Tubing Required</th>
<th></th>
<th></th>
<th></th>
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<td></td>
<td>Quantity</td>
<td>Length</td>
<td>O.D.</td>
<td>Thickness</td>
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<td></td>
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</tr>
<tr>
<td>2-element</td>
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<td>12'</td>
<td>5/8''</td>
<td>0.049 or thicker</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>3</td>
<td>12'</td>
<td>5/8''</td>
<td>0.049 or 0.058</td>
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<tr>
<td>3-element</td>
<td>6</td>
<td>12'</td>
<td>5/8''</td>
<td>0.049 or thicker</td>
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<td>12'</td>
<td>5/8''</td>
<td>0.049 or 0.058</td>
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</tbody>
</table>

Fig. 9—Element construction detail for two-element antenna.

After assembly the elements are formed into their circular shape. This can be done in a few minutes by first preparing a circle of stakes or nails around which the tubing can be formed. Wooden stakes driven into the ground work well,
NOTE: Overall length is not the same as final element length, as it includes "H" which is telescoped into "D" after the element has been formed into circular shape.

Fig. 10—Element construction detail for three-element antenna.

as do nails hammered into an asphalt driveway surface. The diameter of the circle should be approximately 10 feet 6 inches. To form an element, simply fasten one end in a fixed position (get your wife to stand on it) and bend the tubing around the stakes until the two ends meet.

If the element being made is the driven element for the two-element antenna, the two free ends should be temporarily taped together until the element has been attached to the top boom.

The reflector of the two-element, and all of the elements of the three-element antenna, are complete, unbroken circles. Thus the two free ends can be slipped together after forming, and the joint fastened with a sheet-metal screw.

Booms

Two-inch diameter hard-temper aluminum is used for the top boom, which actually supports virtually the entire weight of the elements. The lower boom acts mainly as a sway brace, and to carry the feed line.

All elements are connected directly to the top boom with automobile muffler clamps or pipe clamps. Fig. 11 shows two simple methods of attachment which have proved satisfactory.

The lower boom may be of wood (for the two-element circular only) or of metal. However, as the driven element of the two-element circular is split to accept coax or balun feed, it is necessary to insulate the two ends from the lower boom if it is metal.

The two-element circular shown in Fig. 2 used a 2 × 2-inch wooden lower boom, while that of the three-element antenna is 1½ × 1½-inch square aluminum.

Note that all elements of the three-element model are directly connected to the lower boom as well as to the upper boom.

Performance

No gain figures are included in this article, because accurate data of this type can only be obtained through elaborate tests conducted on model antennas operating in the microwave spectrum. However, the following operating results will give a pretty good idea as to what can be expected from a circular antenna operating in a fairly good location:

When operated with its lower boom only 7 feet above ground level the two-element circular outperformed a well-tuned three-element close-spaced conventional beam immediately adjacent, but at a height of 50 feet.

All continents were easily worked using the three-element circular operating with its lower boom 7 feet above ground level.

The gain of the three-element circular is of a sufficiently high order to allow solid contacts from the Detroit area with many stations throughout the eastern half of the country using back scatter. One interesting 11-meter evening roundtable (before operating privileges in this band were withdrawn—Ed.), in which both back scatter and normal forward propagation were used at KSCFTJ, included stations in Australia, Ohio, Marshall Islands, California and Pennsylvania.

Operating in less than one third of the 1958 ARRL DX Competition resulted in contacts with 55 countries on 10 meters, and 15 countries on 11 meters. Only one country called (Estonia) was not worked.

The transmitter used for all operations was a DX-100 operating with an input of 130 watts.

In spite of the excellent results from the circular antennas built to date, there are undoubtedly many ways in which the performance and versatility of this type antenna may be increased.

Want to be a pioneer?

Fig. 11—Alternative methods for attaching elements to booms.
Once in a while we throw in one to separate the men from the boys. This one by Burton Dobratz of Berkeley, Calif, is in that class.

The network shown below is made up of 1-ohm resistors. The generators provide constant currents of 1 and 2 amperes as shown. The problem:

\[ \text{Find the current in each resistor. ( Resistors can be identified by their terminals, as } R_{12}, R_{15}, R_{16}, \text{ etc.} \]

The answer to last month’s Quiz is shown below. Anyone have a solution with single-pole switches throughout?

Richard Chambers, W3WZL, points out that the solution given for the 10-terminal problem (August, 1958) is not unique. Recalling the 3-terminal problem (April, 1958) and the wye or delta possibility, W3WZL conjures up an “n-order delta” involving n terminals and a resistor from each terminal to every other terminal. To show 2 ohms between any two terminals, the 10th-order delta would use ten 10-ohm resistors.

Some amateurs are sending QSL cards, destined for Canadian amateurs, to Alex Reid, VE2BE, for further distribution. Canadian Director Reid handles the administrative affairs of the League in Canada; he is not a QSL manager. The QSL manager for the VE2 district is George C. Goode, VE2YA. A complete listing of VE and W/K QSL managers may be found on page 190 of this issue.
A Five-Way Antenna Coupler

Many hams, at one time or another, are faced with the problem of not being able to put up a good antenna. When this situation arises, most of these hams will hang a random length wire between two convenient supports. The tuner described in the following pages was designed for the specific purpose of coupling a Viking Ranger to any haywire antenna that might be used, but the basic circuit can be tailored to fit any transmitter.

Lewis McCoy, W1ICP, has written two articles during the past few years about antenna tuners built especially to couple low-power transmitters to random length (or short) antennas. The circuit shown in Fig. 1 provides, by means of $S_1$, a choice of either of McCoy's tuning circuits, or a pi network, or one other circuit. Fig. 2B may look like an unusual circuit, but it is used with either $C_1$ set at maximum, and $L_1$ varied, or with $L_1$ shorted out and $C_1$ varied. With all these different circuits available, it is possible to match almost any antenna.

Although Fig. 1 shows specific values for $C_1$, $C_2$, and $L_1$, they are not critical. $C_1$ and $C_2$ should be at least 150 µf each, but the more the merrier. The spacing of $C_1$ and $C_2$ should be .025 inch for transmitter inputs of 100 watts or less. $L_1$ may be a convenient length of any of the two- to three-inch diameter air inductors, or a home-wound coil on a ceramic form. It should be tapped every two or three turns. The tuner may be built breadboard style, or it may be built inside a small cabinet or chassis. If it is built breadboard, it can be shorted out and $L_1$ varied.

BY ALBERT M. BROGDON, * W4UWA/DL4

Versatile Unit for Coupling to Any and All Skywires

You may be frightfully clever and never have any trouble loading your transmitter with any old piece of wire, but most of us have had trouble at one time or another and so are interested in this antenna coupler. But even old Mr. Clever himself will be interested in an account of some of the experiments of the author and the DX he worked.

Above, and facing page: Two views of the 5-way antenna coupler, mounted in a chassis that serves as a support for the transmitter. The antenna ammeter is connected to the input side of the coupler, but it would have been better to have it in the output line.
may be more convenient to use a movable clip instead of $S_2$ to vary the inductance of $L_1$. Of course, the basic tuner may be jazzed up with the addition of such things as a low-pass filter, s.w.r. indicator, t.r. switch, and output indicator. Or it may be built from your junk box at very little cost. Let your budget be your guide.

When first using this tuner with an antenna, try various positions of $C_1$, $C_2$, $S_1$ and $S_2$ in order to find the point at which maximum output is reached (maintaining a constant transmitter input). When the correct settings have been found for each frequency band, and these settings noted for future reference, it is an easy matter to hop from band to band. You should keep in mind that with certain settings of the tuner controls, it is possible to dissipate a large part of the transmitter output in the tuner itself. Therefore, an output indicator should be used for initial tune up.

The photographs show the author’s antenna tuner, which is built inside a 10 X 17 X 3-inch chassis mounted on the bottom of the Ranger. A bottom plate is used on the chassis to provide r.f. shielding. The large vacant space on the right side of the chassis was left so that a low-pass filter, such as the one in the Handbook, could be added at a later date.

**Results**

Every time McCoy builds an antenna tuner, he modestly mentions all the KB reports he has received from DX stations while using such antennas as a brass doorknob, a base-loaded cuff link, or a double extended coat hanger. I thought it might be a good idea for W4UWA/2 to try to outdo McCoy at his own game. While running 50 watts input to the Ranger, I checked into the Kentucky and Tennessee c.w. nets on 80 meters, (Continued on page 164)
The Tecraft V.H.F. Converters

Basic features of the Tecraft 2-meter converter, one of the first high-quality crystal-controlled converters for v.h.f. use to appear on the market, were discussed by its designers in a QST technical article some years ago. The circuit and layout features that made for uniform response across the band, with good attenuation of signals outside the desired tuning range, are still featured in current Tecraft designs for 50, 111 and 220 Mc.

The 50- and 220-Mc. models are shown in the accompanying photograph. The 144-Mc. model is similar in appearance to the 220-Mc. unit. The principal difference between the two is in the position of the r.f. coils. The 50-Mc. unit has its coils mounted in individual shield cans, the greater permissible lead length at the lower frequency making this a practical matter.

All three converters use a dual-triode r.f. amplifier stage (6BZ7) followed by 6CB6 pentode amplifier and a 6CB6 mixer. The injection is furnished in each by a 6J6, though the circuit lineup is different for the various frequency ranges. Each converter in the new line has a series trap connected at the input circuit, to prevent strong signals at the intermediate frequency from riding through. This is no problem unless you happen to be close to a station operating in your i.f. range, a not-uncommon condition in densely populated areas, especially with converters tuning the 14-Mc. i.f. range.

Another new feature in the Tecraft converter line is an r.f. gain control. This is connected in the cathode circuit of the 6CB6 amplifier stage. Normally it is left in the maximum position, for the noise figure is lowest at this setting. A considerable reduction in cross-modulation trouble from a strong local station can be effected by turning the gain control back a bit, usually with only slight degradation of the converter noise figure. Gain, as such, is relatively unimportant, for there will be more than adequate gain with almost any modern communications receiver.

Tecraft converters are supplied for 14-Mc. i.f. tuning range, unless otherwise specified. Other frequencies, to suit various communications receivers where suitable tuning is not available at 14 Mc., can be obtained upon request. — R.P.T.

"Notes on V.h.f. Converter Design" — Van Duyne and Trepdour, QST, February, 1958, p. 52.
Johnson Directional Coupler and Indicator

Although the economy-minded ham can buy the E. F. Johnson 250-37 Directional Coupler and put together an indicator from the instructions furnished with the coupler, most customers will also probably buy the 250-38 Directional Coupler Indicator. It would be rather difficult to duplicate at home the attractiveness of the 250-38, with its gray sloping cabinet and large plastic-housing meter.

The coupler bears a resemblance to the Monimatch and other reflectometer-type couplers, but it differs in several interesting ways. Designed to work in 52-ohm line up to 150 Mc., and to handle levels of signals from peanut whistles to full kilowatt transmitters, the coupler is itself a section of 52-ohm line. Housed in a 2 1/4-inch diameter tube, an inner conductor tapers out from the connectors to a diameter that minimizes any impedance "bump." Since the associated resistors, diode rectifiers and by-pass capacitors are inside the coaxial line and could be exposed to the field, considerable care has been exercised to dress the leads so that undesirable couplings are avoided.

Leads for metering are brought to color-coded nylon tip jacks at the ends of the coupler, and to put the coupler to use the owner connects his coaxial cable to the SO-239 coax receptacles at each end and the meter to the tip jacks. Instructions provided with the coupler suggest a number of ways the coupler can be used, such as s.w.r. measurement, antenna coupler adjustment, determination of antenna radiation resistance and the measurement of amplifier input impedance.

The indicator has two scales, one labeled "Standing Wave Ratio" and the other marked "Power." Actually, the power scale is only a relative one, very useful for detecting a change in output (trouble in the rig) but not to be expected to deliver absolute readings. The s.w.r. scale has been carefully calibrated, however, and its readings are accurate within the limitations of s.w.r. measurements at the generator (transmitter) end of a line.

The Knight Receiver

Strictly speaking, the title should read "The Allied Knight-Kit De Luxe All-Band Amateur Receiver 83YZ272G," since that is what the manufacturer (Allied Radio of Chicago) calls it in the catalog and on the cover of the instruction book. Somehow it is a little hard to visualize a ham telling another over the air that he's using an "83YZ272G": he is much more likely to use the simple title above. And we suspect there will be a lot of these receivers used: the price of the kit is well below that of any completed receiver of comparable quality, and the design is such that no more than 22 to 25 hours construction time will be required by most assemblers.

The story of the Knight receiver is in the mechanical end of things, not the electrical. After all, it is asking a little too much to expect radical circuit engineering in a receiver designed to sell at such a low price. The Knight uses a sound straightforward circuit; one stage of r.f. amplification, two 455-ke. i.f. stages, and a Q multiplier for selectivity. The block diagram in Fig. 1 pretty well tells the story; nine tube envelopes conceal a 15-tube circuit. Following the
6BZ6 r.f. stage is the triode-pentode 63118 oscillator-mixer stage; the oscillator is the triode section in a grid-tickler grounded-cathode circuit, and the pentode mixer has grid-circuit injection. The pentode portions of the 6AZ8s are used in the i.f. amplifier, and the triode section of the second 6AZ8 is used in the audio-amplifier stage following the 6BC7 triple-diode detector-a.v.c.-automatic noise limiter circuit. The triode in the first 6AZ8 isn't used at all; we thought at first it might be used in the (optional) 100-kc. crystal calibrator, but investigation showed that this addition carries its own tube.

The Q multiplier circuit provides for either null or peak operation: in the peak condition the selectivity is quite sufficient for good single-signal c.w. reception with little or no trace of "the other side of zero beat."

Although the b.f.o. is quite loosely coupled to the grid of the second i.f. stage (as it should be to avoid overloading the stage), the amplified b.f.o. reaching the diode detector is sufficient for good s.s.b. demodulation without pampering of the r.f. gain. The diode noise limiter uses the well-known series circuit to provide automatic noise limiting during a.m. reception. The (optional) 8 meter reads the variation in cathode bias voltage on the second i.f. stage as the a.v.c. voltage applied to the grid reduces the cathode current; a.v.c. is applied to both i.f. stages and the r.f. stage, while manual gain varies the cathode voltage of the r.f. and first i.f. stages.

In the power-supply department, the operating plate voltage runs around 180 volts, apparently in keeping with the philosophy of "lower voltages mean less heating and drift:" The regulated voltage provided by the OB2 is applied to the high-frequency oscillator.

Both of the dials use planetary reductions to slow down the tuning. The band-set drive takes 2 1/2 turns of the knob to cover any of the four ranges: 0.54 to 1.65 Mc., 1.6-4.6, 4.4-12.1 and 12-30 Mc. Bandspread requires 2 1/2 turns for 80 meters, 1 3/4 for 40 and 20, 1 for 15 and 1 1/4 for 10 meters.

**Mechanical**

A glance at the photographs shows that two printed-circuit boards are used in the construction of the receiver. The band-switch sections also utilize printed circuits: this single feature practically eliminates the possibility for wiring error around the (usually) tricky band-switch circuits. Assembling the parts on the printed-circuit boards has been made truly easy: the components are identified on the boards and in the instruction book. As a further convenience, the resistors are packed on sheets of cardboard.

---

**Fig. 1 — Block diagram of the Knight receiver.**
Looking at the underside of the chassis, one can see the two main printed-circuit assemblies. That on the right (r.f. section) also includes printed-circuit switch assemblies. Terminals at the rear of the receiver provide for antenna (plain wire or coax), speaker connections and remote switching standby-receive of the receiver.

An optional 100-kc. crystal calibrator unit can be bolted to the bare chassis at the center.

in numerical order, making it an easy job to locate R35, R40 or any other. As a double check, the instruction book gives the proper color coding for the resistor to be used.

Anyone who has much to do with wiring kits, or correcting wiring errors of newborn hams, knows that the No. 1 problem is soldering. The Knight receiver kit includes a folder on "How to Solder" and enough solder to wire the receiver and then some. The solder is included because one common mistake in radio soldering is to use acid-core solder or solder with too high a melting point. Obviously, this printed-circuit work will require attention to soldering details, but it isn't all difficult once you get the "feel" of it. Just don't be in such a hurry that you don't study the soldering instructions first; if you are a beginner, read the folder and practice your soldering before starting the receiver.

With the wiring errors fairly well eliminated through the use of printed circuits, the inexperienced constructor of a Knight receiver can only come a cropper during the alignment procedure. If he doesn't have or can't borrow a signal generator for the initial alignment, he can follow the "Alignment on the Air" instructions. We had someone else align this receiver after assembly, using the on-the-air method. Checking later with a signal generator, we were able to effect only minor improvement in the i.f. The front-end alignment depends to a large extent on one's ability to furnish signals of known frequency for checking, and here it is rather hard to hit the right spots without a signal generator or a good knowledge of marker signals. However, this is a problem with any receiver built at home. Since most kits are finished on Sundays or during evenings when the radio stores are closed, the two alignment tools furnished with the kit are a very welcome touch.

A 46-page instruction book gives all of the information necessary to assemble, wire, align, install and use the receiver. It even tells hams and s.w.l.'s when to listen on the various frequencies. All in all, it's hard to see how the constructor who takes the time to learn to solder before carefully following the instruction book step-by-step procedure can go wrong.

—B. G.

Strays

Needing a neat operating desk but one which wouldn't permit touching of the equipment by unauthorized personnel, the radio club members at Freehold Regional High School in New Jersey put together this knotty pine and plywood cabinet. Measuring 22 inches deep, 48 inches wide and 54 inches high, it is mounted on small casters so that it may be moved from one spot to another in the electronics shop of the Industrial Arts Department. The operating shelf folds up to form a lid which is fastened with a padlock. Although not done on this model, individual drawer locks could also be installed. The fellow in the photo is K2SLJ.

(K2SLJ photo)

November 1958
CONTEST PERIODS

<table>
<thead>
<tr>
<th>Time</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST</td>
<td>12:00 P.M.</td>
<td>3:00 A.M.</td>
</tr>
<tr>
<td>CST</td>
<td>1:00 P.M.</td>
<td>4:00 A.M.</td>
</tr>
<tr>
<td>MST</td>
<td>2:00 P.M.</td>
<td>5:00 A.M.</td>
</tr>
<tr>
<td>PST</td>
<td>3:00 P.M.</td>
<td>6:00 A.M.</td>
</tr>
</tbody>
</table>

The rules are the same as those of last year. The contest runs over two week-end periods, with a maximum allowable total operating time of 40 hours for each entry. Take part on both phone and c.w. if you wish, but please submit separate logs for each mode because these are considered separate contests.

All amateurs in the ARRL field organization, as shown on page six of this QST, are invited to enter the SS. Certificates will be awarded to the c.w. and phone winner in each of the 73 ARRL Sections. Within a club, single-operator stations may compete for certificates given to the club’s top scorer on both phone and c.w. A cocoabola gavel, engraved with the name of the winning club, will be offered to the group whose members run up the highest aggregate score. A certificate also goes to the leading Novice in sections in which there are three or more such entries.

To get in on the fun, just call CQ SS or answer “yes,” you’d better get set for the 1958 SS! The rules are the same as the last time.

Read over previous Sweepstakes results for an idea of your sectional competition and operating hints. Then scan the rules below and stand by for two week ends packed with wonderful operating enjoyment.

Rules

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

2) **Time**: All contacts must be made during the contest periods indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 73 sections. Time may be divided between week ends as desired, but a total of 40 hours must not be exceeded for each entry. Time spent in listening counts as operating time.

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

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

The final score equals the total “points” X the “sections multiplier” X the “power multiplier.”

5) **Reporting**: Contest work must be reported as shown in the sample form. Printed contest forms will be sent free on request. Indicate starting and ending times for each period on the air. All Sweepstakes reports become the property of ARRL and none can be returned.

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

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest period. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously is not allowed. Contest reports must be postmarked no later than December 31, 1958, to secure eligibility for QST listing and awards.

6) **Awards**: Certificates will be awarded to the highest
EXPLANATION OF "SS" CONTEST EXCHANGES

<table>
<thead>
<tr>
<th>Exchange</th>
<th>Context serial numbers, 1, 2, 3, etc., for each station worked</th>
<th>Send your own call</th>
<th>CK (RT report of station worked)</th>
<th>Your ARRL section</th>
<th>Send time of transmitting this NR</th>
<th>Send date of QSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>NR 1</td>
<td>WS1AW</td>
<td>589</td>
<td>CONN</td>
<td>1812</td>
<td>NOV 8</td>
</tr>
</tbody>
</table>

c.w. scorer and to the highest phone scorer in each ARRL section. A c.w. certificate will also be awarded to the highest scoring Novice or Technician in each section where at least three such licenses submit c.w. logs; similarly, a phone certificate will be earned by a Novice or Technician in each section where a total of three such licenses submit phone logs. Only single-operator stations are eligible for certificate awards. Multiple-operator scores will receive separate QST listings in the final results.

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

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

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

Sample of report form that must be used by contestants

<table>
<thead>
<tr>
<th>Station</th>
<th>C.W. or Phone</th>
<th>Section</th>
<th>Time</th>
<th>Date</th>
<th>Number of Each Station as Worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1AW</td>
<td></td>
<td>Conn.</td>
<td>1812</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>W3JQ</td>
<td></td>
<td>E. Pa.</td>
<td>1814</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>W1HFC</td>
<td></td>
<td>Va.</td>
<td>1817</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>W1HHD</td>
<td></td>
<td>Conn.</td>
<td>1821</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>K5HYB</td>
<td></td>
<td>Ark.</td>
<td>2005</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>KN6EVE</td>
<td></td>
<td>S. E.</td>
<td>1818</td>
<td>8</td>
<td></td>
</tr>
<tr>
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<td>2114</td>
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<tr>
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<tr>
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<td></td>
<td>Ark.</td>
<td>2005</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Total Operating Time: 5 hrs. 55 min.

Assembling persons, name(s) and call(s) ..........................................................................................................................

Claimed score: 22 points X 10 sections = 220 X 1.25 (145 watts input) = 275

Type transmitter (tube line-up if home-built) ..................................................................................................................

Receiver ...................................................................................................................................................................... Antennas ...................................................................................................................................................................

Participation for Club Award in the .................................................................................................................................

(Name of Club)

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

Signature ........................................................................................................................................................................

Number of stations worked ..................................................................................................................................................

Address ..........................................................................................................................................................................

November 1958

49
Amateur radio operators are invited to tune in on moon-bounce signals being transmitted on a frequency of 151.11 megacycles at the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N. J.

Lunar transmission on that frequency was resumed after the Army Signal Laboratory successfully completed a project of reflecting 108 megacycles off the moon to establish the feasibility of such a method for checking out equipment at satellite tracking stations. The unique method of calibrating the satellite tracking receivers to the frequency of U. S. space-vehicle transmitters was carried out primarily for the benefit of the widespread Minitrack stations prior to satellite launchings.

However, at the same time, the Army Signal Laboratory, in cooperation with the American Radio Relay League, sent schedules and asked amateurs receiving the moon-bounce signals to report their reception as additional and valuable data for the project. Hundreds of operators reported and were sent QSL cards acknowledging their accomplishment. Signal Corps scientists taking part in the work express their appreciation for the volunteer support the amateurs gave.

Transmission on the 151.11-megacycle frequency is for further study of factors affecting behavior of radio waves. Fields of interest take in ionospheric influences, including the Faraday effect — that is, rotation of the plane of polarization of radio transmission in the ionosphere due to the presence of the earth's magnetic field.

Alan Gross, chief of the Research Instrumentation Branch of the Laboratory, who is in direct charge of the propagation work, points out that the Laboratory would be appreciative of reports from amateurs picking up the 151.11-Mc. signal. All reports will be acknowledged.

Present schedules call for transmissions during the period November 1-8, inclusive, and December 1-10, inclusive, at times when the moon is in proper phase — i.e., above the horizon at Fort Monmouth. The time that operators in different parts of the country might pick up signals obviously varies because of differences in moonrise and moonset.

The transmitter in use is being operated alternately on c.w. and on two-second pulse on a cycle of four or eight seconds. Output is 50,000 watts c.w. The antenna, with 25-db. gain, boosts output to 20 megawatts of radiated power. The 50-foot parabola is widely identified with Radar Diana, which with an earlier antenna transmitted and received the world's first radio echo from the moon in 1946.

The lunar probes which, as we write, have had one failure and one postponement, will have two transmitters sending back information. On 108.06 Mc., with 300 milliwatts, there will be five Microlock phase-modulated sub-carriers transmitting continuously from launch. Information received at the ground stations will include meteorite impingement, lunar magnetic field strength, and the payload compartment temperature. On 108.09 Mc., with a power of 1 to 50 watts, the carrier will be amplitude modulated when the moon is in the field of a photo-cell telescope.

During a recent and enjoyable c.w. QSO with a KN0, we exchanged the information that I was a Roman Catholic priest and he was a mechanic.
ELECTION RESULTS

FCC Rules Proposal

In the Northwestern Division, the incumbent director, R. Rex Roberts, W7CPY, has been returned to office without opposition, and will start his sixth consecutive term on January 1.

Five vice-director candidates were similarly unopposed and were declared elected. Lloyd H. Manahan, W2YQR, was returned to office as Hudson vice-director, and Virgil Talbott, W0GTE, remains as vice-director of the Northwestern Division.


The new Rocky Mountain vice-director will be John H. Sampson, Jr., W7OCX, a retired Army Colonel. He is president of the Ogden Amateur Radio Club, Inc., and has served as acting SCM and assistant SCM of the Utah Section. He holds appointments as ORS and OBS of the AREC, and is MARS Director for Utah.

Assuming office as vice-director of the West Gulf Division the first of next year is Robert D. Reed, W5KY, who has been serving as an assistant director since 1953. He has been the public relations director of the Tulsa Amateur Radio Club, and is presently its vice-president. He is a member of 4th Army MARS and of the AREC, and holds appointments as ORS, OPS, and OO. He is chief engineer of the John Zink Burner Company.

Fifty-one delegates and observers from amateur radio societies in seventeen countries attended the Fourth Region One Congress of the International Amateur Radio Union held at Bad Godesberg, Germany, July 21 through 26. The delegates and most of the observers were from Europe, but W1BUD, ARRL General Manager, was present as an observer, in his capacity as Secretary of IARU.

All other offices are contested, and ballots have been sent to Full Members of the divisions concerned.

FCC PROPOSES REMOTE CONTROL ON 220 MC.; AFSK ON 50 MC.

FCC recently issued a Notice of Proposed Rule-Making, based on a petition of the United States Civil Defense Amateur Radio Alliance, filed in the spring of 1957. Docket 12007, if adopted in its present form, would permit remote control by radio in the 220-Mc. band (now permitted only in bands above 430 Mc.) and will permit 6F2 emission in the whole of the six-meter band.

The position of the League will be determined by the Board of Directors. Comment date, it will be noted, is November 20, 1958.
Taking Single Sideband to the Seychelles

BY JAMES CHAPMAN,* VQ4GU

East of Mombasa, 1000 miles off the African coast, about one third of the way to India and some 4 degrees south of the Equator, lies the Seychelles archipelago consisting of some 92 islands ranging from small rocks with barely a single palm tree to quite fair-sized islands of several square miles with small towns, roads and a good population. The complete territory of Seychelles occupies several hundreds of miles of the Indian Ocean, all known as “VQ9-land.”

For some time now hams of the neighboring continent of Africa, both in the east and the south, have looked on these islands for purposes of a DXpedition especially since there has been no active ham operation there because of a lack of a.c. and because distance from the outside world has added to the difficulties. Ships only call there about once every six weeks. VQ9HFAY has lived on the islands for quite a while but being restricted to an auto battery for power (which he has to take miles to recharge) has curtailed his activities to c.w. contact with Nairobi.

Having to make a trip with an associate (who incidentally once was active as IIBK in pre-war days) to make a TV documentary film, we decided to take our B & W 5100-B with sideband just in case we could find power, and started the journey in the overnight train from Nairobi to Mombasa with about half a ton of luggage—cameras, recording gear and the ham station occupying some eighteen large packages which were stowed with difficulty on deck aboard the State of Bombay. Four days sailing eastward to the sun seeing neither land nor other ships brought us one fair dawn to Mahe, the major island, where we were conveyed ashore in small launches to the port of Victoria. Customs, immigration, information and postal departments were all most helpful and the gear was quickly cleared and the operating permission obtained. A very charming French lady who owned a local hotel said she had electricity but alas it was found to be d.c. It was decided to try the hospital which had an x-ray plant or the local Cable & Wireless which we heard had small alternators when suddenly up popped another hotel owner (actually an old friend from Johannesburg) who said he had a diesel giving 6 kw. of 230 volts a.c. Although his establishment fully loaded the plant he very kindly consented to give us half an hour before lighting up time and another similar period when all had gone to bed — so little time was wasted in getting our bulky luggage over the hill to the lido of Beau Vallon beach, two miles from town. A local youth climbed coconut trees like a monkey at half a rupee an antenna (which was very useful later when we wanted to change the direction of our dipole). The first afternoon we worked, just by chance, ZS6UR in Johannesburg. From then on things were pretty hectic — the too-short half-hour periods being crammed with replies, and our deepest sorrow and apologies to anyone who was overlooked in the scramble. It is hoped that in the very near future a return visit will be made. VQ4ERR is already organizing, and power plant and operators will make it a full-time ham affair and twenty-four-hour and multiband operation may be possible.

Some of the keener types sent cables asking for QSOs and more than one ham in the States had organized a special antenna. Australians and New Zealanders set up into the early hours for a QSO to fit in with our time restrictions and one Canadian, not satisfied with his first QSO, rushed out and got himself a KWS and was rewarded next night with a good two-way s.s.b. contact.

QSL cards were printed locally, and made out and stamped daily, awaiting the first ship (which was to bring the station back also and from which this is being written on the seas).

The extreme humidity and also close proximity to the sea was feared but no trouble was experi-

* East African Film Service, Box 2818, Nairobi, Africa.
American gear, British op, exotic QTH. Or, in the usual order B&W and Collins VQ4GU, and VQ9.

enced. A resistance in the t.r. switch was damaged (possibly in transportation) and luckily a small general store was found to stock radio spares. A very useful feature was the “low mains” switch on the B&W. As we were transforming down from already low 200 volts via a normal 220/110 transformer the rig was not getting enough mains voltage but the “hi-lo” mains switch soon rectified that. A ground plane was used for 20 but the 15 dipole pointing to the States brought in the best W contacts. Regular skeds were kept with “base” in Nairobi. A strange feature was the number of other islands worked, islands not known to exist, and others where hams were not expected to be found. Is there perhaps some strange island-to-island polarization or is it just the keenness of desert-island hams to contact other islands?

Real history was made the evening VQ0HAY returned from a visit to some distant island and got his portable c.w. rig out of storage and the battery charged and gave us a local contact. This was the first time VQ9 has ever worked VQ9 and incidentally the only c.w. contact (it was much regretted that time restrictions kept us to phone especially favoring s.s.b., but this limitation will be overcome in the fully “ham” expedition).

Not much time could be given to rag chewing and describing the location. Mahe was the fixed operating base although visits were made to nearby St. Aunes where a kind Australian managing a fisheries business offered use of his a.c. plant, as also did a British visitor from Rangoon on another neighboring isle (both would have made better antenna spots as they were not mountainous like Mahe). It would have been interesting to operate on Praslin, the second largest island, which was not visited but is a scene of one supposed location of the Garden of Eden and the only place in the world where the fabulous Coco de Mer double coconuts grow.

Mahe itself is a very pleasant place. Fine safe beaches offer good swimming and goggling. The whole area is a fisherman’s paradise and palm trees abound everywhere. From the house recently occupied by Archbishop Makarios (the Governor’s country residence) and the neighboring hills there is a magnificent view of some of the nearby islands. Life is simple and there is little gaiety— a weekly cinema and the occasional parties and dances in the holiday resorts. As there is little meat available in Mahe diet consists mainly of sea food, turtles making excellent tender steaks.

Operations started on the afternoon of Saturday, July 19 (day of arrival) and ended on the night of Wednesday, August 16 (strangely enough with QSO with ZS6KD whose was the first station I ever operated on s.s.b., when I was ZS6IIG). Sixty-nine countries were worked.

The main purpose of the trip, the TV film (a documentary with story on the scenic splendor and life of the Seychelles), is intended for Italian TV but may reach the American TV networks.

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The MARS First Army Sideband Technical Net (Wednesdays at 2100 EST, 4030 ke.) will offer the following during November:

Nov. 5 — Application of Transistors in SSB Equipment.
Nov. 12 — Ionospheric Storms and Their Effect on Radio Communications.
Nov. 19 — The Engine Scope.
Nov. 26 — Compatible Sideband.

Another all-ham family — K3EXQ, W3MMM, K3EXR and W31WJ. Father, mother, daughter and son.

W4JXF, well-known Louisville amateur, has recently received a patent on a clamp for holding military insignia in place. It is designed to keep the insignia no higher than flush with the cloth of the uniform.
Let us discuss, OMs, the following philosophical problem: Is an amateur radio expedition a failure by definition if no contacts are made despite extensive preparations and the expenditure of a great amount of effort? If the answer is an unequivocal "yes," then let it be known that the writer and three associates have recently returned from one of the most miserable failures in many a year. Ready despair may not, however, be warranted — if we can justify a "no" answer. A circuitous proof for the latter proposition follows.

The idea of our taking a 144-Mc. expedition to Four Corners, where Colorado, New Mexico, Arizona and Utah come together at one point, was first conceived in the mind of wily Willie Rose, W9KLIR, the country's leader in states worked on two meters. Such ideas frequently come to men who want to remain leaders, and the nice part of it all is, as they realize so well, that they get to sit at home while others brave new frontiers on their behalf! Well, perhaps we should be more generous in motive evaluations. At any rate, he "needed" Utah and Arizona, and the Corners is just inside what is thought to be his range — by meteor scatter communication.

The thought of such a venture did not scare us, though we are hardly rugged outdoor types. The author is a psychologist by profession and has considered Ping-Pong to be strenuous enough. Don W7RUX, Bob W7VLN, and Dick Wellman (newcomer to the radio ranks) the eventual personnel component, aren't known for exceptional physical prowess either. But no matter; just last year a similar expedition was taken to Mesa Verde National Monument in Colorado, and all went well. Only a few differences were anticipated — Four Corners is many miles over rugged terrain from any town. The best maps show a "primitive road" to the spot. Others show none. Several old timers of the desert pointed out that the area was apt to have flash floods and be infested with rabid dog packs. While we managed to find a number of fellows who were proud to say that they had been "all over" Arizona, we couldn't find any who had ever been to the geographically unique Corners.

The only reasonable time to go would be August 10-13. This is the period of the annual Perseids meteor shower, when more stuff is entering the $F$ layer than most other times; a lot of contacts up to 1300 miles have been made on two meters during the resulting bursts which may be as long as a minute or so.

Planning was begun several months in advance. Don was to supply most of the equipment, since the writer's setup at W7VMP was to be used during the shower by brother Bob, W7VMQ. Besides, a rig 7 feet high isn't very portable. Several interested members of the Phoenix VHF Club made valuable donations, most notably W7s AGG and QÎMO.

Don had about four weeks to get a transmitter built, and his diligent work produced a jewel in record time. That is, a jewel in appearance. With three days to go, 48 hours of schedules made with twenty 2-meter stations located in about as many states, and almost all preparations for the four-day outing completed, the transmitter wouldn't work. To be more specific, it oscillated at 1 kw., light on the fundamental frequency with the key up! In view of the modern tetrodes being used and the apparently modern construction, this was horrifying. Brilliant engineers passed it off as "impossible," which was a great help. On the day before we left, juggling of grid tuning, neutralizing wires, and the loading capacitor stopped the oscillation at once, prompting us to leave it there and pray. There was no more time for R and D. Little did we suspect that the oscillations would be among the least of our worries.

Everything went smoothly until our caravan of three vehicles was 25 miles west of Gallup, N. M., on famous U. S. 66. It was then that the rut jiggled off the bolt of Dick's hitch ball and W7YNY's 3.5-kw. generator on its trailer went reeling off the road. We had passed a thousand places where it would have gone off a cliff but,
luckily, we were going through a cut and it stopped, suffering only a leak at the top water outlet of the radiator. Oddly enough, the safety chain which had been clipped to itself through a hole in the truck bumper was still intact. The trailer was chained onto the truck and we limped into Gallup.

A radiator shop wanted $14 and several hours to solder up the radiator outlet tube. In a word, we couldn't see it. So Don and the writer proceeded to spend three precious hours locating a small torch in a store. Seems the streets were all torn up with rebuilding in progress, necessitating one-lane slowed traffic, while thousands of tourists and Indians were arriving for a big annual Indian ceremonial. The torch was found at the seventh store. We also picked up a new nut and lock washer for the hitch.

The arrival at Four Corners came about seven hours later than originally planned on. We had to drive very slowly most of the 100 miles from Gallup—the last 15 miles taking two hours. The “primitive road” was that, indeed. At times, the generator bouncéd a full two feet off the “road.” After taking the official arrival pictures we set to repairing the radiator and setting up the tent. We only had five hours until schedule time and the high voltage power supply and control circuits had yet to be designed and built! Besides, we hadn’t eaten for about 18 hours nor slept for 36!

Nevertheless, we did get to the point that we thought we were set up for the first meteor scatter schedule at 11 p.m., having omitted transmitting during a ground-wave sked with W71JV in Arizona — though we listened and heard nothing. The first night we were set up in Colorado. For that night the high-voltage power supply never got put together, but we did have 120 watts peaking to the 6N2. The 13-element long Yagi was at 30 feet and the converter with 417A front end was working nicely into the GPR50. An HQ-100 monitored WWV and the TS323/UR was indispensable as a frequency standard, and, of all things, a keying monitor. The skeds had us transmitting the first and third 15-second periods of each minute, so accurate time and frequency spotting facilities were essential. In m.s. work you just leave the receiver set on the prearranged frequency of the station scheduled — there’s no time for tuning.

All skeds lasted an hour. The object was to exchange sets of calls, S reports, and R’s to S reports. This constitutes a contact, and it’s hard enough. High-speed c.w. is the mode.

Immediately upon getting the 120 watts on we found that its frequency was 144.073 Mc. Knowing that many of those we were skedding hate to tune, and that they have bandwidths as narrow as 800 cycles, there was reason for concern — we’d told them we’d be on 141.058. The crystal had produced the latter frequency. But post-mortemss weren’t practical and we knew that in our desert workshop a crystal putting us on .058 had to be produced pronto. This didn’t happen; invariably touching it with solder would take us down to .048, then a swipe with paper toweling would take it back up to .073. Somehow, though, it did settle down on .058 after working on it more than 12 hours. A total of about two hours of transmitting was done that first night, about evenly distributed among the 12 schedules — on .073. The rest of the time was spent in listening.

A whole transmission of W6NLZ was heard at one time, but he didn’t hear us. Let it not be said that the c.w. men are all down at 14.000 or the like because that was the fastest Morse we’d ever heard. The real heartbreaker came after 7 a.m. when we heard two successive S9 transmissions from W9GAB in Beloit, Wisconsin, while Don had the crystal (yes, the quartz) between his fingers! It should have been an easy contact. That was all for Colorado; we didn’t feel too bad because we knew that anyone who could have worked us could just as profitably schedule W01C in the future. In fact, W6NLZ worked W01C during this showover.

As of the ending of the first night of schedules, we hadn’t seen a living soul anywhere near the camp. However, at 3:40 a.m., the writer was surprised to hear a motor start up just outside the tent. All the other fellows were asleep. Stepping outside, the faint outline of a truck could be seen going down the road only 30 feet away. It must have been no more than 10 feet from the

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Left: Emergency repairs to the damaged radiator of the generator’s engine are made by W7RUX, left, and W7VLN. Three hours of shopping were needed to locate the small torch, foreground, that was used to solder the leaky water tube. Right: High-voltage power supply and the control circuits were designed and assembled on the spot.
The author, with four-day beard, gives a brief summary of results.

tent when it started up. We never knew who he was, how he could have come up so close without being heard, nor what he was doing out in the wilds at 3:50 in the morning.

During the day we hooked up the high-power supply. The rig seemed to be working. After dinner we moved the setup to New Mexico, an operation which was efficiently executed to Arizona and Utah the following two days, respectively, according to prearrangement.

In New Mexico everything but an “R” was exchanged with W5JWL in Arkansas. Part of “W4ZXI” was heard, claimed the operator. That was interesting because he is in North Carolina, supposedly beyond “range.” The call, and many pings, were heard from W0IFS in Minneapolis. Occasionally, our rig would oscillate and we’d be off for a while, but fiddling with controls and straightening out the 300-ohm open-wire feed line ultimately fixed it — so long as we held input down to 300 watts.

At times, the generator would have a coughing spell, and we’d have to wait it out. WWV faded out at 9:00 A.M. and we had to keep correcting the electric clock reading according to a rough predetermined formula. Keeping the frequency of the line at 60 1/2 cycles on stand-by and transmitting every other 15 seconds, the clock would gain 5 seconds in every 15 minutes. The only wrist watch in the crowd quit just as Don started using it. It had been running faithfully for six years. Don says he can never keep a wrist watch running.

The wiring was something to behold. There were eleven things to be plugged in, and everyone thought someone else had brought the cube taps. Since there were only three outlets, the only thing to do was to connect plugs together with hook-up wire through the handy prong holes. The result looked like a model of an atom. Someone had omitted electrical tape (though all these things were on an exhaustive check list), so a roll of masking tape served as the multipurpose insulation material.

Following the New Mexico schedules it was agreed upon that we needed to replenish our ice supply (everything originally iced being hot). The critical incident was the warming up of a dozen eggs Bob’s well-meaning mother had included in his rations, though the warm beer was not inoffensive. We took off down the road and doubled the speed made on the way in, which still isn’t saying much. Dick had volunteered to stay at camp, .45 revolver in holster and 30.06 rifle nearby. (With the noonday sun shining and his being an Englishman, he undoubtedly feared an attack of mad dogs.)

When we inquired in Shiprock about getting ice, you’d have thought we were asking for an atomic submarine. Clearly, Shiprock has no more of the former than of the latter kind of merchandise. We were advised to go to Farmington, N. M., some 30 miles further east. As we arrived at the ice plant, a sign informed us that they were “sold out for the day.” With our fingers crossed we went across town — to the only other ice plant. They had plenty. When we got back to the Corners with the 100 lbs., we had taken five hours and gone 150 miles in our quest.

In Arizona, a five-second burst from W9GAB was all that was heard in 12 hours of schedules. For a number of stations this turned out to be one of the best days, but not for us. Half of the first hour was spent calming down the final. From 8:30 A.M. until the skeds ended at 11, we had to stop for repairs five times.

First the final quit, then the tN2. We noticed a flickering of pilot lights and the voltmeter told us that the power was coming from the generator in intermittent form. Just then the GPR90 blew a fuse, a plume of smoke arose from the HQ (though it continued to run), and the electric clock stopped. A commutator ring on the generator was found to be badly pitted and burned.

We polished it up as best we could and put the heavier load on the other two rings. Everything worked all right — even the clock. Some tremendous peak voltages must have been generated, though. A 5-amp. slo-blo fuse was all we
After dinner that evening and moving to Utah there was a terrific windstorm, but everything weathered it all right. We then had a decision to make. Everyone was badly in need of sleep. It was four hours to schedule time, and the gas was coming out so close that we couldn't run the generator, hence the electric clock, through that time. The wrist watch was running again, but unreliably. It was decided that everyone would sleep and trust the watch, which the writer was to consult (by moonlight) between napping periods.

When the watch had said "9:30" four different times he awoke, the sentry grew suspicious and aroused the other fellows. With the power plant revived, WWV informed us that it was 1:00 a.m.; we slept through two skeds (apologies to W7LHL and W5KTD).

"WS" was heard from WSRCI in Marks, Miss., and a short burst came through from W4TLV in Demopolis, Ala. Everything was working beautifully until, in the process of turning the beam around on W6NLZ at 5:00 a.m., some lateral pressure was put on the feedline near the rotator and left one section between insulator spaced at about ¼ inch. This sent the final into violent oscillation that took several hours to stop, and then only by running 100 watts. We found that spacing one feedline section near the transmitter at ¼ inch would change the final loading 200 ma. Unfortunately, we hadn't included any provisions for putting the feedline under tension — the obvious answer.

Operations were continued until the last schedule was over at 11:00 a.m., mostly listening. Unfortunately enough, there is now good evidence that several of those scheduled may have just been listening at the same times we were. The twin-lamp output indicator suggested that a very high s.w.r. existed, and the ultramodern ceramic tubes in ultramodern sockets were very unstable. Since the 6N2 ran all right and at just as much power as the final would run, the last hour was run with it, while everything not absolutely essential was readied for a speedy departure from a place rapidly becoming uninhabitable.

By noon we were gone. About 20 miles out a trailer tire threw off a foot of tread and we crept into Shiprock to look for a replacement. None of the six stations had a used 6.00 X 16, so we had to buy a new one. The trip by this time had become quite unpleasant, as we couldn't get a new one. The return to Phoenix took until 6 a.m. Being up through another night was all we needed!

Of course, it was a nice change to be home. It may be hard to understand how we could not consider the expedition a failure in view of all the trouble and no contacts. But there are some strong positive values! As a camping trip, it was wonderful. The weather was simply beautiful, the nights being cool and clear, hence quite nice for sleeping out under the stars. Furthermore, we have been able to make a list of 37 "lessons" we learned on the trip — things we'll do differently next time. The adventure certainly presented many situations demanding the solution of problems with limited facilities, and this seems to be desirable experience.

For another thing, we demonstrated what couldn't be done in the shower, to a certain extent. Also, we did prove that several fellows can be heard at the Corners, so if they'd like to send another expedition there and schedule it longer, they would stand a good chance of working it.

Also, none of us had ever shot a high-powered gun before. The stories about the tremendous recoil had built up mental blocks against doing so. However, the lack of anything else to do during the day and the availability of the .45 revolver and the 30-06 broke the barrier once and for all. Unfortunately for W7AGG, owner of the arsenal, we shot up all his ammunition. The guns were supposed to be for emergency use.

The situations encountered also produced many laughs. While several tourists came to the Corners during our encampment as the result of a lifelong ambition to see the place, one fellow drove in to ask us if there were any fish in a river about a mile away. Seems he was looking for untapped fishing grounds. Spying the monument, he stared and said, "Is this that Four Corners thing?" After all our tribulations it was hard to believe that anyone could reach the spot by accident! As for us, we've had enough of the place to last a long, long time.

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**Strays**

The MARS Air Force Eastern Technical Net schedule (Sundays 14400-1600 EST, simultaneously on 3295, 7540 and 15,715 kc.) is as follows:

Nov. 2 — Highway Traffic Control by Radio.
Nov. 9 — Detection and Correction of Radio Interference.
Nov. 16 — Facts About Quartz Crystals.
Nov. 23 — Double Sideband with the DSB-100.
Nov. 30 — More on Double Sideband and Synchronous Detection.
Dec. 7 — Let's Review Our Physics.

Sometimes it seems as though some of the local club awards would be rather difficult for an out-of-towner, yet one afternoon W3HWU worked twenty-five of the Denver gang for the Mile-Hi award. He doesn't say if he broke into a net to accomplish the feat.

W2EWZ suggests another source of distilled water for battery use. He collects his from the dehumidifier which he has in his basement. Good not only for batteries but for steam irons.

November 1958
This is one view of the St. Pierre landscape. Plenty of rocks, and rugged.

**DXpedition or Vacation?**

BY TOM HUGHES,* K2JGG/FP8AB

Sparing the reader the usual opening comments on the months of planning and preparation and dreams-come-true of DXpeditions, I'll start right in at the beginning of our trip.

My cousin Bill Shepherd, two XYLs, two jr. ops and I started forth from Parsippany, N. J., on June 27 about 4:00 p.m. in the hope that we might possibly by some quirk of fate, since planning is impossible, reach St. Pierre et Miquelon Islands.

Now the desire for a ham to go to St. Pierre is not an unusual one, but as has been pointed out in the past, it is not the easiest place to reach — especially for the American ham who has been soundly indoctrinated from birth with the process of planning, timing and precise schedules.

After driving straight through (yes, with two XYLs and two kids) we arrived in Sydney, Nova Scotia, very late Saturday night and after enlisting the aid of the local police, who probably were curious about our roaming around town for two hours, found a suitable tourist home that could handle us all.

The following morning at 7:00 a.m. with the alarm sounding and raising the wrath of all, this OM trotted out to the mobile rig to see what was in VE1-land as it was ARRL field day. Things had evidently been pretty slow, for I immediately hooked up with VE2AEP, the Sydney club station, and was promptly invited up to the location. On arrival I found a fine installation for multiband operation and was promptly offered, as per typical ham hospitality, a bottle of beer. After all, what's field day for? A short stay here brought many new friends, both on and off the air, but alas, the situation being what it was, it was time to raise my crew and look for a place for the XYLs to stay and try to arrange transportation for Bill and myself to the islands.

VE1MK, Marshall Killen, who works at the cable office linked with St. Pierre, had been contacted about two weeks prior to our arrival and had offered to keep us posted on the movements of the two boats traveling back and forth from the islands. It was, however, three days since we had received the sailing time from Marshall via telegram and having been previously warned of the boat's split-second departure timing (this is accomplished by discreetly changing the sailing time or date about five minutes before the previously posted time; thus no matter when she leaves, it's always on time and in plenty of time) we thought it best to consult Marshall immediately and announce our presence. Sure enough a boat, the Langlade, the smaller of the two and a converted mine sweeper, was leaving the following evening, Monday, at 7:00 p.m., two days before we had thought one was leaving, and we were not at all disappointed.

Now I won't go into the trials and tribulations of locating lodging satisfactory to the XYLs and children in time, since I consider this an expedition in its own and one which I don't care to discuss or go through again. It was by far the most nerve-wracking experience of the trip. Such is life!

At 7:00 P.M. promptly (+ 30 minutes) on Monday, the Langlade sailed out into a pea-soup bay in which the visibility was all of one hundred feet. Many times on this trip we devoted tender thoughts to the radar!

At this point I would like to return to that Monday afternoon when we were trying to find a place to store the equipment on board. Bill and I approached the Chief Engineer since he was standing nearby, but found he spoke only French and we only English. After a few minutes of looking at each other stupidly, the Chief (Louis) motioned us to follow below to his quarters. At this point we were offered what appeared to be a large glass of red port wine and this green landlubber proceeded to "down the hatch," being somewhat parched. Now Bill and the Chief, both being old sea dogs, just stared and waited . . . all of one second, at which time a mad dash for a glass of water was in order, much to the glee of the others. Needless to say, it was good old-fashioned navy rum, not port.

Getting back to the trip across, that evening Louis stopped by for a friendly visit and though we didn't understand each other directly, we managed for better than an hour when Serge, a deck and galley hand, dropped in and acted as master of ceremonies and interpreter for at least

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* P. O. Box 1, Morris Plains, New Jersey.
another hour before we hit the sack.

The following day about twelve noon, after a night of rough sea, St. Pierre was in sight, but unfortunately only the radar could see it. Entering the harbor was a harrowing experience for me since the water could be heard breaking over the rocks and we were at times no more than fifty to one hundred feet off the shore. The fog was so thick that we didn’t realize that we were tying up until we were practically along the pier.

Gus Roblot, the only resident ham, was away fishing for the week and we were somewhat confused as to what to do first. But it was all straightened out soon enough after passing through customs, Bill has his Polaroid Land camera along and whenever we couldn’t communicate directly he took a picture, presented it to the official concerned and things just naturally cleared up. This was an especially fortunate gimmick with Monsieur Hourtane, the Chief of the Service Radiodélectrique, who issues the licenses and speaks no English. He does have an avid interest in cameras though, and we did manage with Bill’s 650-second camera as go-between. Mr. Hourtane was gracious and understanding in granting permission to start operation immediately with the call FP8AB while he in the meantime processed the license papers, which takes about one to two days since the governor must sign them also.

Issuing a license beforehand is no longer practiced by the St. Pierre government since several were issued and the recipients never arrived. Obtaining a license is relatively simple after arrival. The most important requirement is to bring along your FCC license. It took only about two hours to receive a verbal O.K. to begin operation with FP8AB and this time was used primarily in interpreting and filling out the required forms. The only advance procedure was a letter to Gus Roblot, FP8AP, requesting information and assistance if necessary. Gus replied assuring me that licensing would be no problem and suggested that I write to Monsieur Hourtane and let him know my plans while Gus in the meantime spoke to him personally. Although I received no reply from Monsieur Hourtane he did have the letter on file and used it as a reference when we arrived. I would recommend that any one intending to go to St. Pierre be willing to commit himself definitely before writing Monsieur Hourtane since he is quite busy and I think receives a considerable number of inquiries.

We arrived at the Hotel Robert, where Monsieur Robert was expecting us and had assigned us the ham shack, the traditional room eight. At this time I feel sure we took two years off his life, for he was preparing for a large wedding party that evening and we were running all over the place climbing out windows stringing the antenna. But at last we both finished in time, he for the wedding and we in as little time as possible. Not that we were anxious!!

On the Air!

Now then I fear I shall be the first in history to say that on the very first short CQ I was not swamped with calls. As a matter of fact I got none!! Twenty minutes checking all equipment, and I let fly with another confident CQ proudly signing that coveted FP8AB. Still nothing. Feeling a

The Hotel Robert, scene of many "DXpeditions" to St. Pierre. We’re not sure which window leads to room eight, but that’s Bill in the roadway.

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1 No health certificate or vaccination is required. There are some regulations, however, that should be kept in mind. You must declare on arrival the amount of money you are carrying in order to avoid any possible delay. You must also declare how much you have spent on leaving the islands and I think this is primarily to keep track of the tourist trade. American and Canadian money is readily accepted in all places of business. St. Pierre is a free port and you may purchase and leave with all you like. Entering Canada and the U.S. with your purchase is a different matter. What you may bring into or through Canada whether you are Canadian or U.S. citizen is governed by Canadian regulations. Often where import laws differ between the U.S. and Canada a U.S. citizen may ship his purchase direct to U.S.A. An example of this is in the case of alcoholic beverages. Canada allows the import of 40 ozs. per person whereas the U.S. allows a full gallon. I mistakenly assumed that as an American citizen I would be able to pass through but being over the 40 oz. limit for entering Canada I was challenged at customs. It was for this reason that I lost the bottle of champagne. By some legal means on which I’m not clear the confiscated bottle was turned over, at my request, to the captain of the Miquelon to become part of the ship’s ration.

Radio equipment, of course, is valuable and looked upon as dollars and as such can land you in a real mess of red tape and possible expense if not treated properly. The following procedure should be followed by U.S. hams traveling through Canada with radio gear.

1. Obtain a permit to operate in Canada from the Department of Transport in Ottawa. This will get you in and out of Canada at will with a minimum of red tape.

2. Normally you wouldn’t stop in U.S. customs when leaving the U.S. but in this case you must or you may not get your gear back in on returning.

3. It will expedite matters at each customs point, i.e., leaving U.S., entering Canada, leaving Canada, entering St. Pierre, and vice versa, if you have on hand several copies of a sheet listing the equipment which you are taking. The equipment should be checked at each point and the list turned over at any or all points and you must leave with everything that you took in.

4. Since arriving home I have received a letter from Jack DuBois, K2CPR, informing me that he had held FP8AB along with FP8AX until its reassignment to me. This has led to some confusion, since the call was once listed in the CQ Earth under Jack’s name. He has, however, been forwarding the cards to me so there is no cause for alarm to those who sent the wrong address.

November 1958
K2JGG himself, complete with local uniform, on the air. little weak I meekly called another CQ and sure
enough the first contact came through at 2023 GMT, July 1, with G3LX. What happened to all those W's? Well, the pileups did come soon after and mostly on c.w. The band conditions
were poor and it was hard work to make headway
on any band but 20, and 20 phone was not easy
going, although there were usually a goodly num-
ber of stations on at all times. First to be worked
in the various call areas were W1LQG, W2UUN,
W3ECR, W4UAE, W5JKF, W6BIL, W7PHO,
W8QJR, K9COS, K0DMY. All in all, the W's
and K's were courteous and patient even though
there are always those in there that don't care at
all about the QSO you're having with the other
fellow. Perhaps I'm being unfair in the opinion of
others but I did work them anyway and made a note to QSL them last.
I do recall one instance where breaking-in reached
such proportions I had to announce on c.w.,
"QRT for ten minutes due to breakers," and I will
say this helped for the next hour. Although it is
slower I tried consistently to send my home call
for QSL and even knowing it to be boring for
those trying forty or fifty times to work FP8AB,
I still received requests for repeats. K2JGG has
been primarily a phone station and I take this
opportunity to apologize for my c.w. It was stand-
ard practice to send QST and announce when
going QRT or standing by for foreign stations
and I must say I was delighted with the results.
On several occasions when it was necessary to
QRT for a show in the middle of a pileup (show is
served on schedule — get there then or else no
show) after the usual announcement it was found
that 99 per cent of the stations immediately
stopped calling. But they were there when we
This is FP8AB, Gus, a long-time resident of St. Pierre
and the only resident ham. He is heard on the bands quite often.
got back! Let me at this point give due credit to
Bill Shepherd, my cousin, who is not a ham and
did all logging and, incidentally, the slave driving.
When I wanted to party or see the sights, it was
always "Let's get back at the rig for a while
and see if we can't make that thousand." There
would have been a lot less contacts were it not
for him.
For the record, approximately forty states and
teenty-nine countries for a total of 1000+ con-
tacts were worked. About ninety per cent were on
30 meters. QSLs will be 100 per cent, and to date
about 5 per cent have been received and they are
still coming in. Only one station was worked on
75 from the states. This was W2HTT (FP8AB) on
schedule on c.w. Ed, who has been a close
friend, sparked the idea of my making the trip
myself. A few contacts were made on 15 and 10
but a little heckling was needed to stir up the
three lonely phone contacts on 10 although many
stateside stations were heard.
While we were still on the island, Gus returned
and we had the pleasure of meeting his wonderful
wife and family as well as having many good
times with the OM himself and his friends as
guests on his cabin cruiser, the *Atta Boy.*
To get on with the story, the *M. Y. Miquelon*
which was to take us back on about Saturday,
July 5, came into port on July 4. The process of
unloading coal was moving along nicely up until
Monday afternoon, July 7, and the beat had
been posted to leave that evening at 8:00 p.m.
Bill and I proceeded to disassemble all the equip-
ment and start packing. Sure enough just as I
cut the antenna down and it lay sprawled grace-
fully across the roof and yard, Monsieur Robert
came dashing out of the hotel shouting "Stop!
Stop! The boat's not leaving 'til tomorrow at
2:00 p.m." No need to explain how we felt, but it
was too late now. It seems that a French warship
had arrived in the harbor that morning and the
crew on landing had challenged the island's
soccer team to a match. Sure enough, some of the
crew of the *Miquelon* belonged to the team and
they just refused to work, so we waited another
day while the St. Pierres whipped the navy and
started back to work. This is typical of the island
folk and the people take pride in saying, "That's
St. Pierre; anything can happen here." Not at all
unpleasant once you get used to doing tomorrow
what you could have done today had you felt
like it.
At any rate, up to this point we had worked
some 985 contacts and were suffering with the
thought "almost 1000." The gear was packed
and all we heard everywhere we went was, "Too bad,
almost 1000." Well, you guessed it. We went
back, dropped thirty-foot piece of coax out the
window as a vertical and loaded the outer braid.
With the transmitter on the table, the receiver
on the bed, we worked twenty-five more that
night to break one kilo, packed up again and
spent the following morning seeing some of the
island and doing some last minute shopping be-
fore leaving that afternoon.
(Continued on page 164)
I have wanted to learn something about Russian amateur radio ever since I worked my first Russian (in 1950, under my old call, W7LEL), but it wasn't until I moved to the Washington, D. C., area that I was able to do much about it. The excellent library facilities here together with an ability to read Russian (it was my major in college) enabled me to investigate the Russian amateur radio literature with the aim of finding out just what Russian ham radio is like.

In reading Russian amateur-radio magazines you soon realize that ham radio in the Soviet Union is a highly organized, serious thing. Like almost everything else in the USSR, amateur radio serves the state. The agency charged

**Amateur Radio, Russian Style**

**BY THEODORE M. HANNAH*, K3CUI**

That last “U”-call amateur you worked, what sort of guy was he? Did he have to be a Party member to get a license? How much power can Russian hams use? What kind of radio magazines do they read? What is DOSAAF? For the answers to these and other interesting questions, read on.

We customarily have a few photographs or drawings to illustrate each QST article, but found nothing suitable for this one. We think, however, that you’ll find the article interesting even though there is no art work.

with administering amateur radio is known as DOSAAF (The Voluntary Society for Assistance to the Army, Aviation and Navy), a para-military civil defense and military training organization headed by a General-Colonel Belov. The Russian ham cannot escape DOSAAF. He must have its approval to build or buy a station; the type of license he receives is determined by DOSAAF; DOSAAF permission is necessary to put his station on the air.

Amateur radio is only one of DOSAAF’s interests. As part of its responsibilities for civil defense training, pre-military training, and technical training of reserves, DOSAAF promotes rifle clubs, automobile and motorcycle clubs, and glider flying, all in addition to amateur radio. It publishes magazines on some of these activities, just as it publishes Radio on the amateur radio field.

An official definition of DOSAAF is found in the Large Soviet Encyclopedia. It says:

DOSAAF, USSR. A mass, voluntary organization of workers of the USSR. Its purpose is to assist in strengthening the power of the Soviet army, aviation and navy. It was established in 1951 through the merging of three independent societies: DOSAR, DOSAV and DOSFLOT (Voluntary Societies for Assistance to the Army, Aviation and Navy). DOSAAF activities are based on the independent action and initiative of its members.

(Before the creation of DOSAAF, amateur radio was administered by DOSARM.)

Under the heading “Amateur Radio,” the Encyclopedia has this to say about DOSAAF:

Today amateur radio activities in the USSR are consolidated under DOSAAF, which maintains a network of radio clubs and radio circles. DOSAAF directs the short-wave amateur radio movement, plays a prominent role in consolidating the activities of radio amateurs and constructors and in diffusing technical radio knowledge. It also organizes contests among short-wave enthusiasts, competitions among radio operators, exhibitions of equipment built by radio amateurs, technical meetings and lectures.

The DOSAAF hierarchy closely parallels the governmental and Party organizations, and is found on all administrative levels. There are all-union, krai, republic, oblast, city and district DOSAAF committees and primary organizations.

DOSAAF’s main function is to interest the greatest possible number of young people in radio operating and repair, in pre-flight training, in rifle clubs, and in automotive repair. The object, of course, is to train young people in skills needed by the armed forces.

The amateur radio part of DOSAAF does not exist primarily for the benefit of the radio amateur. It would be unthinkable, for example, for DOSAAF to petition the government for more frequency allocations for amateur radio. This would be tantamount to the government petitioning itself, and is obviously absurd.

DOSAAF is constantly urging the establishment of “radio circles” (basic radio courses) in every school and institute in the Soviet Union. It even prescribes what should go on the walls of a “radio circle” room — schematic symbols and diagrams, and a picture of Aleksandr Popov, “the inventor of radio.” DOSAAF claims that more than 230,000 people were enrolled in these courses in 1957, and that more than a million persons completed the courses during the past four years.

Today the greatest emphasis is on “mastering the ultra-short waves” (the v.h.f. and u.h.f. bands). The goal is to close the rather wide gap which separates Western from Russian achievements in amateur v.h.f./u.h.f. knowledge and technique. When you realize that as recently as 1953 there were in the entire Moscow region only eight or nine private and collective stations active on the v.h.f./u.h.f. bands, you can understand why DOSAAF stresses the “mastering” of these bands.

In essence, then, DOSAAF’s role is that of a “pusher.” It pushes the Russian radio amateur to greater operating achievements, to the attaining of more and more technical skills, to assisting in “radiofying” the country, and to enrolling more young people in radio clubs and circles.
DOSAAF uses both the "carrot" and the "stick" techniques in carrying out its tasks. It is quick to publicly praise individual hams or clubs for their achievements. It is equally quick to admonish those hams or clubs that fall short of meeting DOSAAF standards.

The Russians have extended the DOSAAF idea to the satellites. All Soviet bloc countries now have organizations similar to DOSAAF (the Bulgarian amateur radio organization, for example, is called "The Voluntary Society for Assisting in the Defense of the People's Republic of Bulgaria"). They also have magazines patterned after the Russian magazine Radio (more about this later), and many of them identify their club stations by a "K" after the digit in the call sign.

### Licensing and Operating

In the Soviet Union a distinction is made between amateurs who operate on the high frequencies (1.7 through 29 Mc.) and those who operate on the v.h.f. and u.h.f. bands. The former are known as "short-wave amateurs," the latter as "ultra-short-wave amateurs." There is also a distinction made between those who operate a station and those who merely listen, for, unlike his American counterpart, the Russian s.w.l. is licensed in the same way as those who transmit. The s.w.l. is assigned a call and sends out QSLs — these are the "UA9-9610," "UB5-5014" — kind of cards you may have received.

Suppose you're a Soviet citizen, you're interested in radio, and you want to get a license. How do you go about it?

First you enroll in a radio course conducted by the local radio club station. Because these clubs (collective) stations play such an important role in Russian amateur radio, a brief description of them is necessary. Club stations (identified by a "K" after the digit in the call) are administered by DOSAAF and are often sponsored by a technical institute. (Station UA1KAC, for example, is the station of the Leningrad Electrotechnical Institute of Communications.)

There is nothing casual about these stations. They are highly organized, and usually contain a high-frequency section, a u.h.f./v.h.f. section, classrooms, a library, and workshops. Each club station is headed by a chief (who is paid for his work in the station); the chief is allowed three assistants. Admittance to the station is rigidly controlled, and when the station is closed down for the day the premises must be locked and sealed.

It is not accidental that the club station is the focal point of all amateur activity in a given locality. DOSAAF intends that the operations of all ham stations, both private and collective, revolve around the local DOSAAF club station.

Back to you and your efforts to get on the air.

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1 The Russian high-frequency amateur bands are approximately the same as ours, although some bands are smaller. Their v.h.f. and u.h.f. bands are 38-40, 144-146, 420-425, 1470-1520 and 5650-5950 Mc.

2 On v.h.f. and u.h.f., the maximum power permitted any station regardless of class is 19 watts. Until recently, the three classes of high-frequency work permitted powers of 5, 20 and 100 watts, respectively.
The final step is to obtain permission to put your station on the air. You will have to submit a "special form" application, a personal history statement, a work record from your employer or school, petitions from the DOSAAF Central Committee and the local committees, and a schematic diagram of your station. Two copies of these papers are sent to the local Inspectorate of Electrocommunications. It is not necessary to be a member of the Communist Party, although most young amateurs are probably members of the Komsomol (Communist Youth League). If your application is approved, you will be granted permission to operate for one year. Renewal of licenses is handled through the State Inspectorate of Electrocommunications.

The Russian amateur radio books and magazines which I read contained nothing specific about how a Russian ham obtains permission to operate a station at his home. It appears, however, that he must first go through the club station routine, then, after gaining enough experience, he can apply for an individual (two-letter) call.

The literature is, however, specific on two points regarding privately operated stations. First, there are minimum age requirements. For high-frequency work, you have to be 18; for v.h.f./u.h.f. work, 16 is the minimum age. Second, you must notify the State Inspectorate of any changes in the station which results in increasing its power, or of any change in address. If your station is inactive for three months you must notify the Inspectorate. If you close it down permanently you must either dismantle the transmitter or turn it over to the nearest DOSAAF radio club.

Regulations

These are some of the rules which the Russian ham must live by:

All amateur stations, whether individual or collective, are subordinate to the Central Committee of DOSAAF, which exercises control over the operations of these stations. It should be especially noted that amateur radio stations may communicate only with other amateur stations. There is one exception. In the event that an amateur hears a distress signal (SOS) from a ship or plane he must immediately establish communication with the station sending the distress call. He must also immediately report all details to the local State Inspectorate of Electrocommunications.

Before going on the air either on phone or cw, it should be thoroughly understood that all conversations must be limited to questions concerning the contact itself or to a discussion of amateur radio equipment.

The transmission of cipher, the use of an unauthorized call sign, out-of-band working, and increasing power beyond that authorized are all categorically prohibited. Unauthorized phone operation is also prohibited.

For violating regulations the owner of a station (or the chief of a collective station) is subject to a warning, exclusion from working on certain bands, to a fine, or, finally, to suspension of operations.

Only one copy is necessary if you are applying for permission to work on the v.h.f./u.h.f. bands.

The magazine Radio is the closest Russian counterpart to QST. Published since 1924, Radio is now printed in 300,000 copies. Its cost is three rubles (75 cents by official exchange rate).

Radio is the voice of the Soviet government speaking through its agencies, the Ministry of Communications and DOSAAF. Its masthead says: "The Organ of the Ministry of Communications, USSR, and the All-Union Red Banner Order of the Voluntary Society for Assistance to the Army, Aviation and Navy." Compare this with QST's masthead and you will have an idea of the difference in philosophies of the two magazines.

There are other differences. Radio includes articles not only on amateur radio but also on broadcast and television receivers, on the industrial applications of electronics, etc. There is, of course, no advertising. There is always a lead editorial, usually exhorting the radio fan in general, and the DOSAAF member in particular, to greater efforts in "mastering the radio sport" (radio fans are called "radio-sportsmen"), to more participation in DOSAAF activities, and to greater efforts in "radiofying" the country.

A recent issue of Radio carried an editorial entitled "Let's Put Into Practice the Resolutions of the Fourth DOSAAF Congress." It said, in part:

DOSAAF organizations must educate their members in the spirit of Soviet patriotism and proletarian internationalism, in complete loyalty to the Communist Party and the Soviet state, in the spirit of love for our army and navy, and in constant readiness for the defense of our socialist motherland.

The resolutions of the Fourth DOSAAF Congress (held in February, 1958, in Moscow and published in Radio) included this:

One of the most important tasks of all DOSAAF organizations is the further development of the skill of society sportsmen, the re-attaining of existing records in all forms of military-applied sport and the raising of these records in the next two to three years to the level of the best world achievements, especially in those aspects of the sport in which there is international competition.

The same issue contained this appeal in large block letters: "Radio Amateurs! Increase Your Sporting and Technical Achievements! The Decisions of the Fourth DOSAAF Congress Call You To Do This!"

What else does Radio contain? Some recent issues have included these representative articles:

The All-Union Spartakiada — A military-type sports competition was held this summer among Komsomol and other youth groups. Radio hams competed in sending and receiving contests.

Let's Not Rest On Our Laurels — Officials of various youth groups urge greater efforts in this year's v.h.f./u.h.f. Field Day.

When Will There Be Radio Parts? — Radio and its readers complain about the lack of radio parts, except in the largest cities, radio components are simply not available.

The United States Program for the Launching of Earth Satellites — A digest of an article which appeared in the January, 1958, issue of QST, Radio

November 1958
adds that signals from American satellites are not easily received in the USSR, although signals from Explorer I were received in Kharkov and Lvov.


A Radar Speedometer — How to build your own radar speed trap.

From the Pages of Foreign Journals — A regular feature containing excerpts from foreign (mostly American) electronics magazines.

It appears from reading Radio that single sideband is just beginning to catch on with the Russian amateurs. As of May, 1958, there were only two amateur sideband stations on the air, UA1HJ and UA3CR. The latter reports working DL1UV in February for his first s.s.b. QSO. Among his more interesting sideband contacts, UA3CR lists ET2NS, K2ZMA, VF2RX ("the only sideband station in India"), VQ4EO/0Q5, YV5FL and ZC4DA. He also reports that the first QSL he received for a s.s.b. QSO was from W6ONU.

Sideband adherents, take heart; your problems are international in scope. As UA3CR puts it:

Unfortunately, our short-wave amateurs still pay inadequate attention to this interesting aspect of amateur radio. The conventional 1.m. station often does not answer at all, and if it does, it reports 89, M (modulation) 2. It is necessary to explain patiently that the b.f.o. must be turned on and that you must tune carefully.

Amplifying his complaint, UA3CR said that another ham, UA3BF, was of the opinion that "only Americans work on s.s.b., and that only on 75 meters."

For you s.s.b. DX men, UA3CR reports that OD5BZ (Beirut) is — or was — active almost daily from 0500 to 0600 GMT, on 14000-14320 kc. Also that UY1AD, using an electro-mechanical filter and a pair of grounded-grid EL34s, is active on 20, 15 and 10 meters.

The editor of Radio promises that there will be more articles on s.s.b. in future issues.

The part of Radio which corresponds to the "How's DX?" section in QST is a short (usually a half-page), irregularly appearing section called "Chronicle."

Russian hams are encouraged to make more QSOs with foreign amateurs. General-Lieutenant Melnik, Deputy Chairman of the DOSAAF Central Committee, said recently:

During the past 18 months Soviet short-wave amateurs have made more than 500,000 two-way radio contacts with amateurs in 250 countries. Although this is a not inconsiderable figure, to us it is clearly unsatisfactory. It seems to us that doubling the number of contacts with foreign radio amateurs is a completely achievable task for our short-wave amateurs.

Russian Equipment

Because commercial equipment is quite scarce, and because there are no do-it-yourself radio kits in the USSR, most Russian ham gear is either home-built (even to the winding of transformers) or is military surplus provided to club stations by the government. The circuits of transmitters and receivers which are published in Radio are not very advanced: a receiver with more than three or four tubes is rather uncommon. On the other hand, you often find "12-tube super" written on Russian QSL cards. These are probably military receivers, or are the ones home-built by the more advanced hams.

Judging by the pictures of ham stations printed in Radio, it appears that the most common receiver (at least at club stations) is one resembling the Super-Pro. (This is probably a military receiver.) Another common one is the American BC-348-type receiver, probably obtained during the war under Lend-Lease. Less common, but still seen occasionally, are RCA AR-88s and old-model HR0s.

There are very few beam antennas in use. The most common antennas are long-wires and doubles. A recent issue of Radio (June, 1958) contained the first description I have seen of the vertical ground-plane antenna. Radio treated it as a relatively new development, and referred to it as a "Ground Plane" antenna (in English).

TVI does not seem to be a serious problem to the Russian ham. One reason, of course, is that there are fewer television receivers in the Soviet Union. Another reason is that the Russian television stations are normally on the air only during evening hours and not at all on Thursdays.

Awards

In order to encourage greater amateur activity, DOSAAF has created some awards and rewards. DX awards include "Worked 150 Countries," "Worked Six Continents," "Worked the 15 Republics of the USSR," and "Worked 100 Districts of the USSR." For the last three there are also awards for s.w.i.s who hear six continents, 15 republics or 100 districts.

I know of certain of only one award which is available to foreign amateurs; this is the "Worked Six Continents" (R-6-K) award. This has been won by DL1JB, G3GSZ, G3LFT and SM4BPY, as well as by Russian and satellite hams.

This award is divided into several divisions. There is the "R-6-K-I (CW)" division (work all continents on 80 or 40 meters, c.w.), the "R-6-K-II (CW)" division (work all continents on 20 meters, c.w.); the "R-6-K-III (CW)" division (work all continents on 15 or 10 meters, c.w.); the "R-6-K-IV (CW)" division (work all continents on all bands, c.w.); the "R-6-K-II (Phone)" division (work all continents on 20 meters, phone); and the "R-6-K-IV (Phone)" division (work all continents on all bands, phone).

Most, if not all, of the other awards may also be available to foreign amateurs. Further information on this could probably be obtained by writing to one or both of the following:

1. The Chief Judging Board of the DOSAAF Central Committee, P.O. Box 101, Main Post Office, Moscow, USSR.
2. Radio Magazine, Novo-Ryazanskaya Street, 26, Moscow B-66, USSR.

Rewards include "Master of Amateur Radio Sport," "Master Radio Constructor," and others. Winners of these awards receive medals.

To qualify for "Master of Amateur Radio Sport," an amateur must meet one of these sets (Continued on page 182)
How's DX?

CONDUCTED BY ROD NEWKIRK,* W0BD

Where:
Shades of one Richard Tracy and OM Whitehall! As we declared last month, the scope of content in your monthly “How's” mailbag is scarcely predictable. That contention is further supported by lines from a nonham which arrived a hair too late to be included in October's sampling:

Editor, “How’s DX”:
Four Marine and Navy pilots recently were discharged from service in Japan, built themselves a boat and started a trip through the China Sea islands. They left Keelung, Formosa, on the 7th of July and headed for Hong Kong. They have not been heard from since.

A Collins radio installation was aboard and they were known to be operating in the 20-meter band. I do not know their call—if they had one—but their yacht was the Tuna. In one of their letters it was mentioned that they had radio schedules with some amateur in the area. I am trying to run down any contact which might have had in order to ascertain their present whereabouts.

The men are Bohning of Belmond, Iowa; Van Doebren of Elkhart, Indiana; Martin of Seattle, Washington; and my own son, Farmer. Can you help in any way?
— C. Everett Farmer

This inquiry is complimentary to the renowned ubiquity of DXdom's grapevine. Who knows? Perhaps someone in the arbor's outskirts has the key to Mr. F.'s quandary. Should anything develop we'll pass the word along.

As the accompanying cut and caption proclaim, we've got that Novice DXCC, a first among firsts. What next, Pegasus? What other bright brass ring dangles just out of reach on the dizzying DX merry-go-round? Well, until something else suggests itself, how about WEC—Worked Every Country? Some are close but yet so far. It's something that may never happen or may happen tomorrow. True, countries are added and the list is revised, but only a handful of inert items—Wrangel Island and the Aldabras, mainly—really bar the door. When, men?

* 4822 West Berteau Avenue, Chicago 41, Ill.

November 1958
KEV and KJ6LV found early birds G9s ES FYI, CR6AJ, CTIH, CXIs BY CA FM MD, HP2-ON, KAGJ, KB0M, 3J2XK, K2CA, K2SA AL DU, IAOLY, QO3C, and KB0M (s.s.b.). K5M6, K5X6C, KZ8S AD DU, IAOLY, QO3C, and KB0M (s.s.b.). VPs 3HAK 9EKG, V02DC, X0ASg of Chile, YN1s EK2J, Z6CN, ZE5A, ZEA lE 1EJ 1Ey and ZS3E on tap.

The happy hour departure from summer-time contesting is strikingly evident in the c.w. slot where K1CB, K1DL, K1EL, W2s 9GK, and A1CB grabbed an easy lead of DL/DJ G GI GW GM HB OH OK 0N4 OZ FA0 PUA (84/61), RJM (65), SXR, W5KLB (163/1401, 1GD 16/37), K3ARV, W4TVQ, K4s DRO (161/138), 1GD

QST for
Lee Grant's rather untropical foliage evidently never cramps his DX style. This is the ZD3G layout that followed earlier activations as V5PAO and ST2NG. "I've had three receivers smashed in freight accidents in the last five years and my rig won't stand much more beating around. At the moment my AR-88D receiver is in a box almost big enough to house a concert grand piano, so I hope it arrives intact on the next move. It's a bitter moment when you open a crate and hear the tinkle-tinkle of fractured fragments!" After concluding current Bahrain duties Lee envisions a juicy VQ6 sint. (Photo via W2ZGB)
counter previously unpublished QTHs of potential value to the
wagon, stop 'em before you leave, and do so:
AGACX, D. S., Seal, c/o Consulate General of India, Lisbon,
Tibet (or via India bureau)
ACSOT, S. Saja (AC8SQ), c/o Blutan Agent, Kathimpok, India
ex-CQGUN, R. Donovan, W9FJY, RF2 J, Mascoutah, Ill.
CQGUN, P.O. Box 124, Tebtun, Morocco
CX7BT, Box 37, Montréal, University
DL1WU, H. Lufkin (W6I1D), U/L No. 5, 557th C & G Squdrn.,
A-271, New York, N. Y.
FRCD, Dakar Airport, Dakar, French West Africa
PG7XQ (via RGF)
P7QAR (to W9MTH)
P7ZBB (to K2QDD)
P8OAJ, J. Franco, Box 2023, Brazzaville, French Eq. Africa
P8EO, O. L. Kalmar, XVI Metro urgea, 18, Budapest, Hungary
HI9CM, P.O. Box 122, Ciudad Trujillo, D. R.
HR2AK (W9JVE/KE5) (via W9V02)
HI1JN, J. Sowana, 317 Sawmanskoe Rd., Bangok, Thailand
H1Z1AR, 1002nd ATW, Det. 10, MATS, APO 616, New York,
N. Y.
J1A1M/M1 (to H1AID)
J3OKA, H. A. R. Diemont, Bentani Airstrip, Hollandia,
N. G. G.
J0ZPPB (via W8QXK)
K3BSP/KEQ, Box 1362, Azana, Guam
K7CDF/VOQ, E. Adair, 1092nd AAC Squdrn., APO 677,
New York, N. Y.
ex-BXDL (to K8CQD)
K16MG/ZK1 (to K16MG)
K5A2 (to W8KAQ)
K5BQ (to W8XKZ)
K5CNC, L. Bowton, Box 739, Ft. Kohbe, C. Z.
L5GQ (via NHRL)
L1BB/P (via W8XLC)
L2KX (to DL7AIH)
L2N9PC, Box 730, Sofia, Bulgaria
D0SGB, Najhan, P.O. Box 206, Tripoli, Lebanon
P3AE, Box 596, Seco Colorado, Aruba, Netherlands
Antilles
P4YAPJ, Box 87, Canea City, Rio G. do s., Brazil
P4YAXN, L. F. S. Games, Rua Amaores 2042, Belo Horiz-
ontos, Brazil
SUHIM (W/Ks via W9DRS)
UABLS/mm, Gerardly M. Mashonkin, SS Goroka, Crab-
crest, Vlagivostok, U. S. S. R.
VELDUA/VE8 (via VE3DUA)
VK8CP,Rev. C. J. Patrick, c/o P.O., Kavieng, New Ire-
land, T. G.
VP2YAV (via KV4A4A)
VP2ZMR, Box 221, Plymouth, Montserrat (or to W6T7K)
VP3BY, S. Bailey, P. O. Box 588, St. Thomas, V. I.
VP7NA, Box 5019, Nassau, Bahamas
VP8BJ, G. N. Biggs, c/o Dean St., Port Stanley, Falkland
Islands
VP8DW, T. Hardy, P. O. Box 185, Port Stanley, Falkland
Islands
VB9AJC (via W8QAF)
W2 DA DE (via W2CTN)
W34JT (via K6GALA)

Engrossed is the word for G3FJu, shown here operating 9K2AQ in typical canvas desert quarters. In three Kuwait months Ron tallied some 2000 QSOs with 105 countries using fifty watts, a Marconi
CR-100 receiver, ground-plane for 20 meters and a 135-foot wire for 40, 15 and 10. Next stop for G3FJu Libya. (Photo via W1V0C)

Whence:

Europe — Amateurs the world over are invited to work
G, C.C. (G1) G1 GM and GW brevets in the third annual
RSGB E2/38. Dr. Phone Contest which runs from 0700 GMT
November 22nd to 0000 on the 23rd. Prime stipulations are
that one must be single-operator on 10b and 15-meter phone
and exchange RS-plus-QSO-number serials (+7001, 58002, etc.)
with the 6 men. Each completed contact with a British
Islands station scores five points. In addition, a bonus of
50 points can be claimed for the initial QSO with each
country using fifty watts, a Marconi
CR-100 receiver, ground-plane for 20
meters and a 135-foot wire for 40, 15 and 10. Next stop for G3FJu Libya. (Photo via W1V0C)

V95MA, R. A. F. Stn., Gan, Maldives, via BPTO 180, GOP,
London, England (or via RSGB)
V7W0KC (via W8XKZ)
V7U2JG, J. Gonznli, F-1418 So, Vinay Nagar, New Delhi,
India
W2ZEPS/KJ6, c/o W8SOG, Loan Stn., APO 105, San Fran-
cisco, Calif.
ex-WBMC/F/C1/G3 (to W7VGR)
XW5X, Box 229, Gualajara, Mexico
YN1PK, F. Kettle, Box 195, Managua, Nicaragua
YQ2CD, M. Neguzte, Box 80, Timisoara, Roumanina
ZQ7SA (c/0 W6QNT, W7VCY)
Z1AM10, R. Wright, 773 Sandinsnace Rd., Alt. Rosskill,
Auckland, N. Z
ZL3DA (via W8ZWN)
SA2CT, P. J. Biriaar (G3JH2), Party 616, P. O. Box 193,
Benzoni, Libya
9G1CV, ComCan, Gifford Camp, Acera, Ghana
9G1CV, ComCan, Gifford Camp, Aker, Ghana

QST for
and SU1IM upon rotating Stateside tlds year. V7SUJ kad kept saw, Bob confirms, "As of today there is no amateur radio Shizuoka Amateur Radio Club members. This is a Ubrical-on 11-ÂIc. c.w. from 1100 to 1200 GMT to close WAS en-
boo beumwurk after this years typhoon season paciticking. Bob also hears that .ÎAICV bas sworn off bam-
had juicy 220-volt a.c. mains going to waste JA4-
dropped us postais from such variant Asian points asDhah-
tiree-year KA2TP hifcch in the Orient. _ W0WXJ
activity in Turkey." DL4XC oxpects to be back with the
had previousiy beonissued to USAF personnel but was with-
groups on a one-year yxtendable basis. The call HL2AM
yet permitted to bave foretgn contacts. Third-party inter-
ated in an advisory cauacity at tiie Korea
and BV0
call possibly LXiKA. They'il concentrate on c.w.
and fellow OVARAians with a transtea QBO in late August,
May. QBTb.
ran, New Delhi and Bangkok but apparently fourni no op-
license can be issued," hints V8NYG D1/4XC
with international treaty régulations and the three H.L9
national trahie with H 1,9s is prohibited in cmiformauce
HL2 calls are issued to Korean nationals but they are not
municate with amateurs outside Korea. Certain expérimental
ent Bill finds only HLQs KR KS and KT autiiorized to com-
ports for liis Middle East opérations. K2-
Nain among, licenst.'d only a year ago, really is warming up
in the Royal Thai Navy's Bangkok research laboratory,
ica SCDXC sources bave DLs 7ÀH aud 9PF
The Gs attend Cambridge 11. when not touring North Amer-
by pushing K7FAE to a 132/92 DX status Ils
srore a iogitimatc ham QfclO from tl»e place . ...     W7-
INT expects to be stationed with the USAF at Sevilla,
Spain, for the next two years. His authorization as an EA.
Frank mulls over DXpeditionary possibilities together with friend KBGJP who is billed in next-by WDQ, c.w. DL4XC diamonded his DX feet by pushing KYFAE to a 132/02 DX status.     «Its
A11 AM and ZC schedule a San Marino voice vacation last late March, work on five phone words
... V8CAIN worked OZS 3SN and 7SN same day, both Dunes being Sven Nielsen. Further scrutiny of the C6F Doc reveals that OZS 3SN 8SN and 8SN in Nielsens,
... G3s MZR and MJK delighted W8CRB and fellow OVARAians with a transtea QSO in late August. The two are not touring North Africa
. .. SCDCX sources have DLs TAH and OPP primed for a Luxembourg incursion around this time or sometime.
ItAIA. They then concentrate on c.w. with a DX-100, a homespun spare rig and a miniaturized beam for several hands. 1.2GOL goes word leading to QSOs from T7QG and T7AAS, the latter worked on
100 meters in 1951.
Asia — Thirty-two-year-old HS1ON, an electronics officer in the Turkish navy research laboratory, now heads for his DXCC after nailing down a 14-Mc. WAC, mission, licensed only a year ago, really is warming up on the DX scene, as will be seen, almost a year ago. The
Hungarian 21-Mc. SSB DXing around 14,000-14,200 kHz, who can prove two-way communication with any ten mem-
VERON also rails attention in the ADXC certification,
Winners of this race — ZS6APQ and ZS6IF report over 600 contacts,
SWITCH-TO-SAFETY IDEA

HAVING in mind the worthwhile purpose of increasing the longevity of ARRL members and other amateurs, I would like to add a suggestion to the several technical Switch-to-Safety items which have appeared in QST. Fig. 1 illustrates a simple power wiring arrangement which provides continuous safety checks on power and ground connections. With this arrangement, all switches and fuses are located in the “hot” side of the 117 volt a.c. line, carrying through the scheme used in standard house wiring. (When fuses are installed in both sides of the line, it is possible for the cold fuse to operate from overload and still leave equipment and wiring energized with 117 volts with respect to ground.)

One side of a neon panel light is connected to the “hot” side of the a.c. line after the fuse and main power switch. The other side is connected to station equipment cabinet ground through a 50,000 ohm resistor. A standard bayonet panel socket with a clear glass jewel is used for lamp (NE-51) installation. Before connecting the power plug to an outlet, the main power switch, S1, is placed in the off position. Some resistive load normally connected after the main power switch should be present. This fixed load may be provided by a desk lamp and a receiver.

If the NE-51 illuminates when the power plug is inserted in an outlet, reversed polarity is indicated. The NE-51 will then go out if the main power switch, S1, is placed to on. Reversing the power plug will result in opposite- and proper-operation of the panel light. It will illuminate only with the main switch on. Failure of the light to glow with either position of the power plug indicates an absence of the vital connection between chassis and actual ground (shown as heavy line in Fig. 1). With the power plug properly installed, all station equipment is completely de-energized by operation of the main switch or fuse. Improper installation of the plug is immediately apparent from the appearance of the neon lamp.

In addition to the main power switch, S1, the circuit includes S2 and S3 for control of the filament and plate supplies, respectively. Of course, S2 and S3 may be used to control additional transformers provided these are properly connected in parallel with the primaries of T1 and T2. Ratings shown for fuses F1, F2, and F3 are suited for use with the W8DDF equipment and these values may be varied to suit individual requirements.

Use of this power arrangement could result in increased safety for many low and medium power amateur installations where equipment is not permanently connected to a power source.

— John W. Browning, W8DDF

REMEDY FOR NOISY VOLUME CONTROLS

THE FOLLOWING scheme has been used for several years to advantage, for quieting noisy volume controls, First make up a cleaning solution using a small dab of plain unmedicated Vaseline and a small amount of lighter fluid, naptha, or any noncorrosive solvent that is quite volatile under normal conditions. Dissolve the Vaseline in the solvent in a warm place. Make up a batch of it and keep it in a stoppered bottle.

To cure the noisy volume control, remove the volume control knob, dip a pipe cleaner into the cleaning solution, and apply to the control shaft while turning the shaft back and forth with your fingers. A few applications for about one minute should be enough to return the control to normal again. Remember, if you use an inflammable solvent, keep fire and sparks away from it. If used on a plugged in receiver or other equipment connected to the a.c. line, pull the plug out first. The cleaning solution is both a cleaner and a lubricant and is not messy. It will penetrate small spaces, the solvent will evaporate and the lubricant will remain.

— G. Roger Gladding, W1AGS

PLASTIC STAND-OFF INSULATORS

THE COST of good stand-off insulators has been increasing and their availability declining for
some years, yet the need for a good stand-off continues.

Recently, several hardware manufacturers have unknowingly put on the market some excellent plastic stand-off insulators, having leakage resistances in the neighborhood of 20 megs at 15,000 volts, and a net cost to user of about 25 cents each.

These insulators are sold in dime and hardware stores as door bumpers and have a circular base already drilled and countersunk to take 6-32 flathead mounting screws in the base. There is a center hole that will clear an 8-32 screw when the rubber bumper tip is pulled out.

Unlike ceramic stand-offs, these plastic devices can be sawed, filed, drilled, and threaded with ordinary metal-working tools. Those made of white, cream, and off-white plastic have good insulating properties. Those of colored plastic are not good insulators. The black plastic door bumpers, due apparently to carbon black coloring, are poor insulators even at low voltages.

A manufacturer of these plastic stand-offs is the Macklanburg-Duncan Company, of Oklahoma City, Oklahoma.

— Ronald L. Ives

ONE-HAND KEY MONITONE SWITCH

Users of Monitones (QST, Sept., 1948) know the inconvenience of not being able to zero beat received signals due to muting of the receiver by the monitone.

The accompanying sketch illustrates how this trouble was eliminated by making use of a normally closed microswitch directly attached to the base of the bug or straight key. This switch is then connected in series with the r.f. or power supply of the Monitone.

Fig. 2—Sketch showing the microswitch attachment to a standard "bug."

The transmitter can then be keyed and, with additional digital pressure on the actuator, the Monitone signal is cut off and the receiver operates normally. — A. C. Coggan, VE3BOA

A 2-BAND ANTENNA FOR 7 AND 14 MC.

Having used a ground plane for four years on 7 Mc, with good results, it was decided to try it as a half-wave vertical on 14 Mc. A 5/8-inch diameter copper-tubing coil, L₁, was constructed, consisting of 3 1/4 turns wound on a 3 1/4-inch form, turns spaced 5/8 inch. The coil was mounted just below the vertical element of the ground plane on a stand-off insulator, and was connected by its top end to the base of the vertical and by its bottom end to the radials. RG-8/U coax line was coupled to this coil by a link, L₂, consisting of two turns of lamp cord the same diameter as the copper coil, inserted between the bottom two turns of the tubing and fastened in place. A 100-μf capacitor, C₁, is necessary to tune the coil to resonance in the 14-Mc. band and should be a mica rated at about 6000 volts.

Fig. 3—W6TSX's two-band antenna.

While results on 14 Mc. were quite good, it was inconvenient to have to change antenna connections each time band changing was desired. In an attempt to avoid this, the antenna was tried on 7 Mc. while connected for 14 Mc. The transmitter loaded even better than with the regular ground-plane connections and reports on 7 Mc. seem to indicate that the antenna works just as well as with the original ground-plane connection.¹ No measurements have yet been made as to the s.w.r., but results on both bands have been quite satisfactory.

— Samuel J. Henderson, W6TSX

LONGER LIFE FOR THE 6146 BEAM POWER TUBE

Due to the popularity of the 6146 beam power tube among hams, here are a few do's which should help you to increase considerably the life of this type.

1) Hold heater voltage at 6.3 volts — at the tube terminals.

2) Provide for adequate ventilation around tube to prevent tube and circuit damage caused by overheating.

3) Keep shiny shielding surfaces away from tube to prevent heat reflection back into tube.

4) Design circuits around tube to use lowest

¹ Probably because the inductive reactance of the LC circuit at 7 Mc. just about equals the capacitive reactance of the vertical element at that frequency — a principle commonly used in trap antennas. — Ed.
possible value of resistance in grid circuit and screen circuit.

5) In high frequency service, operate tube under load conditions such that maximum rated plate current flows at the plate voltage which will give maximum rated input.

6) Have overload protection in plate and screen circuits to protect tube in the event of driver failure.

7) See that plate shows no color when operated at full ratings (CCS or ICAS conditions).

8) Reduce B+ or insert additional screen resistance when tuning under no-load conditions to prevent exceeding grid No. 2 input rating.

9) Maintain tuning and loading adjustments precisely so that tube will not be subjected to excessive overload. The 6146 is a high-gain, high-perveance tube and can be more easily overloaded through circuit misadjustments than older types not having such features.

10) Use adequate grid drive, keeping within maximum grid current and screen dissipation ratings of tube. Too little grid drive can cause high plate dissipation.

11) Make connections to plate with flexible lead to prevent strain on cap seal.

12) Operate 6146 within ratings as recommended by the manufacturer.

— RCA Ham Tips

A NOVEL FEED-THROUGH INSULATOR

An inexpensive feed-through insulator can be quickly made by using parts from the junk box. A polystyrene rod or the center portion of a piece of coax is drilled and tapped to take a 6-32 threaded rod. A rubber grommet of the proper size is placed over the rod as shown in Fig. 4.

The threaded rod may be a 6-32 machine screw with its head removed.

— J. R. Pivinchuy, KN3EOV

V.H.F. CRYSTAL OSCILLATOR

Diagrammed on this page is a circuit that gives 2-meter output directly from 8-Mc. crystals. The circuit is actually two oscillators in one; $L_2C_1$ forms a tank for a conventional ultradion 144-Mc. oscillator, and the tuned circuit $L_2C_2$ in conjunction with the crystal forms a tuned-plate crystal oscillator. The purpose of $L_2$ is to add some third harmonic voltage to the grid, thereby giving a more optimum waveform. With the circuit adjusted properly, the 144-Mc. oscillations are synchronized or "locked in" with the 8-Mc. oscillator, and hence give 144-Mc. crystal controlled output.

The circuit is not much harder to adjust than an overtone crystal oscillator. First grid-dip $L_2C_1$ to 144 Mc., $L_2$ to 23.1 Mc., and $L_3C_2$ to 8.7 Mc. These frequencies are about right for an 8-Mc. crystal: if some other crystal is used, they must, of course, be changed proportionately. Next, apply plate voltage and tune in the 18th harmonic of the 8-Mc. crystal on a two-meter receiver. Tune $C_1$ for maximum S-meter reading (being careful to avoid receiver overloading). It should be possible to find settings of $L_2$ and $L_3$ that will permit a very sharp but smooth peak in the tuning of $C_1$ without slop or heterodynes on either side of resonance. This will not coincide with the settings of $L_2$ and $L_3$ that give maximum output. The output is insufficient to drive a Class C amplifier directly but is adequate for local oscillator use. This circuit was described by Alwin Hahnel in the January 1953 QST for

IMPROVED R.F. SAMPLER

Here is an idea that should be of interest to hams who have oscilloscopes and are puzzled about a convenient way to sample the r.f. output of their transmitters for checking modulation or keying characteristics.

The Handbook indicates that the r.f. sample may be secured by a pickup coil in the field of the amplifier tank. This is not the most convenient setup, especially for those who have com-
pletely shielded transmitters with coax output.

It has been found that five turns of No. 3014 B & W Miniductor can be placed in series with the coax transmission line without materially changing impedance characteristics. Around the Miniductor is a 5-turn link made from the end of a length of small coax. The coil and link are in a $4 \times 2\frac{1}{2} \times 2\frac{1}{4}$-inch Mini-box with coax fittings. The link coax leaves the box via a grommet.

Shown in Fig. 6 is the resonant circuit, a multiband tank circuit in a separate Mini-box. Each of the two tank coils is associated with a 4-turn link. The vertical plates of the scope are connected to the multiband tank. The scope is not grounded.

 Adequate display heights are secured at resonance with power as low as 50 watts and for higher power the tank capacitor can be detuned as necessary.

The Mini-box that houses the tank circuit also houses the potentiometer, resistors and capacitor associated with the usual circuit for securing a trapezoid modulation pattern. Thus the setup is convenient for observing modulation patterns and keying characteristics at any time.

Incidentally, connection of r.f. directly to the vertical plates is not recommended for some of the low-priced kit scopes. With these scopes, feed the plates through .005 ceramic capacitors, and connect the plates to the scope circuit through 1-megohm resistors. This can be done at the rear of the scope with a mounted icicle strip, two binding posts and two jumpers.

— Cecil W. Gogatt, K3ABN

**INEXPENSIVE SCREEN-GRID MODULATOR**

Here is a simple method of screen-grid modulation. It makes use of a low-power audio amplifier with a low output impedance. A radio, TV or phone amplifier may be used for the modulator. The audio amplifier used here at K2MYC is a phone amplifier capable of two and a half watts maximum output of audio, more than ample to modulate a pair of 807s.

The only change necessary in the audio amplifier is to disconnect the two wires coming from the audio output transformer to the speaker. The audio output transformer $T_1$, Fig. 7, was salvaged from a junked radio. The screen-grid voltage should be obtained from a fixed voltage supply with a voltage divider, $R_1$. Tune the transmitter for maximum output on c.w. using heavy loading; then reduce grid drive until a slight increase in plate current is observed. Note the plate current, then reduce the screen-grid voltage until the plate current is one half the original value. Connect the microphone to the audio amplifier input, then advance the volume control on the amplifier until small upward kicks of plate current are observed on voice peaks. The transmitter is now modulated.

— Frank Seier, K2MYC

**A COAXIAL STRAIGHT ADAPTER**

The connection of two or more lengths of RG-8/U (50-ohm) coax requires the use of a PL-275 straight adapter, which is often hard to procure. On the other hand, chassis-type receptacles, 80-239, are plentiful on chassis of surplus equipment.

A very practical straight adapter can be made by removing the flanges from two chassis receptacles, either in a lathe or by means of a hacksaw, and filing flush with the diameter of the connector. The normal protruding connections are then soldered together as shown in Fig. 8, keeping both pieces on center line as much as possible. Next, wrap a piece of sheet metal completely around and over the gap, overlapping the start of the sheet slightly. This continues the shielded portion. Finally, solder along all the edges.

— W. W. Peterka, W8XNB

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**Fig. 6**—Multiband circuit used with an oscilloscope to observe r.f. wave forms.

C1—Midget dual variable capacitor 140-μuf.-per-section.

$L_1, L_2$—4 turns each wound in series over $L_2, L_3$.

$L_4$—22 turns No. 18 enam., 1-inch diam., close-wound.

$L_5$—8 turns No. 18 enam., 1-inch diam., 1 inch long.

**Fig. 7**—Diagram of the screen-grid modulator. $T_1$ is a small audio output transformer, pri. 4000-10,000 ohms, sec. 4-8 ohms.

**Fig. 8**—W8XHB's coaxial straight adapter.

To facilitate soldering, the sheet can be held snugly against the connectors by winding a couple of turns of wire around the outside. The wire can be removed after the solder freezes.
The publishers of QST assume no responsibility for statements made herein by correspondents.

SUPERPOWER
70734 Cameron Avenue
Dallas 23, Texas

Editor, QST:
I hope that your editorial in the September issue of QST will inspire other amateurs, who may have a tendency to turn the leading control over a little too far, to try to work some DX QRP for a while. If a novice can work over one hundred countries with only 75 watts and crystal control, a general should be able to do it with one kw.

In the first place, running over one kw. isn't worth the risk and expense because very little power gain is realized by only doubling or tripling the power input. An increase of more than five or six times practicably impossible and the cost is far too great for the small amount of signal gain achieved.

The man running over a kw. has an extremely small advantage over the man running one kw. and when he is found out he has absolutely nothing to show for his misguided.

— Bob Clum, K5GTP
3420 Timlerlake Rd. SW
Knoxville, Tennessee

Editor, QST:
 Hats off to the FCC on their Washington's Birthday Coup d' California kw. The scourge, of course, not confined to its nameless locality, and like traffic violators on the highway, probably only a small portion of the guilty were caught. But the effect should be for the good.

— Herrick B. Brown, W4ZZ
245 So. 0 Malby Avenue
Ana, California

Editor, QST:
I would like to shake the hand of everyone at Headquarters for that editorial. I don't believe you have written for that editorial. I don't believe you have written

— John B. Stratton, K2QOC
708 Brown Street
Branson, Missouri

Editor, QST:
In reference to "It Seems to Us," QST, Sept., 1958, the last sentence is a masterpiece in summarizing the superpower situation "We must return to complete self-regulation.

— J. W. Wilhite, K01IC
Box 971
Harlowton, Montana

Editor, QST:
Orchids to the FCC for clamping down on the "California Kilowatts." Orchids to the amateurs who continue to flout the law. Orchids to QST for the editorial, "Superpower," which is in the September issue. Orchids to the amateur fraternity if we do not continue the crusade to clean up our own ranks and make our hobby "legal." The chap with the 6kA will get quite a lift of his morale if he knows he is competing on a more nearly equitable basis and does not have to buy his QSO's.

— Vernon Phillips, W7NPY
8128 Belford Avenue
Los Angeles 45, California

Editor, QST:
Heartiest congratulations on your extremely well expressed editorial on "Superpower." The activity of the FCC with wholehearted support from the League has done much to restore the faith of the vast majority of hams who have seen members of their own ranks brazenly establish their own warped codes of fair play and conduct to the detriment of all who have the privilege of participating in this hobby. May you continue to give future violators the same degree of merited selections.

— John Powers, W6QVZ
37 Longmeadow Avenue
Worcester 6, Massachusetts

Editor, QST:
This is my first letter to QST after 23 years as a ham. I have a complaint to make to ARRL and to the FCC (these 'em): Why is heaven's name did you or FCC wait until 1958 before cracking down on the violators?

— Walt Starek, W7KDW
570 Philadelphia Street
Indiana, Pennsylvania

Editor, QST:
I notice with interest the editorial in September 1958 QST titled, "Superpower." It seems to me that it is about time the FCC is cracking down on some of the DX men, to his no regard for the regulations that apply to the power limitation we are supposed to observe. Under the present state of development in electronic engineering, it seems that even 1000 watts is more than needed. But so long as there is a power limitation of 1000-watts it becomes necessary to use that amount of power in order to compete for wanted QSOs. Those who use more than the legal limit want to be on top of the pile when a rare one comes along, but who are they kidding?

— Art Lewis, W7KIC

DX QSOs

Editor, QST:
In view of the letters appearing on page 76 of September QST and, especially Mr. Jimenez-Benvenutti's letter, which I have no doubt refers to Yaesu DX Expedition, and which creates an impression quite contrary to fact, I request that the following be published to set forth the facts regarding this expedition, with which I am closely connected, and which may serve to clear up any misunderstandings.

As most DX men know, the original Yaesu trip, as far as ham radio is concerned, was conceived in 1955 when Danny visited K4A-land. Subsequent contributions by hams and radio manufacturers enabled Danny to get on the air, suitably equipped, and operate from such rare spots as FO8AN, VR1B, VR9TW (Nauru), VR4AA and VR9TW (Papua). This phase of the expedition came to a close when Yaesu struck an uncharted reef in the Papuan Gulf on October 24, 1956, and was a total loss. Since that time, through lecture tours, further contributions and donation of complete ham gear by a prominent radio manufacturer, Danny was able to purchase and equip Yaesu II and continue his DX Expedition as borne out by his recent activity as VR9AB, VP2YB, and VP3KF. This is a radio expedition sponsored and maintained by DX men. Danny has no source of revenue. It would be impossible for this expedition to continue on its present level without contributions. Danny's original plan was to work his watchmaker's trade at each stop and thereby earn enough to carry him on to his next port. It is obvious that such procedure would leave him little time to get on the air and many sparingly populated rare islands would have to be bypassed.

Danny is dedicated to the hard, and many times hazardous, task of putting as many rare spots on the air as he possibly can. This is his No. 1 chore and he generally accepted that he is doing a tremendous job. Circumnavigating the globe, his original intention, is now just a
As to the charges of a racket and ham-radio-for-profit, the only racket involved is the noise made by a few dissenters, and by those who, for reasons of their own, choose deliberately to misinterpret the facts. And the only profit that resulted from the DX fraternity in being able to add more new ones to the confirmed list!

On the profit side is the satisfaction one feels in having been able to share, even in a small way, in a job well done to the benefit of many others of like interest.

— Lee Roy Scott, W8PGB

Editor, QST:

Several letters appeared in the September issue of QST and they contained a variety of statements that certainly need some discussion. Mr. A. D. Lester's letter comments on the situation that DX men do not want DX QSLs. I, for one, have nothing but admiration for the enterprise and the spirit in which the expedition was planned and in which it is being conducted. Acceptance and participation should be made with the same spirit in which the expedition was planned and in which it is being continued — that of sharing in the advancement of a common interest for DX men only. We have all willingly contributed to Danny's expedition. We as DX groups are responsible, and will continue to keep Danny going as long as he will so graciously risk his life and property to give us DX men a new country. For this DX expedition is to be commended and not ridiculed by other than DX men.

— Dewey M. Beraldo, W6VE

WE, AGAIN

Route 4, Box 285
Texarkana, Arkansas

Editor, QST:

Again regarding the fairly common practice of using the

(Continued on page 179)
CONDUCTED BY ELEANOR WILSON,* W1QON

YLRL NINETEENTH ANNIVERSARY PARTY

As always the YLRL extends a cordial invitation to all YLs the world over to participate in the annual Anniversary Party. It is not necessary to be a member of YLRL in order to enter the contest; however, only YLRL members are eligible for the cup awards. Non-members will receive certificates. Only YLRL-affiliated clubs will be eligible for the club award.

In nineteen years of YLRL contesting a new participation record has been made each year, and it is expected that the results of this year's contest will again surpass those of last year's affair. So, be sure to be in on the excitement and fun. Set aside November 12 and 13 for the phone contest and November 19 and 20 for the c.w. section.

It is suggested that OMs kindly refrain from breaking for QSOs with YLs who are operating in the contest. OM enthusiasm for contacts with YLs is flattering and appreciated, but frequent interruptions for reports for a QSL exchange slow down a YL's progress in the contest. All OMs will be invited to participate in the annual YL-OM Contest in early Spring, at which time they should have an opportunity to contact hundreds of YLs who will be most eager to work them too.

Here are the Party rules:

Eligibility: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members are eligible for the cup awards. Non-members will receive certificates. Only YLRL-affiliated clubs will be eligible for the club award. Contracts with OMs will not count. (The YL-OM contest will be held in the spring of 1959).

Operation: All bands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

Contest Period

PHONE —
Starts: Wednesday, Nov. 12, 1958, 12 noon EST
Ends: Thursday, Nov. 13, 1958, 12 noon EST

C.W. —
Starts: Wednesday, Nov. 19, 1958, 12 noon EST
Ends: Thursday, Nov. 20, 1958, 12 noon EST

Procedure: Call "CQ-YL"

Exchange: QSO number, RS or RST report, name of State, U.S. possession, VE district or country. California stations will include the name of their section in the QSO. California is divided into eight sections as follows: Santa Clara Valley, East Bay, San Francisco, Sacramento Valley, San Joaquin Valley, Los Angeles, San Diego, and Santa Barbara.

Scoring: (a) Phone and c.w. sections will be scored as separate contests. (b) Multiply number of contacts by the number of different states, sections, U.S. possessions, VE districts and countries worked (Maryland and the District of Columbia count as one state). (c) Contestants running 150 watts input or less at all times may multiply the result of (b) by 1.25 (low power multiplier).

Logs: Copies of all logs showing claimed score must be postmarked not later than November 30, 1958, or they will be disqualified. Send logs directly to YLRL Vice President, Kay Anderson, W4BLR, 5210 Raleigh Rd., Richmond 23, Virginia.

Awards: Highest phone score — gold cup. Highest c.w. score — gold cup. Highest phone and c.w. scores in each district, U.S. Possession, VE district, and country will receive a certificate. A silver cup will be awarded to the club submitting the highest average score. The club secretary should total the scores of all members participating and arrive at an average by dividing this total by the number of members participating. Send this list with average score claimed to the Vice President of YLRL for confirmation. A certificate will be given to the highest scoring novice YL in the c.w. section.

Extra Class License

Early in September Sandra Burke, W1IAC, passed her amateur extra-class exam and thus became about the sixth YL to hold this class of license. Sandy, who attends the University of Maine, has a first-class radiotelephone license too.
YLRL ELECTION RESULTS

The new officers of the Young Ladies Radio League who will serve for a one year term, commencing January 1, 1959, are as follows:

President — Katherine Andersen, W1BLR
Richmond, Virginia

Vice President — Gladys Eastman, W6DXI
Glendale, California

Secretary — Connie Hauck, K6EXQ
Pomona, California

Treasurer — Evelyn Tibbits, W9YWH
Western Springs, Illinois

Publicity Chairman — Mary Meyer, W9RUJ
Brookfield, Wisconsin

Editor — Wanda Gluck, K6ENK
Fair Oaks, California

District Chairmen: Onie Woodward, W1ZEN, Marlboro, Mass.; Lillian Byrne, K2JYZ, Freeport, L. I., N. Y.; Carolyn Curren, W9TTC, Norristown, Pa.; Sue Cable, K4KKT, Asheville, N. C.; Betty Vredenburg, K5AMD, Tyler, Texas; Mary Poe, W6MWH, San Diego, Calif.; Bessie Joas, W7DIC, Veneta, Oregon; Esther Stuewe, W8ATB, Flat, Ill.; Lois Zehr, W9UXL, Flanagan, Ill.; Elo Kumukahi, KH6BGE, Hilo, Hawaii; Sheila Goodhue, KL7BIE, Anchorage, Alaska; Maude Phillips, VE6MP, Calgary, Alberta.

Congratulations and good luck to the new officers. YLRL members issue a vote of thanks for a job well done by out-going officers President Beth Taylor, W7NJS; Vice President Kay Anderson, W1BLR; Secretary Betty Rogers, W9TYB; and Treasurer Harryetto Barker, W6QGX. Mary Meyer, W9RUJ, will serve another term as Publicity Chairman. Betty Sandberg, W8STR, served for a short time as Harmonies editor in 1958, before her duties were assumed by Wanda Gluck, K6ENK.

Custodians of the various awards offered by the YLRL are appointed and serve an indefinite term. President custodians are as follows: YL Century Certificate — Katherine Johnson, W4SGD; YL Worked All States — Grace Ryden, W9GME; YL Worked All Continents — Barbara Houston, K6LYV; DX-YL Award — Kay Anderson, W1BLR.

Evelyn Tibbits, W9YWH, will oversee finances as club treasurer. Licensed in 1953, Evelyn is active in the Chicago LARK and is Treasurer of the Chicago Area RC Council. She and her OM, W9YRR, reside in Western Springs, Ill.

Serving a second term as publicity chairman, Mary Meyer, W9RUJ, urges members to send photos and clippings for the club scrapbook. Mary is EC for Waukesha County and RO for Brookfield, Wisconsin.

November 1958
Miscellany:

After undergoing treatment for polio for almost a year in an Oklahoma hospital, Bina, PY4-APA, has recovered sufficiently to return home to Brazil. From their home QTH, Rua Plumigrina, 579, Belo Horizonte, Minas, Brazil, Bina and her sisters Ziza, PY4-UL, and Eunice, PY4-AUL, hope to contact some of the many W friends they made while in the States (see photo in February, 1958 column).

... W5CCK, Ila, and W5GQY. Sue, organized the licensed YL activities for the West Gulf Convention in Oklahoma City. Thirty-seven YLs attended the special breakfast and YLRL Forum. Doris, K5BNQ, moderated the forum. Allan, W5EGD, was in charge of the Monitor booth at the same convention. Dedicated to W3 YLs, the booth reportedly attracted more interest than any other convention booth.

W500K, lia, and W5QT, Sue, organized the licensed YL activities for the West Chilf Convention in Oklahoma City. Thirty-seven YLs attended the special breakfast and YLRL Forum. Doris, K5BNQ, moderated the forum. Allian, W5EGD, was in charge of the Monitor booth at the same convention. Dedicated to W3 YLs, the booth reportedly attracted more interest than any other convention booth.

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It was more than 20 years ago that your conductor first ventured into the region above 200 Mc. We put an acorn-tube superregen together to listen for the late Ross Hull, who was then making tests on 224 Mc. from Selden Hill. Much to our surprise, we heard Ross on the first try, which seemed incredible in view of the 25 miles or so intervening. We had no transmitting tubes in stock at W1HDQ that would work on such a frequency, so receiver and antenna experiments were the extent of our project for the time being.

A few years later we got a highly unstable oscillator working in the general vicinity of 224 Mc., and a lot of fun fooling with beam antennas, and working v.h.f. pioneer W1AAY, some 50 miles distant, but close to line-of-sight.

After the initial rush to get back into full-fledged operation on 50 and 144 Mc. following World War II, we once again turned some of our attention to the 220-Mc. band. This time we went to crystal control, and soon after came narrow-band techniques to 220-Mc. communication. By 1950 we had a substantial number of 220-Mc. stations around the country, and our v.h.f. contests saw extensive use of this band to take advantage of the multipliers it offered in contest work.

There was one common denominator throughout the 20 years of work in the 220-Mc. region up to about 1956: everyone had some expensive equipment involved. "look-for-me-on-220-Mc." arrangements on a lower frequency. Now and then, particularly during contests, you could find activity and catch a contact or two without prior arrangements on 50 or 144 Mc., but such 220-Mc. QSOs were the exception, rather than the rule. Everyone recognized that you could do nearly everything on 220 that could be done on 144, but that was not enough incentive to make for much regular activity on the higher band.

The Technician Class license, made available in the early '50s, was supposed to change all that. Being usable only on 200 Mc. and higher, it was expected to bring to our higher bands a large reservoir of trained electronics technicians and engineers who would populate this largely vacant world above 220 Mc. It never worked out that way. The "Technician" turned out by the new regulations was a fellow who was slow in learning the code. He had an amateur license which was good for five years in which to increase his code speed, but it amounted to little else, as far as most holders of the ticket were concerned.

Then in April, 1955, the Technician Class ticket was made usable on 50 Mc., at ARRL's request. Things began to happen on 50 almost at once. The Technician Class license, made available late in 1956, brought a substantial number of 50-Mc. amateurs worldwide. It never worked out that way. The "Technician" turned out to be a fellow who was slow in learning the code. He had an amateur license which was good for five years in which to increase his code speed, but it amounted to little else, as far as most holders of the ticket were concerned.

*V.H.F. Editor, QST.
once, and the population of the 50-Mc. band has been growing ever since. The "Technician" became a 6-meter operator, and an active ham. Being exposed to the pleasures of active hamming, he soon began to look for ways to expand his field of operations. Unless he chose to try for a higher class of license and go on lower amateur frequencies, the only way he could go was up. So he went up.

The 220-Mc. band has been the main beneficiary of the movement upward in frequency by Technician Class licensees. At W1IIDQ we got back into the 220-Mc. business early in September, for the first operating on that band in several years. A 66-element array (soon to be in QST) was erected, a new exciter built, and the W1VLF amplifier, of February, 1957, QST, pressed into service. One Sunday morning we got these items of equipment working, and spent a few minutes checking up on how things were going. Then we looked around the 220-Mc. band. Surprise — several stations calling W1 IIDQ!

It was two hours before we could leave the air, and by then we'd worked 8 stations in New York, New Jersey and Pennsylvania, all more than 100 miles away. In the September V.H.F. Party the next week end we worked 20 stations in 12 ARRL Sections, all without a single "look-for-me-on-220" arrangement. With more operating time we could have caught quite a few others.

These were not all Technicians, by any means. Several were friends of long standing from lower bands. But the fact that there were Technicians on there, spending all or a good part of their time promoting 220-Mc. activity helps to make working on 220 more fun for all of us.

We've heard many Technicians arguing that they should be given operating privileges on 144 Mc. or possibly on lower bands. Here is one amateur who feels that the original aims and purposes of the Technician Class license are just beginning to be served. There is some fine work being done by true technicians (and engineers, too) on 220, 420 and higher bands, as well as on 50 Mc. We congratulate the holders of this class of license who have had the fortitude to make the ticket mean something, and we commend their example to others who may be looking for new worlds to conquer. 220 is going places, 420, 1215, and all the higher bands, are showing improvement. The Technician has a place in this picture, and he can do a service to all of amateur radio by moving into it, with both feet, without delay.

**Here and There on the V.H.F. Bands**

In July QST we reported reception of ZFD by W5BBT, and asked for information as to his whereabouts. Scores of letters and cards have come in telling us that he is in Bermuda. Thanks to you all, including VK8ZCG, our DX on this one. From all we can learn, reception was via a harmonic.

What is the best distance worked by a v.h.f. mobile station, without the aid of skip propagation? Here is the best we've heard of yet. It comes from W5ECL, who says that W3ABR worked W0YPT in Iowa on 50 Mc. from a point on the Indiana Toll Road, not far from the Ohio line. The distance claimed is 275 miles, and it seemed all of that on our map. W3ABR also worked W0TQ in Milwaukee at the same time.

A transsequatorial 50-Mc. opening is reported by W6LFM, San Antonio, Texas. Cal says that from about 2030 to 2000 CST Sept. 11 CESAC, LU1DBF, LU1DDQ, CESQK, CESQC and TGOET were worked from the San Antonio area. The following evening W5LM began hearing weak voice signals at 2100. LU8EX was worked on c.w. and a number of weak phone signals were heard.

Not all the activity on 8 is at 50.1 or lower. K1ADB informs us of the 51.30 Club, consisting of 6-meter men of the Framingham-Wellesley-Sudbury-Westboro (Mass.) area. To encourage more tuning of the band these boys have gotten out a certificate that will be awarded to anyone who works 10 or more of their members while using a frequency of 51 Mc. or higher. They gather on 51.3 Mc. each Tuesday at 2100.

Ever hear some choice DX coming through, and call him at every opportunity only to have evidence that he was utterly unaware of any significant opening and was busily engaged in local or near-local work? This doesn't always happen to Ws. A tear sheet from the Australian equivalent of QST devotes several paragraphs to the sad story of VK4ZRA, one of several Australians who last March heard W6, W0 and W7 stations working one another, without being able to break through the U. S. QRM. We quote him as he closes: "One of the Ws was running only 20 watts, yet he was putting in a good signal, seeking 88 with good copy for quite a long time. It is pounds to peanuts that if he and the other Ws concerned had looked beyond the 80-plus signals from adjacent call areas they'd have had themselves a few VK6s!" Is anyone blushing?

Among the 50-Mc. state-hunters of the East the two most difficult catches currently are Nevada and Idaho. Cards from recent applicants for 50-Mc. WAs have included these two new prospects: K2YEB/7, P. O. Box 1412, Reno, Nev., has a 4X150A, 200 watts and a 4-element array. Tony will be on the job at least through next summer. John Butrovich III, WGGTJ/7, Bell Trailer Court, Poetello, Idaho, uses a Communicator III and 5-element array. Tony will be operating in Poetello for another year or two, and he is expecting help on the 6-meter front from K7EKL. Of course, the old standby in Idaho is W7ACD. but Louie is only a summer resident now.

In September QST we discussed the future of wideband f.m. and mentioned that this type of signal could be copied.

Northern terminal of the 270-mile 1296-Mc. record set during the September V.H.F. Party. Mike Krivohlavek, K6AXN, is shown operating from Mt. Diablo, 3849-foot elevation east of Oakland, Cal. Southern end was W6MMU/E atop Mt. Pinos. The 2C39 tripler and amplifier stages of the crystal-controlled transmitter of K6AXN/E are shown at the left. Communication was maintained on c.w. from 8 to 10 A.M. Sept. 21.
only on a receiver designed for the purpose. KBQGN points out that we ignored the Communicators in this. Actually, the passband of the Communicator, either the 50- or 144-Mc. model, is quite wide and can be tuned in, but the frequency markers are too close for the aforementioned method to be used. The 50-Mc. Comet may be on the sharp side, and the 144-Mc. model is a little broad, but you can read the stuff.

Interest in European v.h.f. circles, and we can expect to see skeds are also kept, at 2220, but so far without result. On the 144-Mc., numerous schedules around the 144-Me. model are produced. The 144-Mc. model is quite popular, it is capable of being received on 144-Mc. and also operates as a 2220 wave. The fed impedance is nearly the same on both bands, and the whip can be fed with 50-ohm coax without serious mismatch.

A report of Sept. 4 will be remembered as the occasion of one of the most widespread auroras on record. This was one of the three rare ones that, viewed from New England, light up the entire canopy of the sky. When such auroras are seen we sit back and wait for reports to come in from the far south.

The most southerly report on the Sept. 4 aurora came from W4GJO, Sarasota, Fla., who heard W4IKK with a strong aurora burst at 2007 EST. This 50-Mc. reception was Grid's first aurora experience in Florida.

We don't have anything from that far south on 144-Mc., but W4LTLU, Springfield, Va., turned up in a list of news items, including W4VSN, Oak Ridge, Tenn., W5RTI, WITUW, Knoxville, Tenn., W4FUV, Atlanta, W5PG, Holy Springs, Md., W6BR, Elizabeth, Ky., W5GJL, Langhala, Ala., and W5JWL, Gurdin, Ark., a good job of covering the South on 144 Mc. Walt's QSO with W4FUV gave him all states west of the Mississippi. Signals heard at W4FUV were the faintest of southern origin; K9BGN, of Cedar Rapids, was heard briefly, but not worked. The visible aurora extended to overseas, even in Virginia.

More northerly stations worked east and west over unusual distances. W8SAJJ, Indianapolis, Ind., worked W4ZK. Fairfield, Conn., W2LLB, Middletown, R.I., The W8SLL-WIREZ QSO took place at 1600 EST, and aurora work was reported by others as early as 1400 EST.

An interesting report on this one comes from SM8HT, Goteborg, Sweden. He heard the buzz on TV Dinner at about 1700 GMT (1200 EST). Soon there were aurora-propagated TV signals in the 50-Mc. band. At 2000 GMT signals began to come in on 144 Mc. From Stockholm, 250 miles to the northeast. At 1947 SM8HT worked SP6PD, and soon the band was filled with signals from Norway, Denmark, Poland, Germany and Britain. There were still some signals coming through at 0248 on the 5th, which is 0945 local time in Goteborg. It is worthy of note that these European observations cover a considerable portion of the American opening in time, raising the intriguing possibility of auroral work across the Atlantic. Nothing like transatlantic distances have ever been worked in America via the aurora, but it would not rule out the possibility.

This same SM8HT was responsible for the first meteor-seatter observations by amateurs outside North America. Ten made schedules with PBAE, G8HBW, HBRQG and G8LP, New England, but signals were heard by, and from G8HBW and HBRQG. This created considerable interest in European v.h.f. circles, and we can expect to see more meteor-seatter activity coming up on future showers.

What is probably the first Colorado — New Mexico 144-Me. QSO between fixed stations was made Aug. 31 by W9IC, Denver, and W9WWU, Albuquerque. Signals were relatively weak, and of the scatter type, indicating that this may be a consistent scatter path. Contacts were made at once, and W9IC, the first-day, said that the report was made on the 460-Kc. band at 1750 the following day. The path is about 350 miles, over relatively weak, and of the scatter type, indicating that this may be a consistent scatter path. Contacts were made at once, and W9IC, the first-day, said that the report was made on the 460-Kc. band at 1750 the following day. The path is about 350 miles, over the South on 144 Mc. W4JMO with W9IC was made Aug. 31 by W9IC, Denver, and W9WWU, Albuquerque. Signals were relatively weak, and of the scatter type, indicating that this may be a consistent scatter path. Contacts were made at once, and W9IC, the first-day, said that the report was made on the 460-Kc. band at 1750 the following day.

After many tries by all kinds of propagation, W4LNG, Atlanta, Ga., and W9WOK, Barrington, Ill., finally made 144-Me. contact by tropospheric propagation. This contact was made Sept. 23 on a regular morning sked that had been running for some time, beginning at 0900 EST. evening skeds are also kept, at 2220, but so far without result. W4LNG, Atlanta, Ga., is about 55 miles from W9WOK, Barrington, Ill., but he has not been worked. W4FUV was alerted by W4LNG, and he also worked W9WOK. These 620-mile QSOs gave W9WOK his 40th state, and a tie with W9KLR at 49 states worked by dr: RF 144-Mc. Yes.

V.h.f. men who have inferior locations should be interested in the experience of K1ABR, Crawson, R.I. Dick has an unobstructed view to the north, but to southwest, where most of the 2-meter DX lies, a ridge rises to 135 feet above his antenna, less than a quarter mile away. He doesn't always hear everything that the more fortunately situated fellows do, but the country beyond the ridge is far from a total loss. With only 55 watts and a 6-element beam, K1ABR has worked 16 states, 12 of them via tropospheric propagation and 4 by aurora. His best DX is W4VVE, Harrisburg, Va. Frequent use of e.w. has paid off in building up this record from what many would regard as a useless v.h.f. site.

Using the 417A at 144 Mc. — Excerpts from an OES Report by W4LNG, Atlanta, Ga.

Grounded-Grid Operation — The 417A /5842 was designed primarily for grounded-grid operation in the i.f. amplifiers of microwave receivers. It has four grid pins to reduce grid-to-grid coupling.
lead inductance. These are Pins 4, 5, 7 and 8, practically surrounding the cathode, Pin 6, and providing good isolation between the input (cathode) and output (plate) circuits. However, when a shield is placed across the grid pins the heater pins (3 and 9) lie in the same compartment as the plate circuit. It is essential that the heater be at ground potential for r.f., or else somehow shielded from the plate circuit. My present 144-Mc. converter has Pin 9 grounded, and Pin 3 is choked off. The heater choke is oriented for low coupling to the plate coil.

Cascade Considerations — A principal feature of the cascode circuit is the high-conductance load presented to the first stage by the second stage input. This makes the first stage stable without neutralization, though the noise figure is improved when neutralization is added. When two 417As are used in a cascode circuit it becomes difficult to achieve proper coupling between the two stages, and some of the advantage of the cascode is lost. This is mainly because capacitances of 150 μf, and higher have self-resonant frequencies lower than 144 Mc, and therefore appear to be inductive in coupling circuits. The higher in value and the longer the leads, the more they transform the interstage impedances away from a match.

I use two 470-μf. button mica capacitors soldered to a copper plate bent into a shallow "L," bringing the leads closer to the desired tube pins. The only lead that amounts to anything is the short wire running through the shield to the plate pin of the input tube. The rest of the layout follows the W2AZL plan closely. The neutralizing coil lead goes from the copper "L" through a hole in the input shield. The coil is in the input compartment, but the plate end is shielded from the input grid coil by a baffle plate.

Protection from Transmitter R.F. — The very fine wire and close grid-cathode spacing of the 417A characteristic of high-Gm triodes, make the tube very susceptible to damage from transmitter r.f. A grid leak and blocking capacitor are recommended for the first stage. A shorting type antenna relay is important, and plate voltage should be removed from the r.f. amplifier during transmitting periods.

220 Mc. and Up

A much-used site for providing Nevada contacts to Southern California v.h.f. men has been Mt. Potosi, a high point in the Spring Mountains about 20 miles southwest of Las Vegas. Though it is more than 200 miles over many mountains from the summit of Mt. Potosi to the Los Angeles area, the spot has served well for 144-Mc. work in the past. Your conductor spent the better part of a day in 1956 trying to find the road up Mt. Potosi, without success. Its first known use for 220 Mc. was an Aug. 23 expedition by W6WRE/7.

Setting up near the microwave relay station at 1600 PST (see photo) John worked K6s CRX, VLM, GVE, GXT, AIBL, VRE, IIIA, and W6s NLZ and MINU, all more than 200 miles distant. Signals were strong and steady, as is usually the case with paths involving knife-edge refraction or reflections from mountain peaks.

The record for 1215 Mc. has been extended again, this time to 270 miles. W6MMU, who made the long trek to Mt. Hamilton for the 225-mile record reported in September QST, operated from Mt. Pines for the September V.I.F. Party attempt. K6AXN set up on Mt. Diablo, 270 miles to the northwest. Both used crystal-controlled transmitters and receivers. More details next month.

Not all the work on the 1215-Mc. band is done with mountain-top portable stations. W6JR, La Crescenta, Cal., reports crossband and 2-way contacts with W6BLK in San Diego, with the latter on 145 Mc. The first contact was made Sept. 2 at 2050 PST, at which time the 1297-Mc. signal was in for only 10 minutes, peaking 55. At 1930 Sept. 3 another crossband contact was made. Again the signal was about 85 until the boys discovered that they were working cross-polarized. When W6BLK rotated his antenna horizontally the signal went up to 80-plus. There was some fading, but communication was solid over the 130-mile path.

W6JR uses his 829B 2-meter rig to drive a 4X150A tripler to 432 Mc. This in turn pushes a 2SC30A tripler to 1297 Mc., similar to one described by W6DLQ in July, 1956. QST. The antenna is a dipole and reflector, mounted in a 25-inch dish. The feed line is foam-filled 300-ohm lead, which appears to have considerably lower loss at this frequency than other lines tried.

Other stations active in the Los Angeles area include W6s NTW ZW MINU and DQQ. The Los Angeles — San Diego circuit was made two-way on Sept. 12 at 2005, when W6BLK first got his 1296-Mc. rig working. W6DLQ, Riviera, also worked W6BLK two-way, though with not as good signals as prevailed on the W6JR—W6BLK circuit. The 1950-foot elevation of W6JR is some help here.

The tropospheric propagation of Sept. 24 gave W1UJHE, N. Tiverton, R. L., an opportunity to extend the American record for 420-Mc. DX. At 1825 EST, W1UJR was in contact with W4VVE, Hampton, Va., on 144 Mc. W4VVE was looking for 420-Mc. contacts, so Andy called W1UJHE by telephone, Norm made contact with Olie at 1832, but the signals faded out after about 15 minutes. A second contact was made at 1905, with signals reaching 86 peaks at 1929. The power output at both W1UJHE and W4VVE runs around 10 watts. W1UJHE worked W3VTR, Willow Grove, Pa., the same night, with signals peaking 85 over the 220-mile path. The distance to W4VVE is 430 miles, well beyond the previous best work on 432 Mc. in this country, but not

(Continued on page 174)

First Nevada contacts with Southern California on 220 Mc. were made by W6WRE/7 atop Mt. Potosi, near Las Vegas, Nev. Parked alongside the microwave relay station, W6WRE fastened his beam to a signpost. Many stations in the Los Angeles area, up to 225 miles distant, were worked on 220 Mc.
Field Organization Report. In the last year, following QST calls for SCM nomination, SCM elections were completed in 39 of the 73 sections; there were 28 new SCMs named and 11 re-elected for another two-year term of office. The percent return of ballots in SCM elections ran between 34.1 and 70 per cent. In the year 1957 the number of official-station appointments increased to 4017 the total including 767 ARRL Official Observers in this number. Our average ARRL section membership is now 881 Full Members with about 80 SCM-appointive posts held. There must be regular operational activity along designated lines to earn an annual SCM-endorsement to keep SCM-appointments in effect.

Reporting on Your Section Net. One of the beautiful things about reporting on a net is not only that through most accredited Section Nets you have contact with most points throughout the whole nation via the National Traffic System, but that you have become a part of organized doings in amateur radio.

Judging from requests for ARRL Net Directories, joining a net or putting a message in it to assure reliable routing to destination is highly popular these days. However it was something of a surprise to hear some say at the local club meeting "I don't know when it meets" or "I haven't the time." Our directory gives you full information on frequency and time. For the ability to work stations, belong to a fraternal group. To associate with really skilled communicators, it's hard to beat belonging to a net of one's choice. Some amateurs find time to be good active members of several nets!

Amateurs with lots of outside activity and family responsibility can still have fun belonging to their local net, if they know the NCS will dismiss them (QNX) within 15 to 20 minutes, or as stipulated when they report, if no traffic is designated for their station.

Our booklet Operating an Amateur Radio Station has some much to-the-point portions concerning network operation and the functioning of the Net Control Station. The best nets aim for ever-higher efficiency in conducting or directing communications to go on between those who have reported in on their net. Nets aim usually to clear their traffic as early as possible. Often 15 to 20 minutes will suffice, if traffic is light, to see it all on its way. The NCS may then declare the net free (QNF) so that members with no formal communications can go about their business and others may ragchew to their heart's content.

New Check-ins. While our booklet lays down the principles of operation for phone and c.w. nets, there will be minor variations in net procedures depending on circumstances, the specific NCS etc. Our best advice to newcomers who plan to share the pleasures of checking into amateur nets is to listen-and-learn before reporting in. Rule 1 when you do report is to check in on time. To follow one or two sessions of any net shown in the Net Directory will permit you to have some idea of the calls and locations of the stations as well as to note whether you will be likely to work solely on the net frequency or perhaps to be expected to go to frequencies specified 5 to 20 kc. in either direction from the net frequency to meet designated stations. If the latter, you may need to check your v.f.o. calibration points in advance rather carefully or give it some special markings.

Be ready ahead of net time. A second rule to follow is to be sure you are right on frequency. We have heard some new reporters who got reported in by some miracle even though their individual frequency was way off. But to be successful and well regarded as a netter learn to zero your frequency to the NCS's frequency. First set your receiver to zero beat instead of some audio tone. Then quickly adjust your v.f.o. (with power off the final) to zero beat with the receiver.

Reports Welcome

A report of what you are doing and how you are getting on will be welcomed by your SCM. You will find his address on page 6 of QST each month. Such reports will put you in line for ORS or OPS when you are ready. Working in the net takes very little of your daily time so you can still pursue DX and casual amateur radio. You then have added to your wealth of amateur friends that you may call on to visit or for cooperation in communications matters. Best of all, if you are a netter you have it made with some real communications knowledge, if you are called upon to explain how amateur communications work or put on the spot in a real emergency where only such experience and your intimate acquaintance with the groups that know the ropes will suffice to do the most commendable job in the public interest. Amateurs who have merely puttered about, belonging to nothing at all are so often the ones that foul up emergency operations by unknowledgeable and inadvisable attempts to do irrational things. Individually it's important that we not miff the main chance when a real communications emergency is presented! Net operation, and appointments are
tops on the list of projects for the individual operator to help prevent such a circumstance.

Whatever your circumstance or station in amateur radio, you have missed an important bet, if you have passed up the opportunities in net operations. A daily net has it all over the once a week variety for fraternalism as well as ability to put messages where they are going and get answers speedily. Each member of a modern net may report only a few times a week, if the NCS has the coverage of several stations to represent major cities; yet all can benefit from the organized amateur effort. Supporting the net helps fashion a true communications instrument in which self-training is combined with a traffic performance capability. Amateurs mostly engage in the activity for fun and fraternalism, but as ARRL organization is maintained, it spells out our Public Service values.

Using Bands and Nets to Best Purpose. From time to time much has been said about using the proper bands for working across town, and for DX work. For every season and place there are optimum choices in band use; knowledge of the distance-time-frequency probabilities is always worthwhile. Because there are at times rapid changes in propagation, an ear glued to the receiver is better than the best "book" information, of course. Live with a band or schedule for a while, and you can often guess what may happen before it does! In earlier years we were not blessed with versatile equipment capable of quick change from band to band; but today almost every amateur can use almost every band at will. Perhaps today we belong as a class to users of the h.f. or the v.h.f. parts of our amateur world. But increasingly we should equip to take best advantage of both our worlds. We want here to make some remarks about the operating properties in DX and Local amateur operations.

Before we talk about individual work, there is something to be said for nets not only as an organized means of routing communications, but as a way for several stations to work efficiently together using just one channel. Both h.f. and v.h.f. nets have their special rewards, and give more certain results than single operators can achieve. The nature of the type of activity engaged in net operations in a remote area in the Angeles National Forest, Los Angeles County, California, an unlicensed radio transmitter which on various occasions during the week of December 24 to 28, 1957, automatically emitted on the frequency 20,005 Mc, signals resembling those of the Russian Satellite "Sputnik," in violation of Section 301 of the Communications Act of 1934, as amended, these actions were taken:

The Commission required that the person operating the station be suspended for a period of one year as well as the period of any proceedings in connection with the suspension orders, that FCC will not receive or consider any application filed by these licensees for any class of amateur radio operator or amateur radio station license; the operator licenses in such cases are returnable to the FCC offices during any period of suspension.

Also noteworthy: (1) Because of the public interest involved, six FCC men got favorable citations for the prompt monitoring action. (2) We are glad that the report in Broadcasting identifies those attempting the hoax as "three electronics engineers...arrested and fined" not mentioning that they were amateurs. (3) But we have to note that though the illegal work was not on an amateur frequency, the penalties were extended to include curtailment of FCC's amateur band authorizations for those involved. (4) We all know that the majority of amateurs are good citizens, generally helpful in reporting and locating irregular radio emissions. It is unfortunate when a few, by improper activities, cause possible reverse implications on the good name of the amateur.

RTTYers Eligible for All but OPS Appointments. The Official Station posts available through SCMs (see addresses page 6 QST) have long been based primarily on the recognition of the type of service activity engaged in consistently by a member amateur. Early in ARRL operating history, the first basic classification established was that of Official Relay Station. "Traffic service" was the raison d'être. The ORS was joined in early 1957 by an OPS post with the hope to get operators using voice to help with the traffic. Service not only for ourselves but for others was provided as well as recognition for the traffic handler. Later objective led to provisions for very definite kinds of new services between

FCC Suspends Three for Activating Unlicensed Station. Recent Public Information Releases of the Federal Communications Commission include penalties for three persons, who incidentally were amateur licensees, and who installed and placed in operation an unlicensed transmitter.

FCC ordered (August 19, 1958) under authority contained in Section 303 (m) (1) (A) of the Communications Act of 1934, as amended, and Section 0.292 (f) of the Commission's Rules, the following actions:

(1) That the General Class Amateur Radio Operator License of Dean L. Hanson (KE7TE) BE SUSPENDED for a period of one year.

(2) That the Technician Class Amateur Radio Operator License of Rulon Dale Jensen (KE7ZT) BE SUSPENDED for a period of one year.

(3) That the Advanced Class Amateur Radio Operator License of Fred W. Field Jr., (K6NHY) BE SUSPENDED for a period of one year.

If appearing that these licenses installed and placed in operation in a remote area in the Angeles National Forest, Los Angeles County, California, an unlicensed radio transmitter which on various occasions during the week of December 24 to 28, 1957, automatically emitted on the frequency 20,005 Mc, signals resembling those of the Russian Satellite "Sputnik," in violation of Section 301 of the Communications Act of 1934, as amended, these actions were taken.

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different groups of amateurs to each other, and corresponding personal recognition. ARRL action was taken setting up (1) the OBS post for Bulletin Service, (2) OOs for necessary Observer work, and (3) the OBS for the experimenter (for v.h.f. propagation reports and systems development). Leadership posts of EC and SEC were set up to provide stand-by emergency amateur radio facilities and a continuing AREC.

Our Departmental Rules and Regulations for appointments stand amended this fall, as reflected in the new edition of Operating an Amateur Radio Station. Amendments are minor, the action taken to clarify and emphasize the availability of the different posts to RTTY stations in the Official Bulletin Station group. A number of the leading RTTYers have undertaken to supply local radio clubs with the bulletins to be posted from time to time. Local as well as national information is given and/or read by club officers at meetings. The operating booklet’s 39th edition read “until such time as amateur radio-telegraph activity reaches a volume making separate Section provisions desirable, the Route Manager will coordinate any RTTY facilities engaged in traffic work with existing nets.” We now in the 40th edition show under ORS provisions: Every radio-telegraphing, RTTY, or other amateur interested in traffic work and operating activities who can meet qualifications is eligible for “the Official Relay Station post.” Under the numbered points we refer to c.w. traffic activity or equivalent RTTY activity. In connection with the Official Experimental Station post, in addition to other provisions, it is now stated that in developing systems the RTTY groups, users of a.f.s.k. and make-and-break, etc. are welcomed as OES. There were any doubts concerning RTTY eligibility for OO and OBS posts. Depending on their equipment availabilities the Class IV OO engages in radio-telegraph and/or RTTY checks.

Our 25th ARRL “SS”! If you have never been in an ARRL Sweepstakes, you have a real surprise and operating treat, we hope, in store. Read again the report on last year’s SS and the rules announcement elsewhere in this issue of QST. All U. S. and Canadian amateurs are invited to enter. A multiplier helps all scorers in the lower power categories. This is a chance for those working for WAS to complete all states too, since the SS ensures that all 48 will have good representation, phone or c.w. There are certificates for section leadership, separate ones for the highest phone and c.w. scores, additional ones for the leading Novice if a Section has at least three entries; also club ARRL certificates where there are enough club entries to meet the definition for competition.

The November 8-9 and 15-16 Sweepstakes requires only your submission of the list of those you work in the form shown with the announcement; logging forms are sent free on request. Operating time is limited to 40 hours total. It’s basically the chance to test what your station can do, using any or all of the assigned amateur bands. If time will not permit an all-out try, just enjoy the chance to send CQ SS and get in and meet old and new friends and see how the station is getting around! The two different week ends cut down on the chances of poor conditions, and will help those tied up to try operating on at least one of them, if it comes to that. Best Luck and CU in the SS!

—F.E.H.

During the busy July 4 week end, Winthrop (Mass.) RACES turned out to assist the state police in watching traffic conditions on major highways. At this vantage point W1WLP is doing the operating while K1AQ services the generator.

November 1958

| NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.) |
|-----------------|-----------------|-----------------|-----------------|
| 3550            | 3875            | 7100            | 7250            |
| 14,050          | 14,225          | 21,050          | 21,400          |
| 28,100          | 29,610          | 50,550          | 145,350         |

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3636, 7090, 14,060; phone — 3765, 14,160, 28,250 kc.
One of these days, we're going to call a special national convention of all AREC members at a centralized location easily accessible to all of us, and as the result of the flip of a coin — because they attended the "RACES" session were at one of the other quite a large group of amateurs who might otherwise have had them on the table. Even if only half of them will still be a crackerjack. No definite plans, yet, but we've got it in the back of our minds.

This would be much better than having meetings at national and divisional conventions in which the emergency communications meeting conflicts with about half a dozen meetings on other subjects going on at the same time. Such was the case at the National Convention in Washington in August. While the so-called RACES Session was going on, W30NO was conducting a V.H.F. Session, W3YAR was conducting a TVI Session and FCC's Harold Richmond, W4CIZ, was giving examinations at other places in the hotel. Oh, we're not criticizing the convention management (we should live so long!). It just isn't possible to avoid conflicts of this nature in a large convention program. However, we'll bet that quite a large group of amateurs who might otherwise have attended the "RACES" session were at one of the other sessions as the result of the flip of a coin — because they were interested in both and had to go to one or the other. Still! So for their benefit, and for those who were unable to get to the convention, here's what went on at the RACES Session, in as few words as possible.

After a few cheery and appropriate words of greeting from the capable chairman, Cecil Harrison, W3PG, we were introduced to Clyde Hendrix, W0HBG, who is the right-hand man of OCDM Administrator Leo Hoegh. He spoke briefly of the FCDA-ODM merger to form a more powerful unit of the civil defense administration, and emphasized the importance of amateur radio as a part of its communications facility. In a new war, he said, there would be no winner, only a survivor. One of the most important functions of communications in such a contingency would be to keep down panic.

Major Kenney of OCDM Region 2, N. Y. State RO and chairman of the USCADAR, presented a talk on the N. Y. 2- and 6-meter RTTY network and spoke briefly on the Alliance, stating that 34 states are now members and Alaska is expected to join soon.

Jim Macgregor, W8DUA, the "RACES Man" from OCDM, showed some slides indicating the growth of RACES during recent months, mentioned that security considerations were holding up the USCADAR petition for more RACES frequencies, emphasized that RACES was only a part of civil defense communications, not the whole works, spoke on the place of MARS in the RACES program and that amateurs may belong to one or the other but cannot very well participate effectively in both, and pointed out that there is no conflict between the RACES and AREC programs.

Austin Sparks of OCDM Region 2 said that as far as communications are concerned, there is a spoiled nation, and exhorted us to remember that in the event of war RACES will continue while other amateur operation will cease.

John Barolet, W3BUD, CD communications officer for St. Mary's County, Md., gave an interesting talk on trans-horizon RACES communications on 6 meters, emphasizing reliability of communications on this band and urging us to stop knocking ourselves out on 75 and use groundwave communications on six meters.

General DuPlantis, assistant administrator for communications, OCDM, said that the policy of RACES is to help c.d. communications in every way possible. His talk consisted mainly of a slide-illustrated description of the horizon warning system, wording in terms of radar, radio, teletype and Soviet capability. His talk was keynoted by the theme that there is "always something new."

After the scheduled part of the program, W3OMN rose from the audience to propose that a resolution be drafted to request OCDM to seek legislation for a permanent Radio Amateur Civil Emergency Service. Other recommendations included (1) that AREC-RACES recruitment be carried out in the schools and (2) that organization for emergency communications be based on place of business as well as on place of residence of individuals concerned.

It was an interesting meeting, attended by about 100 people. Your NEC got a few licks regarding the place of the AREC in all this hubbub about RACES, but aside from that there was little mention made of our own amateur communications organization. After all, you see, this was a RACES meeting.

Who else was there? Many people, but not as many as we would like to have seen. Many AREC officials, soon later during the convention, but not elsewhere at the time, or had not yet arrived. If you were there and we met you, it was a great pleasure. If you were there and we missed you, this is regrettable but unavoidable in such a large convention. If you couldn't make it, you missed a good convention, but...
on route 28 in Milton, Mass., in which a woman and man were injured and bystanders were shouting to call a police officer. W1WSN informed W1LAT of the accident and the latter put out a general call asking anyone copying in the area to call the police to the scene. A police car arrived within ten minutes after the call was made, thanks to the prompt action by W1WSN. 

In response to an urgent appeal on Sept. 1 from the state highway patrol for all available hand-carried portables to aid in the hunt for a lost child, 11 six-meter amateurs with mobiles and hand-carried units responded from Cuyahoga County, Ohio. Communications equipment available to the state highway patrol was found insufficient to handle the extremely large searching party. The search ended before the amateurs arrived at the scene, but the turnout made a very favorable impression on the officials involved. — W8AEU, EC Cuyahoga County, Ohio.

A trio of amateurs maintained emergency communication for WICC on Sept. 1 when severed telephone lines cut service between Pleasure Beach and Booth Hill, a distance of 15 miles, transmitter and studio locations respectively. Contact was first attempted on 15 meters between WINW at the transmitter site and WILIG, without success. Contact was successful on 75 meters, but unsatisfactory because of the QRN. WINW then finally brought 6-meter equipment to both locations after which contact was perfect. The circuit was maintained from 2100 until 0015, and again from 0800 to 0900 the next day. — WILIG.

Members of the Northern Alberta Radio Club took part, May 3-4, in Canada's "Exercice Cooperation II." RTTY was used between Edmonton and the northern zone headquarters, using 147 kc. Local amateurs built, installed and operated the converters, tone keyers and whatnot. Operation was solid for eight hours and c.d. authorities were much pleased.

In the Northern Alberta district another group of amateurs participated in a county-wide test simulating a severe earthquake. The test started at 1500. Communications headquarters was activated at the CD Building and stations were active from hospitals, Red Cross centers, police headquarters and a number of strategic locations throughout the county. Twenty messages were originated from the communications center and each received an answer. About 15 amateurs participated. After the test, equipment was dismantled but the beams were left permanently on the hospital buildings.

On June 21, more than 30 fire engines from departments throughout New Haven County, Conn., converged at three rendezvous areas and proceeded under escort to a simulated conflagration in Hamden. The Hamden RARC/RACES group took part by providing a communications escort for each group, coordinated by the c.d. station located at the town hall in Hamden. TheAlternate C.D. Headquarters Station at Bethany State Police Barracks was also activated. Operation was on 10 and 2 meters. The whole operation was classed as a RACES drill and tactical calls were used throughout. All equipment functioned normally. — W1FSF, EC Hamden, Conn.

The South County Amateur Radio Society c.d. group of Redwood City, Calif., provided communications from the staging area to the surrounding area to the stadium for the Annual Football Olympics. Mobile units were placed along the parade route so they could report spacing of units, pace being maintained, and inform the reviewing stands of last minute changes in parade entries. A roving mobile unit tied together and directed all these units. Eight mobile units were used and two fixed home stations stood by to help if needed. — WBDP, EC Redwood City, Calif.

On Sept. 5, the Muskingum Amateur Radio Assn. set up a portable station at the Zanesville (Ohio) Municipal Stadium to assist in directing football teams from the surrounding area to the stadium for the Annual Football Olympics. Mobiles were sent out to meet the buses and lead them to the stadium, keeping in touch with the control station at all times so that officials at the stadium would know just where each bus bringing in a team was located. The whole operation went off perfectly, seven amateurs participated. — K8ATA.

Eighteen SECs reported July figures, representing 5217 ARS members. This averages about the same as last year — an increase of two reports, a decrease of about 150 ARS members represented. Sections reporting: Conn., Mass., N.Y., C.-L., Wis., Ind., E. Ohio, N. Iowa, S. Texas, Santa Clara Valley, Maritime, E. Pa., San Joaquin Valley, E. Fla., N. M., Santa Barbara, Ala., Mont.

RACES News

On July 20, Chicago RACES held a practice drill in Schiller Woods, with the cooperation of the Boy Scouts. Search parties were sent out with hand-carried units to locate missing boys. When they were found, the mobile units were informed and in turn relayed information to the Chicago CD Mobile Bus. The drill was very successful and informative. — WCSR.

On July 26-27, the Long Branch (N. J.) 2-meter RACES group cooperated with the Long Branch Ice Boat and Yacht Club to provide communications for the two-day regatta and outboard races sponsored by the Yacht Club. This group is one of the more active RACES units in the county. — K4MGM.

Orange County (N. Y.) RACES spent a busy August with two extra drills. The CD truck was stationed at the Orange County Fair during the week of Aug. 2 for recruiting and demonstration purposes. Members reported in on 2 and 6 meters. Operators on the truck simulated actual emergency conditions by using the portable generator, by sending messages to the net members as they reported in, and by maintaining communication with the hand-carried unit which was being demonstrated on the fair grounds.

Another drill was called on the August 16-17 weekend to provide communications for the sports car races at Montgomeri air field. Seven-two-meter mobiles and a pair of six-meter hand carried units were used. All traffic was received by the NCB, at the start—finish line. — W5JEK.

The Bexar County (Texas) RACES plan was approved by FCC in July. Losing no time, the group put on its first mock drill on Aug. 8, with W5DIB (RO) and 80DRO (asst. RO) at the control station. Twenty-five mobiles took part in the test. During the test, there were two fires and one major accident in the city and county in which the communications group assisted in directing traffic and helping authorities. — W5DIB, RO Bexar Co., Texas.
Cuyahoga County (Ohio) RACES had a big blow-out on August 18 to loup out some pertinent problems. Among these were: (1) Discussion of the telephone alerting system. New calling lists were passed out. (2) Plans for participating in the Cleveland Radio Amateur Convention were discussed and a committee appointed to handle details. (3) A committee was appointed to plan and write a RACES operator’s training manual and examination. (4) A committee was appointed to reevaluate the RACES plan and bring it up to date. (5) The group was informed of the procurement of caps containing the RACES emblem for distribution to qualified members, and of the prospect of obtaining two teletype machines for use in the RACES network. W9RCQ, Chief RO, Cuyahoga County, Ohio, RACES.

The DuPage County (Ill.) CD Control Center was dedicated on October 18. W9BVB sent us a complete description and a diagram of the building, and we wish we could describe it in more detail than we have room for here (maybe we will, yet). The DuPage County amateurs put plenty of work into the RACES installation, and have built up a county-wide c.w. network of nearly 200 stations and operators using their own as well as county-owned equipment. Stations are located in municipal buildings in 14 towns, operated by members of the Radio Amateur Society of DuPage County on 2, 6, 10 and 75 meters and drills are conducted each Monday at 2000. All stations in the area are invited to check in, RACES or not. The new control center is located near Wheaton, about 30 miles west of Chicago. It is radiation-proof and contains stocks of food, dormitory facilities, decontamination facilities, emergency power, and tie-ins with state-wide nets making it highly flexible. The call used will be that of the RASDC, K0IEO. Special “dedication certificates” were issued to amateurs working K0IEO during the dedication ceremony and afterward.

TRAFFIC TOPICS

Now that FCC monitors are starting to perk up their ears on some of our identification procedures, perhaps we should examine some of the procedures we use in nets. Actually, the regulations make no mention of identification in nets, except that they state a net call may be used by the NCS in place of a “station called.” Such being the case, we have to interpret the regulations as they are written.

First of all, let’s be sure we all know what identification is. Many of us think it is simply transmitting your own station call. However, according to our regs (see 12.82), identification consists of transmission of the call letters of the station or stations (or net) that you are calling or working, followed by your own call letters. Anything less than that is not complete identification.

Now, when and how often must we go through this procedure? Well, the regs provide some alternatives. One way of being sure of complying is to go through it at the beginning and end of every transmission. This procedure can be a bit cumbersome in nets, however, so we use (1) the reg if they stipulate that in a contact in which transmissions are of less than three minutes duration, the identification need be given only at the beginning and end of each contact, but in no case less than every ten minutes. The ten-minute rule is a fixed one; you must identify at least every ten minutes whether you are transmitting, receiving or just in contact with a net, calling some one, or engaged in a contact; and you must identify at the beginning and end of each transmission lasting more than three minutes. If the whole contact lasts less than three minutes you can skip the end identification.

Granted, this still leaves some questions regarding nets, such as, for example, what is a transmission? Suppose the message lasts more than three minutes without breaks, do you have to identify at the end of it? These are good questions. We think FCC monitors are not unreasonable about such things, and doubt very much if a monitor will issue a citation on the basis of an unidentified 3½-minute transmission in the middle of a contact. But don’t stretch it too far!

It appears to us that some of our nets are asking for it by having procedures that are illegal. For example, phone nets that have members checking in simply by stating their call letters, and c.w. nets whose members check in, after the net call-up, simply with W6QIS or W6BNET. So just what are the legalities connected with identification and logging of nets? Well, according to the regs, here’s how that stands:

When reporting into a net, you must identify the net control station and yourself, in that order. You are then considered to be in contact with him until you check out, at which time you must again identify. During the net, you must identify any transmission longer than three minutes, and in any case you must identify at ten minute intervals.

Your log must contain the call letters of the net control station as having been contacted when you report in; your check-out must be entered as the termination of your contact with him. Each net station you contact directly during the net must be entered in the log, including both beginning and ending times.

If you are net control station, after the net call-up you give identification as each station reports in, then again as each station checks out, plus identification of any transmission you make to any net station lasting more than three minutes, and of course identification of the net at least every ten minutes. Your log must contain the call of each check-in, including the time he reports in and the time he
WIAW GENERAL-CONTACT SCHEDULE
(Effective October 26, 1958)

WIAW welcomes calls from any amateur station. Starting October 26, WIAW will listen for calls in accordance with the following time-frequency chart:

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<td>1200-1300</td>
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<td>1300-1400</td>
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<td>1400-1500</td>
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<td>1500-1600</td>
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<tr>
<td>1600-1700</td>
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<td>1700-1800</td>
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<td>1800-1900</td>
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<tr>
<td>1900-2000</td>
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<tr>
<td>2000-2100</td>
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<tr>
<td>2100-2200</td>
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<td>2200-2300</td>
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<tr>
<td>2300-0000</td>
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<tr>
<td>0000-0100</td>
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<td></td>
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</tr>
</tbody>
</table>

1. General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0000 and 2000 on W2TH and at 2100 and 2300 on W1AW. Starting time is approximate.

2. WIAW will listen for Novices (on Novice band indicated) before looking over the band for other contacts.

3. Operation will be conducted on one of the following frequencies: 21,075; 21,330; 28,080; 29,000 kc.

Checks out.

Whether or not these requirements impose a hardship on network operation or whether or not anything can be done to liberalize them is something outside the scope of this column. The rules let's observe them. Let's not give amateur traffic nets a black eye.

Net Reports. These are starting to get numerous. Let's try a table this month:

<table>
<thead>
<tr>
<th>Net</th>
<th>Sessions</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate S.B.</td>
<td>31</td>
<td>702</td>
</tr>
<tr>
<td>Transcontinental Phone</td>
<td>(1)</td>
<td>1471</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>1576</td>
</tr>
<tr>
<td></td>
<td>(4, 5, 8, 9, 10)</td>
<td>454</td>
</tr>
<tr>
<td></td>
<td>(Total)</td>
<td>3593</td>
</tr>
<tr>
<td>Early Bird Transc.</td>
<td>31</td>
<td>561</td>
</tr>
<tr>
<td>N. Tex.-Okla.</td>
<td>31</td>
<td>225</td>
</tr>
<tr>
<td>7290 Traffic</td>
<td>42</td>
<td>500</td>
</tr>
</tbody>
</table>

National Traffic System. NTS is now in its tenth season of existence. This is not a very long period of time on which to base a history or even reminiscence; and yet it seems a long time ago that we sent out copies of that first national traffic plan to some 30 prominent traffic men for their opinion. Much has happened since the system started its official life on October 1, 1940, and most of those happenings have been recorded in this QST column. The report of the first month's operation has this to say:

"Initial progress has been encouraging, and as the season progresses we expect improving results and increased participation. . . Four regional nets have not yet been activated; some of the others have had frequency difficulties which have necessitated changes often slightly inconvenient to their members. These little annoyances will soon be resolved and there is no need for anyone to get discouraged because of them. After all, we are just getting started."

Starting off with thirteen regional and four area nets was an ambitious undertaking, and we quickly found that the Mountain Area was not going to work well, but that the others functioned perfectly, either. MAN was dissolved, as were the two regions in that area, and joined to the Pacific Area. Other regional and area nets had their ups and downs, depending primarily on the quality of their leadership, but all managed to survive. The first year was a "test" year, so as to ascertain if the system, or some modification of it, was workable. At the end of that time we got up certificates and started this regular monthly bulletin. The first summary which appeared in February 1951 QST included five of the eleven regional nets and two of the three area nets; and no section nets. Compare that reporting record with the kind we enjoy today and you will get a rough idea of how much progress we have made in nine years.

We are pleased with NTS, but far from satisfied. We have a pretty good system - better, we dare say, than any which has ever existed in amateur traffic circles. But there is still a great deal of room for improvement, so let's not get complacent. We still have a long way to go.

August reports:

<table>
<thead>
<tr>
<th>Net</th>
<th>Sessions</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1RN</td>
<td>26</td>
<td>424</td>
</tr>
<tr>
<td>2RN</td>
<td>48</td>
<td>483</td>
</tr>
<tr>
<td>3RN</td>
<td>42</td>
<td>322</td>
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<tr>
<td>4RN</td>
<td>52</td>
<td>375</td>
</tr>
<tr>
<td>5RN</td>
<td>52</td>
<td>774</td>
</tr>
<tr>
<td>6RN</td>
<td>21</td>
<td>420</td>
</tr>
<tr>
<td>8RN</td>
<td>30</td>
<td>159</td>
</tr>
<tr>
<td>9RN</td>
<td>51</td>
<td>877</td>
</tr>
<tr>
<td>TEN</td>
<td>60</td>
<td>726</td>
</tr>
<tr>
<td>TSN</td>
<td>19</td>
<td>958</td>
</tr>
<tr>
<td>ECN</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>EAN</td>
<td>20</td>
<td>1012</td>
</tr>
<tr>
<td>CAN</td>
<td>31</td>
<td>835</td>
</tr>
<tr>
<td>PAN</td>
<td>29</td>
<td>1107</td>
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Sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Sessions</th>
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</thead>
<tbody>
<tr>
<td>East</td>
<td>744</td>
</tr>
<tr>
<td>Central</td>
<td>565</td>
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Traffic:

<table>
<thead>
<tr>
<th>Traffic Rate</th>
<th>Sent ( calls)</th>
<th>Income ( calls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1RN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>2RN</td>
<td>7295</td>
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</tr>
<tr>
<td>3RN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>4RN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>5RN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>6RN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>8RN</td>
<td>7080</td>
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<tr>
<td>9RN</td>
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<td>TEN</td>
<td>7080</td>
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<tr>
<td>TSN</td>
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<td>ECN</td>
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<td>EAN</td>
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<td>CAN</td>
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<td></td>
</tr>
<tr>
<td>PAN</td>
<td>7080</td>
<td></td>
</tr>
</tbody>
</table>

Summary:

<table>
<thead>
<tr>
<th>Traffic Rate</th>
<th>Sent ( calls)</th>
<th>Income ( calls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1RN</td>
<td>7080</td>
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</tr>
<tr>
<td>2RN</td>
<td>7295</td>
<td></td>
</tr>
<tr>
<td>3RN</td>
<td>7080</td>
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<td>4RN</td>
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<tr>
<td>5RN</td>
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<td>6RN</td>
<td>7080</td>
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<td>8RN</td>
<td>7080</td>
<td></td>
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<tr>
<td>9RN</td>
<td>7080</td>
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<tr>
<td>TEN</td>
<td>7080</td>
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<tr>
<td>TSN</td>
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<td>ECN</td>
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<td>EAN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>7080</td>
<td></td>
</tr>
<tr>
<td>PAN</td>
<td>7080</td>
<td></td>
</tr>
</tbody>
</table>

1 Regional net representation based on one session per night. Other regional nets based on two or more sessions.

2 Section nets reporting: PAITN & Gator (Fla.); MSPN New Net; MSCP on New Net; ARN & MJN (Mont.); AEN, AENT, AENB & AENP (Ala.); VN (Va.); KPN Morning, KPN & KYN (Ky.); WYN (W. Va.); S. Dak. CW; S. Dak. Phone; WYN (W. Va.); S. Dak. Phone; WYN (W. Va.); S. Dak. Phone.

3 TCC functions reported, not counted as net sessions.

The latest bulletin from the Pacific Area Staff to all NCS in the Pacific Area requests that each NCS make a habit of keeping a pile of reporting cards at the operating position, and fill one out to be mailed immediately after the close of the net. PAS Manager W6ICC says that in many cases net managers have resigned because of lack of reports from net control stations. "Let's not," he says, "lose a good net manager because of your thoughtlessness." A very good point, and applicable to other areas just as much as to the Pacific. It only takes a minute to drop the manager a card (or a radiogram, if you prefer) reporting the stations who...
Central net is passed from QND to QNF, are transmitted on regular schedules: certain times zones. W1AW will participate in all official ARRL schedules. The current schedule is organized in EST. Certain times are noted exceptions: all support for 3RN is coming from the Mid.-Del.-D.-C. section. The latest ARN Bulletin includes a very good explanation of the significance of the figures in the above summary column; we may note that 115.5 MHz is the new manager of 3RN, replacing WQCM; thanks to KG6XA who has filled the gap so that no QN6 reports are missing. Again, no report from R5N, the only one missing. Ten characters have been sent to all members who have consistently braved the QRN and QRN during the summer of '58. TYN Manager W5DBW, submitting his first report, indicates regional net certificates have been awarded to W1XYX, W9CXYQ and W7TVFQRN and weak signals are still pulling CAN's figures down, and forty meters has been running well. Look at OAN's representation percentage! K6DYX, back at the helm of PAN, announces the return of PAN to 80 meters on Monday, Wednesday and Friday, and 5, 7H, 10 and 13 kHz, except for one or two exceptions. PAN's position is under way. QNI, how much traffic was handled and how long the net lasted from QND to QNF?

**WIAW OPERATING SCHEDULE**

(Effective October 20, 1958)

All times given are Eastern Standard Time

<table>
<thead>
<tr>
<th>Area</th>
<th>Functions of Net</th>
<th>Traffic Time</th>
<th>Out-of-Range Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern</td>
<td>59</td>
<td>80.8</td>
<td>948</td>
</tr>
<tr>
<td>Central</td>
<td>69</td>
<td>93.8</td>
<td>1061</td>
</tr>
<tr>
<td>Pacific</td>
<td>82</td>
<td>80.0</td>
<td>1061</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td><strong>203</strong></td>
<td><strong>90.6</strong></td>
<td><strong>3237</strong></td>
</tr>
</tbody>
</table>

The TCC roster: Central Area (W6BDT, Dir.) — W9CXYX, II5a DBR LCC LGG 8CA; Pacific Area (W9BPT, Dir.) — W5DBW, W6x ADR PLG IHP 8SP, WNY ZVT HC Elq YHH, K6q DYX Ewv illr ges G1D, W7s VTV 8AC ZB, W0BRQD.

**BRASS POUNDERS LEAGUE**

Winners of BPL Certificates for August Traffic:

<table>
<thead>
<tr>
<th>Call</th>
<th>Recd.</th>
<th>Resd.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1WS</td>
<td>120</td>
<td>114</td>
<td>234</td>
</tr>
<tr>
<td>W2BVE</td>
<td>125</td>
<td>119</td>
<td>244</td>
</tr>
<tr>
<td>K2UBW</td>
<td>115</td>
<td>104</td>
<td>219</td>
</tr>
<tr>
<td>K4DAS</td>
<td>115</td>
<td>109</td>
<td>224</td>
</tr>
</tbody>
</table>

The BPL is open to all amateurs in the United States, Canada, Cuba, and U.S. possessions who report to their ARRL a message total of 500 or more, or 100 or more messages within 48 hours of receipt. In standard ARRL form. BRASS POUNDERS LEAGUE for August traffic:

<table>
<thead>
<tr>
<th>Recd.</th>
<th>Resd.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>K4DAS</td>
<td>115</td>
<td>109</td>
</tr>
<tr>
<td>W2BVE</td>
<td>125</td>
<td>119</td>
</tr>
<tr>
<td>K2UBW</td>
<td>115</td>
<td>104</td>
</tr>
<tr>
<td>K4DAS</td>
<td>115</td>
<td>109</td>
</tr>
</tbody>
</table>

**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 on Nov. 17 at 2130 Eastern Standard Time. Identical texts will be sent simultaneously by automatic transmitters on 145.600 kc. The next Code Proficiency Qualifying Run will be transmitted on Nov. 6 at 2100 PST on 3590 and 7128 kc. Any person can apply. A brief explanation of the procedure is given below. For the 1958 Code Proficiency Test, ARRL will accept any code speed as low as 5 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Exception: On Nov. 18 W1AW will transmit the Special Frequency Measuring Test and on Nov. 17 and Dec. 23 W1AW will transmit ARRL Code Proficiency Qualifying Runs instead of the regular code practice.

**QST** for
A.R.R.L. ACTIVITIES CALENDAR

Oct. 25-26: CD QSO Party (phone)
Nov. 6: CP Qualifying Run — W6OWP
Nov. 8-9, 15-16: Sweepstakes Contest
Nov. 17: CP Qualifying Run — W1A1W
Dec. 3: CP Qualifying Run — W6OWP
Dec. 23: CP Qualifying Run — W1A1W
Jan. 8: CP Qualifying Run — W6OWP
Jan. 10-11: V.H.F. Sweepstakes
Jan. 17-18: CD QSO Party (e.w.)
Jan. 21-22: CP Qualifying Run — W1A1W
Jan. 21-25: CD QSO Party (phone)
Feb. 1: CP Qualifying Run — W6OWP
Feb. 6-8: DX Competition (phone)
Feb. 13: Frequency Measuring Test
Feb. 19: CP Qualifying Run — W1A1W
Feb. 20-22: DX Competition (e.w.)
Mar. 5: CP Qualifying Run — W6OWP
Mar. 6-8: DX Competition (phone)
Mar. 19: CP Qualifying Run — W1A1W
Mar. 20-22: DX Competition (e.w.)
June 27-28: Field Day

OTHER ACTIVITIES

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

Oct. 31-Nov. 1: RTTY Sweepstakes
RTTY Society of Southern California (p. 186, last month).
Nov. 19-20: YLRL Anniversary Party (phone), YLRL (p. 76, this issue).

NET DIRECTORY

This list includes nets registered up to and including Sept. 19, 1958. Registrations received after that date will be included in the January QST listing if received prior to November 15. If you have not yet registered your net for the 1958-59 season, see page 82, September 1958 QST, for full instructions.

Important Note: QST net listings are for information only. Insomuch as possible, net information is listed exactly as received, with certain common abbreviations used to save QST space. Listing in QST or the printed directory does not signify that these nets have any official status, does not entitle them to exclusive or prior right to the frequencies or on which they are registered, and is in no sense a form of copyright. Asterisk (*) indicates a part of the A.R.R.L. National Traffic System.

Name of Net  Freq.  Time  Days
Ala. Emerg. Net "B" (AENB)*  3575  1900 CST  Daily
All service Net (ARN)*  7270  1200 EST  Sun.
Amateur Radio Caravan Club of New Mexico: 29,600  2300 MST  Wed.
American National Red Cross — Maine County Net  3885  1000 PST  Fri.
Atlanta Ten Meter Phone Net  28,600  2300 EST  Sun.
Badger Emergency Net (BEN)  3350  1800 CST  Daily
Barnyard Net (Eastern Area)  3950  0900 EST  Mon.-Sat.
Belle Isle, III. C.D. Net  29,520  1800 CST  Thu.
Berrien County Emergency Net (Mich.) (BCEN) 20,610  1430 EST Last Sun.
British Columbia AR4C Net  3755  1800 PST  Mon.-Sat.
British Columbia Emerg. Net (BCEN)  3650  2200 PST  Mon.-Fri.
Brown County AREC Net  3850  2100 EST Fri.
Burlington County Races Net (N.J.)  51,000  2000 EST Fri.
Calif. C.D. Net (CCDN)  3501  1000 PST  Mon.
Cannon Air Force Base, N.M. (E.F.)*  2700  2000 EST Two-Fri.
Cumberland County Emergency Net (Pa.)  29,470  2300 EST Two.
Central Fla. Operational Area 2 M Net  145,200  1900 EST Daily
Central Ill. Six Meter Net  50,100  1800 CST Mon.-Sat.
Central Iowa 6 Meter Net  50,720  2000 CST Tue.
Central Kansas Phone Net  3930  0800 CST Sat.
Central United Trunk Lines (ULTL)  3605  2015 CST Daily
Central Valley C.D. Net (CFCDN) (Wash.)  3930  0400 CST Sat.
Colorado High Noon Net (HNN)*  7210  1200 MST Mon.-Sat.
Conn., Weather Net (CWXX)*  3845  0700 MST Mon.-Sat.
Conn. Nutsmeas Net (CNI)*  3640  1845 EST Mon.-Sat.
Conn. Phone Net (CPN)*  3880  1900 EST Mon.-Sat.
Conn., Training Net (CTN)  3840  0800 EST Sun.
Cooper State Net (Ariz.)  3805  1035 MST Mon.-Fri.
Crest County Phone Net (CPCP)  3900  1830 CST Tues.
Delaware Emergency Net  3905  1800 EST Sat.
Delta 75 Net  3905  0730 CST Sun.
Doghouse Net  3905  1900 EST Mon.-Fri.
Early Bird Transcon Net (EB)  3845  0400 CST Daily
East Coast Radiotelephone Net (ETNET)  3820  1900 EST Wed.
East Texas Net  3880  0615 EST Mon.-Fri.
Eastern Canada Net (ECN)*  3835  1935 EST Mon.-Fri.
Eastern Pennsylvania, PW Net (EPA)*  3360  1830 EST Mon.-Fri.
Eastern States Net (ESN)  7680  1730 EST Daily
Eighth Regional Net (8R8N)*  3830  1915 EST Mon.-Sat.
East Coast Traffic Net  2130 EST
Empire Ship Speed Net (N. Y.)  3501  1800 EST Daily
First Regional Net (1RN)*  3005  1800 EST Mon.-Sat.
Fla., Emerg. Phone Net (FEPN)  3910  1830 EST Tue.
Fla. Midday Traffic Net  7230  1200 EST Daily
Florida Net (FN)*  7105  1900 EST Mon.-Sat.
Fourth Regional Net (4RN)*  3817  1900 EST Mon.-Sat.

November 1958 91
<table>
<thead>
<tr>
<th>Service</th>
<th>Frequency (MHz)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Framingham Radio Club Emerg. Net</strong></td>
<td>26.700</td>
<td>2015 EST</td>
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<tr>
<td><strong>Gator Net (Fla.)</strong></td>
<td>7105</td>
<td>1000 EST</td>
</tr>
<tr>
<td><strong>Ga. Cruiser Emerg. Net</strong></td>
<td>3995</td>
<td>0800 EST</td>
</tr>
<tr>
<td><strong>Georgia Net (GAM)</strong></td>
<td>7105</td>
<td>1800 EST</td>
</tr>
<tr>
<td><strong>Georgia Net (GNN)</strong></td>
<td>7157</td>
<td>1700 EST</td>
</tr>
<tr>
<td><strong>Golden Gate Net (Calif.)</strong></td>
<td>28700</td>
<td>2000 PST</td>
</tr>
<tr>
<td><strong>Golden Gates Net (Ga.)</strong></td>
<td>29200</td>
<td>2000 PST</td>
</tr>
<tr>
<td><strong>Golden West Frequency Modulators (Calif.)</strong></td>
<td>29100</td>
<td>2100 PST</td>
</tr>
<tr>
<td><strong>Granite State Phone Net</strong></td>
<td>3812</td>
<td>1900 EST</td>
</tr>
<tr>
<td><strong>Green Mountain Net</strong></td>
<td>3855</td>
<td>1700 EST</td>
</tr>
<tr>
<td><strong>Grey-Brute Net (Ont.)</strong></td>
<td>3645</td>
<td>0600 EST</td>
</tr>
<tr>
<td><strong>Hill &amp; Bounce Net</strong></td>
<td>7130</td>
<td>0600 EST</td>
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<tr>
<td><strong>Hudson Traffic Net (ITTN)</strong></td>
<td>7000</td>
<td>1815 EST</td>
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<tr>
<td><strong>Huntington Weather Net</strong></td>
<td>50550</td>
<td>1900 Mon.</td>
</tr>
<tr>
<td><strong>Illinois CW Net (ILN)</strong></td>
<td>3515</td>
<td>1900 CST</td>
</tr>
<tr>
<td><strong>Interstate Phone Net</strong></td>
<td>3920</td>
<td>1600 CST</td>
</tr>
<tr>
<td><strong>Iowa 75 Meter Phone Net</strong></td>
<td>3970</td>
<td>1200 CST</td>
</tr>
<tr>
<td><strong>Kansas CW Net (KSN)</strong></td>
<td>3610</td>
<td>1900 CST</td>
</tr>
<tr>
<td><strong>Kansas, 75 Meter Phone Net (KPN)</strong></td>
<td>3920</td>
<td>0900 CST</td>
</tr>
<tr>
<td><strong>Kansas Storm Net (KSN)</strong></td>
<td>3840</td>
<td>1900 CST</td>
</tr>
<tr>
<td><strong>Kentucky CW Net (KYN)</strong></td>
<td>3900</td>
<td>1700 CST</td>
</tr>
<tr>
<td><strong>Lake Erie Emerg. Net (Pa.)</strong></td>
<td>29150</td>
<td>2000 EST</td>
</tr>
<tr>
<td><strong>Lancaster Emerg. Net (Pa.)</strong></td>
<td>144800</td>
<td>2200 Mon.</td>
</tr>
<tr>
<td><strong>Linn County Emerg. Net (LCEN)</strong></td>
<td>3915</td>
<td>1300 CST</td>
</tr>
<tr>
<td><strong>Lobel Net (Me.)</strong></td>
<td>145290</td>
<td>1830 EST</td>
</tr>
<tr>
<td><strong>Long Island 6 Meter Emerg. Net (N.Y.)</strong></td>
<td>50250</td>
<td>1900 EST</td>
</tr>
<tr>
<td><strong>Lorrain County 100 Meter Net</strong></td>
<td>1820</td>
<td>1900 GMT</td>
</tr>
<tr>
<td><strong>Md. Del. &amp; D. C. Net</strong></td>
<td>3650</td>
<td>1915 EST</td>
</tr>
<tr>
<td><strong>McKenzie Emerg. Net (Pa.)</strong></td>
<td>3825</td>
<td>0800 CST</td>
</tr>
<tr>
<td><strong>Mich. Buzzards Root-Mich.</strong></td>
<td>3930</td>
<td>1730 EST</td>
</tr>
<tr>
<td><strong>Mich., 75 Meter Phone Net (MKN)</strong></td>
<td>3603</td>
<td>1800 CST</td>
</tr>
<tr>
<td><strong>Michigan, 75 Meter Phone (MKN)</strong></td>
<td>3603</td>
<td>1800 CST</td>
</tr>
<tr>
<td><strong>Mike F. Ward Emerg. and Traffic Net</strong></td>
<td>72388.8</td>
<td>0715 CST</td>
</tr>
<tr>
<td><strong>Miss. Section Net (MSN)</strong></td>
<td>3395</td>
<td>1830 CST</td>
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<tr>
<td><strong>Mission Trail Net, Inc.</strong></td>
<td>3861</td>
<td>1900 PST</td>
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<td><strong>Miss. Magnolia Emerg. Net</strong></td>
<td>3970</td>
<td>1900 CST</td>
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<tr>
<td><strong>Missouri Section Net (MO)</strong></td>
<td>28720</td>
<td>2610 PST</td>
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<tr>
<td><strong>AREC Net (N. Y.)</strong></td>
<td>28680</td>
<td>2100 Mon.</td>
</tr>
<tr>
<td><strong>Net of Central N. J. (CNJ)</strong></td>
<td>3737</td>
<td>1700 Mon.-Fri.</td>
</tr>
<tr>
<td><strong>New England Weather Network</strong></td>
<td>3863</td>
<td>0900 Mon.-Fri.</td>
</tr>
<tr>
<td><strong>New Hampshire Net</strong></td>
<td>3905</td>
<td>1715 Mon.-Fri.</td>
</tr>
<tr>
<td><strong>New Jersey Emerg. &amp; Phone Traffic Net (NJP)</strong></td>
<td>3900</td>
<td>1800 Mon.-Fri.</td>
</tr>
<tr>
<td><strong>New Jersey Net (NJS)</strong></td>
<td>3985</td>
<td>1900 Mon.-Fri.</td>
</tr>
<tr>
<td><strong>New Orleans 3820 Net</strong></td>
<td>3825</td>
<td>0630 CST</td>
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<tr>
<td><strong>New York State Traffic &amp; Emerg. Net</strong></td>
<td>39850</td>
<td>1800 Daily</td>
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<tr>
<td><strong>Newport County Emerg. Net (Fla.)</strong></td>
<td>26530</td>
<td>1000 EST</td>
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<tr>
<td><strong>Newton Mass. C.D. Net</strong></td>
<td>53745</td>
<td>2100 EST</td>
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<tr>
<td><strong>Northern Regional Net (ORN)</strong></td>
<td>3940</td>
<td>1720 CST</td>
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<tr>
<td><strong>Nit-Owl Net (Hi)</strong></td>
<td>29640</td>
<td>2200 CST</td>
</tr>
<tr>
<td><strong>North Ala. 6 Meter Net</strong></td>
<td>29875</td>
<td>2300 CST</td>
</tr>
<tr>
<td><strong>Net of Central Ohio (OCN)</strong></td>
<td>3960</td>
<td>0900 Mon.-Sat.</td>
</tr>
<tr>
<td><strong>North Central Ohio (CNCP)</strong></td>
<td>3915</td>
<td>0900 Mon.-Sat.</td>
</tr>
<tr>
<td><strong>North East Texas Emerg. Phone Net</strong></td>
<td>3970</td>
<td>0800 CST</td>
</tr>
<tr>
<td><strong>Northeast VHF Net</strong></td>
<td>145900</td>
<td>1930 EST</td>
</tr>
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</table>

**Northern Calif Net (NCN)**
- 3635 1900 PST Mon-Sat.
- 2200 PST Mon-Sat.
- 2350 EST Sat.
- 0700 PST Sun.

**Northeast Texas Emerg. Net**
- 3751 1915 EST Sun.

**NWS-LC Section Net (MIL)**
- 3630 1930 EST Mon-Fri.
- 2130 CST Fri.
- 2130 CST Fri.
- 2130 CST Fri.
- 2130 CST Fri.
- 2130 CST Fri.

**Oak Ridge and Vicinity Traffic Net**
- 50700 1900 EST Mon-Sat.

**Oak Ridge RACES Net (Tenn.)**
- 50700 1300 EST Thu.

**Ohio Emerg. Net (OEN)**
- 3890 1900 EST Mon-Sat.

**Ohio Phone Net (OPN)**
- 3860 1700 EST Mon-Sat.

**Ontario Quebec Net**
- 3355 1900 EST Mon-Sat.

**Oregon State Net (OSN)**
- 3885 1910 PST Mon-Fri.

**Orlando Amateur Club Radio Inc. 10 M Net (Fla.)**
- 29920 2000 EST 1 1 1 Tue.

**Ottawa Radio Net**
- 145380 1900 CST Daily

**PKZ CW Net (Ark.)**
- 3790 1900 EST Mon-Fri.

**Pacific Area Net (PAN)**
- 3895 1930 EST Mon-Sat.

**Peanut Whistle Net**
- 3895 1930 EST Mon-Sat.

**Penna. C.D. (RACES) Net (PA-CD)**
- 39353.5 1900 EST Sun.

**Penowo 6 Meter Phone Net**
- 50520 1900 EST Tue.

**Piedmont Local Area Net 2**
- PLAN (S, C)

**Pine Tree Net (ITN) (Me.)**
- 3404 1900 EST Mon-Fri.

**Quincy Emerg. Net (Mass.)**
- 110800 1900 Mon-Sat.

**Region 3 Calif. Disaster Net**
- 3892 0900 PST Sat.

**Regional Net Five (RN 5)**
- 3800 1900 EST Mon-Sat.

**River Forest Net (RFN)**
- 3750 0900 PST Sat.

**San Diego City, Area's #1 Net**
- 2915 1930 PST Mon.

**San Diego City Area's #2 Net**
- 28725 1930 PST Mon.

**San Diego City General Welfare Net**
- 39045 1930 PST Daily

**San Diego Hospital Net**
- 145090 1930 PST Mon.

**San Diego 75M Monitoring Net**
- 2901 1930 PST Mon.

**San Diego Two Meter Net**
- 145500 1900 PST Mon.

**San Francisco Bay Area AREC Net**
- 3500 1900 PST Sun.

**Sea Gull Net (Me.)**
- 2910 1700 EST Mon-Sat.

**7290 kc Traffic Net**
- 72900 0900 EST Mon-Fri.

**Shreveport-Bossier City Emerg. Net (La.)**
- 29090 1930 EST Mon-Sat.

**Shreveport-Bossier City Emerg. Net (La.)**
- 8 Meter Cross-Band Net

**Sioux Stockholm Net**
- 29030 1930 EST Mon-Thur.

**Stones-Normer Net**
- 2385 1230 (-700) Mon-Sat.

**Tarrant County Six Meter Emerg. Net**
- 50700 2110 CST Daily

**Tennessee CW Net**
- 3635 1900 PST Mon-Sat.

**Tenn. 6 Meter Net (TN6)**
- 3615 1700 CST Daily

**Tenth Regional Net (TEN)**
- 1915 CST Fri.

**Third Regional Net (3RN)**
- 3990 1915 EST Mon-Fri.

**Transcontinental Phone Net (TCPN)**
- 3970 1700 EST Daily
DX CENTURY CLUB AWARDS

From August 1, to September 1, 1958 DXCC certificates and endorsements have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

WASHINGTON COUNTY EMERGENCY NETWORK (WEN)

Georgian Repeater Nets (GRTN)

Midland Repeater Nets (MRN)

Pacific Repeater Nets (PRTN)

Endorsements

W7ICW.

Washington County Emergency Network (WEN)

Georgian Repeater Nets (GRTN)

Midland Repeater Nets (MRN)

Pacific Repeater Nets (PRTN)

Endorsements

W7ICW.

Washington County Emergency Network (WEN)

Georgian Repeater Nets (GRTN)

Midland Repeater Nets (MRN)

Pacific Repeater Nets (PRTN)

Endorsements

W7ICW.
ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Richard B. Mesarov, W3AQ—SEC: DVB, PAM; TREJ, RM: PDJ.

The E. Pa. Nett meets Mon. through Pri. at 1830 on 3610 kHz sneak tune m at the rig for traffic work, ARK was QRT second, terms. YVX euroiled as an E.E., student at Le-the West Phila. RA are HAU, près.; AHX, vice-pres.; New assignées: FEY as OES, WQK as OO. (Officers of on vacation. CMN worked 10 new countries in August lûgh U. FYR is working phone DX on 15 meters and Mesimv, W3JNQ—SEC: DVB. PAM: TEJ. RM: PDJ. EU will be a grandfather. YR (OUI/s OM) was able to liand handling long-haul traffic for KP4s and KL7s. CEE DJW. sec-y.; H AS, treas.; AUT, corr. secy., all servmg mit with the same old gear and a 260-tt, off-center an-

Ibfi, of spuds. KJ received a Worked AU Mass. Counties 24. with 73 peopie consuming 3 bushels of corn and 25

tenna. DYT was entertained by the Radio Club in UIU met a Cuban YL at the convention, but moans that bought a Ranger and is moving to smaller quarters. K3ATX has a new HQ-110. DBL and DBN have a 6-
meter three-element heam 70 ëeet high and again are the GPR-90 with s.s'.i. adapter, and TSC a 10-meter

Expectations for the preceding mon th. Radio Club news is report to the SCM on the first of each

State C.D. Headquarters had plans to have a get-together this November in New

brunswick. W3HDW, N.JN's manager, reports an attendance of 307 for the recent drill. W3KAI, KP00K on s.s.b. and c.w. K3CWZ is on the air in Baltimore and expects to lie back on the v.h.f. and K2EXO, former, 397 for the month. K2JGU is heard regularly on

ATLANTIC DIVISION

MARYLAND-DELAWARE-DISTRICT OF CO-

LUMBIA—SCM, Louis T. Cronberger, W3TCR—Aser, SCM for Delaware—Ray deCourelle, 31XQ, SEC: YV9, PAM: F3G, TREJ, RM: F3R2. New appointees: FEY as OES, WQK as OO. Officers of the section have cooperated with the Burlington County C.D. members cooperated with the

Radio Club in New Brunswick. The Northern Amateur Radio Assn. meets at the

Burlington C D. and K2GXX is president. State C.D. Headquarters had

lightning trouble during the summer. W2RG and son K3OA took QHs home on a recent trip. W3EAI plans to have a get-together this November in New Brunswick. W3HDW, N.JN's manager, reports an attendance of 307 for the recent drill. W3KAI, KP00K on s.s.b. and c.w. K3CWZ is on the air in Baltimore and expects to lie back on the v.h.f. and traffic men who would or could participate in v.h.f. traffic nets for the section. Traffic: (Aug.) W3EAI 29, MCG 13, QCW 129, K3BH 106, K3WBJ 106, W3TN 82. COK 61. (July) W3MCG 148, (June) W3MCG 38, (May) W3-

MCG 155.

BWWER NEW JERSEY—SCM, Herbert C. Brooks, K2JHG—SEC: W2YRB, PAM: W2ZL. RAMs: W2-

YRW, W2HDW and W2ZI. The Cherry Hill Amateur Radio Club is new in the section. WA2BRK is its call

and K2GXX is president. State C.D. Headquarters had

lightning trouble during the summer. W2RG and son K3OA took QHs home on a recent trip. W3EAI plans to have a get-together this November in New Brunswick. W3HDW, N.JN's manager, reports an attendance of 307 for the recent drill. W3KAI, KP00K on s.s.b. and c.w. K3CWZ is on the air in Baltimore and expects to lie back on the v.h.f. and traffic men who would or could participate in v.h.f. traffic nets for the section. Traffic: (Aug.) W3EAI 29, MCG 13, QCW 129, K3BH 106, K3WBJ 106, W3TN 82. COK 61. (July) W3MCG 148, (June) W3MCG 38, (May) W3-

MCG 155.
SOME NOTES ON RTTY

RADIOTELETYPE operation on the amateur bands is a rapidly growing activity, and the RTTY enthusiasts constantly are seeking new methods of improving their techniques. With the advent of S.S.B. transmitters with their required high degree of frequency stability, this group began to explore methods of adapting this equipment to their specialty.

At first, the simplest scheme was to feed an audio frequency shift signal into the audio system. If the input audio signals are perfect sine waves, and the transmitter audio amplifier and balanced modulators free of distortion, the r.f. output signal, under S.S.B. operation, would be a clean C.W. carrier shifted in accordance with the audio input keying frequency. However, any harmonic distortion present from the A.F.S.K. source will appear as spurious C.W. signals. Distortion in the transmitter proper will also appear as spurious C.W. signals. To eliminate these problems, some owners of commercial transmitters have added diode frequency shifters to the V.F.O. of the S.S.B. transmitter. While these diode shifters work, they may cause frequency drift in the V.F.O. Furthermore, the frequency shift will not be constant as the V.F.O. is changed in frequency.

A preferable system is to shift the frequency of a quartz crystal heterodyning oscillator in the S.S.B. transmitter. If the proper oscillator is chosen, the shift will be constant, regardless of the final output frequency of the transmitter. In most cases spurious signals will no longer be a problem. In addition, the excellent frequency stability of the V.F.O. will not be impaired.

In Hallicrafters HT-32 transmitters the side band inverting crystal controlled oscillators can be easily revised for this arrangement by adding a small capacitor across the highest frequency crystal to move it 850 C.P.S. After modification, the removal of a plug-in adapter restores the HT-32 to its normal operation for S.S.B., A.M. or C.W.

A field service bulletin describing this modification in detail is being prepared and will be available upon request.

— Fritz Franke
HERE'S FACT—NOT THEORY

why the "Pacemaker-Thunderbolt" team is your best HIGH POWER LINEAR BUY!

The "Pacemaker-Thunderbolt" power team will deliver:

1. More power output to a wider range of antenna systems than any other exciter and high power linear amplifier combination!

2. ... and it will deliver this power-packed signal at less dollars per watt than any other exciter and high power linear amplifier combination!

Provides superb performance and many unique operating and engineering features!

VIKING "PACEMAKER" TRANSMITTER/EXCITER
An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input ... 35 watts AM. Unique circuitry uses only 1 mixer for improved spurious signal rejection greater than 50 db, Balanced range audio. Highly stable built-in VFO gives complete coverage of bands without crystal switching or re-tuning. Instant bandswitching 80, 40, 20, 15 and 10 meters, VOX and anti-trip circuits. Wide range pi-network output. Effectively TVI suppressed. With tubes and crystals.

Cat. No. 240-301-2, Wired .................................. Amateur Net $495.00

VIKING "THUNDERBOLT" AMPLIFIER
Rated at 2000 watts P.E.P.† input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs. — instant bandswitching. May be driven by the Viking "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: approx. 10 watts Class Aβ linear, 20 watts Class C continuous wave. Employs two 4-400A tetrodes in parallel, bridge neutralized — wide range pi-network output. With tubes.

Cat. No. 240-353-1, Kit ........................................... $524.50
240-353-2, Wired .............................................. $589.50

For the strongest signal on the band!

Unequaled 100% broadcast-type high level amplitude modulation! Full 2000 watts SSB † input—1000 watts CW and AM!

VIKING "KILOWATT"
Brilliantly designed, and engineered specifically for high power operation, the Viking "Kilowatt" is the only power amplifier available which will deliver a signal with the authority of maximum legal power in all modes!

Class C final amplifier operation provides plate circuit efficiencies in excess of 70%. Final amplifier utilizes two 4-400A tetrodes in parallel, bridge neutralized — wide range pi-network output. Continuous coverage 3.5 to 30 megacycles.

For unsurpassed enjoyment with every contact an unforgettable experience ... step up to the very finest ... the thrilling Viking "Kilowatt"!

Cat. No. 240-1000 .................................................
Wired and tested with tubes Amateur Net ...... $1595.00
Matching accessory desk top, back and three drawer pedestal.
Cat. No. 251-101-1 ............................... FOB Corry, Pa. $132.00

*Manufacturer does not publish rating; however, 2000 watts P.E.P. input represents maximum legal limit under average operating conditions.

For easy terms see your Johnson Distributor

E.F. Johnson Company
2840 SECOND AVENUE S.W. • WASECA, MINNESOTA
**VIKING "NAVIGATOR" TRANSMITTER/EXCITER**

More than a novice transmitter—also serves as a flexible VFO-Exciter delivering enough RF power to excite most high powered amplifiers on CW and AM! 40 watts CW input—6146 final amplifier tube—wide range pi-network output. Built-in VFO or crystal control—bandswitching 160 through 10 meters. Timed sequence keying, TVI suppressed and filtered. Complete with tubes, less crystals.

Cat. No. 240-126-1. Kit.. Amateur Net $149.50
Cat. No. 240-126-2. Wired and tested.. Amateur Net $199.50

**VIKING "ADVENTURER" TRANSMITTER**

Perfect for the novice or experienced amateur! 50 watts CW input—instant bandswitching 80 through 10 meters. Crystal or external VFO control. Rugged 807 final amplifier tube—wide range pi-network output. Clean, crisp keying. TVI suppressed. Complete with tubes, less crystals.

Cat. No. 240-181-1. Kit.. Amateur Net $129.50
Cat. No. 240-181-2. Wired.. Amateur Net $169.50

**VIKING "6N2" TRANSMITTER**

This compact VHF transmitter punches your signal out with 150 watts CW and 100 watts phone input. Instant bandswitching 6 and 2 meters. Completely shielded and TVI suppressed, the "6N2" may be used with the Viking "Ranger," Viking 1, Viking 11, or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 output. With tubes.

Cat. No. 240-201-1. Kit.. Amateur Net $129.50
Cat. No. 240-201-2. Wired.. Amateur Net $169.50

**VIKING "FIVE HUNDRED" TRANSMITTER**

Rated 600 watts CW input... 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meters! Compact RF unit designed for desk-top operation—power supply modulator unit may be placed in any convenient location. All exciter stages tuned to VFO tuning. High gain push-to-talk audio system. Operates from panel control or highly stable, built-in VFO. Class C 4-400A final amplifier provides plate circuit efficiencies in excess of 70% with unequalled broadcast-type high level amplitude modulation. Wide range pi-network output circuit with silver-plated final tank coil will load virtually any antenna system. Low level audio clipping—effectively TVI suppressed and filtered. With tubes.

Cat No. Amateur Net
240-500-1. Kit... $749.50
240-500-2. Wired... $749.50

**VIKING "COURIER" AMPLIFIER**

This power-packed Class B linear amplifier is rated 500 watts P.E.P. input with aux. SSB exciter—500 watts CW and 200 watts AM! Continuons coverage 3.5 to 30 meters. May be driven by the Viking "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: 5 to 35 watts. Employs two 811A triodes in parallel—wide range pi-network. TVI suppressed. With tubes.

Cat. No. Amateur Net
240-352-1. Kit... $244.50
240-352-2. Wired... $289.50

**VIKING "RANGER" TRANSMITTER/EXCITER**

Superbly engineered... delivers solid audio punch! This popular 75 watt CW or 65 watt phone transmitter also serves as an RF/audio exciter for high power equipment. Built-in VFO or crystal control—instant bandswitching 160 through 10 meters. 6146 final amplifier—wide range pi-network output. Timed sequence keying, TVI suppressed. With tubes, less crystals.

Cat. No. 240-161-1. Kit... $229.50
Cat. No. 240-161-2. Wired and tested... $329.50

**VIKING "VALIANT" TRANSMITTER**

Here's effective power, wide flexibility, and many unique operating features combined in a compact desk-top transmitter! 275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) and 200 watts phone. Instant bandswitching 160 through 10 meters—built-in VFO or crystal control. Final amplifier utilizes three 6146 tubes in parallel—wide range pi-network output. Silver-plated final amplifier inductor—built-in low pass audio filter—low level audio clipping. With tubes, less crystals.

Cat. No. 240-104-1. Kit... $349.50
Cat. No. 240-104-2. Wired and tested... $439.50

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**For easy terms see your Johnson Distributor.**

**E. F. Johnson Company**

2840 SECOND AVENUE S.W. • WASECA, MINNESOTA.
All of these licensed radio amateurs make important contributions to the Heath line of fine ham kits. In a sense, they are your personal representatives within the company, because their design ideas and performance preferences reflect not only their own "on-the-air" experiences, but those of the amateur fraternity with which they are in constant contact. With this kind of representation in Benton Harbor, you can continue to rely on high-performance Heathkit amateur radio equipment designed by hams, for hams!

HEATH hams work to bring you

HEATHKIT 50-WATT CW TRANSMITTER KIT

MODEL DX-20
$35.95

If high efficiency at low cost in a CW transmitter interests you, you should be using a DX-20! It employs a single 6DQ6A tube in the final Amplifier stage for plate power input of 50 watts. The oscillator stage is a 6CL6, and the rectifier is a 5U4GB. Single-knob band-switching is featured to cover 80, 40, 20, 15, 11 and 10 meters, and a pi network output circuit matches antenna impedances between 50 and 1000 ohms to reduce harmonic output. Designed for the novice as well as the advanced class CW operator. The transmitter is actually fun to build, even for a beginner, with complete step-by-step instructions and pictorial diagrams. All the parts are top-quality and well rated for their application. "Potted" transformers, copper-plated chassis, and ceramic switch insulation are typical. Mechanical and electrical construction is such that TVI problems are minimized. If you desire a good clean CW signal, this is the transmitter for you! Shpg. Wt. 19 lbs.
HEATHKIT “APACHE” HAM TRANSMITTER KIT

- Newly Designed VFO—Provision For S.S.B. Adapter
- Modern Styling—Rotating Slide Rule Dial

MODEL TX-1 $229.50

Fresh out of the Heath Company laboratories, the brand-new “Apache” model TX-1 Ham Transmitter features modern styling and is designed as a handsome companion to the also-new Heathkit “Mohawk” receiver. The “Apache” is a high quality transmitter operating with 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, the “Apache” features an automatic switch to select circuitry providing for single sideband transmission through the use of a plug-in single sideband adapter. These Heathkit adapters will be available in the near future. A compact, stable and completely redesigned VFO provides low drift frequency control necessary for single-sideband transmission. An easy-to-read sliding type illuminated rotating VFO dial with vernier tuning provides ample bandspread and precise frequency setting. Simple band-switching control allows flip-of-the-wrist selection of the amateur bands on 80, 40, 20, 15 and 10 meters (11 M with crystal control). The “Apache” features adjustable low level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL-34 tubes in push-pull class AB operation. Time sequence keying is provided for “chirpless” break-in CW operation. The final amplifier is completely enclosed in a perforated aluminum shielding for greater TVI protection and transmitter stability. Cabinet comes completely preassembled and aligned front panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. Incorporates all the refinements necessary with many “plus” features for effective and dependable communications. Shpg. Wt. 115 lbs.

HEATHKIT “MOHAWK” HAM RECEIVER KIT

- All Critical Circuits Prewired and Aligned
- Crystal Controlled Oscillators for Drift-Free Reception

MODEL RX-1 $274.95

Outstanding results can be expected with the new “Mohawk” receiver which is designed to combine all the necessary functions required in a high quality communications receiver. A perfect companion for the Heathkit “Apache” transmitter, the “Mohawk” features the same wide-band slide rule type vernier tuning and covers all of the amateur bands from 160 through 10 meters on seven bands with an extra band calibrated to cover 6 and 2 meters using a converter. External receiver powered, accommodations are available for these converters which will be available in Heathkits soon. The “Mohawk” is specially designed for single-sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled, wired and aligned front end assures ease of assembly. All critical wiring is done for you insuring top performance. This 15-tube receiver features double conversion with IF’s at 1682 kc and 50 kc. Five selectivity positions from 5 kc to 500 CPS. A bridged T-notch filter is employed for maximum heterodyne rejection. Complete accuracy is obtained with the use of a built-in 100 kc crystal calibrator and the set features 10 db signal-to-noise ratio at less than 1 microvolt input. S-meter and many other fine features built-in for top-notch signal reception. Shpg. Wt. 90 lbs.

HEATH COMPANY
A Subsidiary of Daystrom, Inc.

BENTON HARBOR 9, MICH.
HEATHKIT PHONE & CW TRANSMITTER KIT

MODEL
DX-40
$64.95

The DX-40 incorporates the same high quality and stability as the DX-100, but is a lower powered rig for crystal operation, or for use with an external VFO. Plate power input is 75 watts on CW, permitting the novice to utilize maximum power. An efficient, control-carrier modulator for phone operation peaks up to 60-watts, so that the rig has tremendous appeal to the general class operator also. Single-knob switching covers 80, 40, 20, 15, 11 and 10 meters. PI network output coupling makes for easy antenna loading, and PI network interstage coupling between the buffer and final amplifier improves stability and attenuates harmonics. A line filter is incorporated for power line isolation. The efficient oscillator and buffer circuits provide adequate drive to the 6146 final amplifier from 80 to 10 meters, even with an 80-meter crystal. A drive control adjustment is provided, and the function switch incorporates an extra "tune" position so that the buffer stage can be pretuned before the final is switched on. A switch selects any of three crystals, or a jack for external VFO. High quality D’Arsonval meter for tuning. Shpg. Wt. 26 lbs.

HEATHKIT DX-100 PHONE & CW TRANSMITTER KIT

MODEL
DX-100
$189.50

You get more for your transmitter dollar when you decide on a DX-100 for your ham shack! Recognized as a leader in its power class, the DX-100 offers such features as a built-in VFO, built-in modulator, TVI suppression, PI network output coupling to match a variety of antenna impedances from 50 to 600 ohms, PI network interstage coupling, and high quality materials throughout. Copper plated 16-gauge steel chassis, ceramic switch contacts, etc., are typical of the kind of parts you get, in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11 and 10 meters with a single band-switch, and with VFO or crystal operation on all bands. RF output is in excess of 100 watts on phone and 120 watts on CW, with a pair of 6146 tubes in parallel for the final amplifier, modulated by a pair of 1625 tubes in parallel. VFO tuning dial and panel meter are both illuminated for easy reading, even under subdued lighting conditions. Attractive front panel and case styling is completely functional, for operating convenience. Designed exclusively for easy step-by-step assembly. No other transmitter in this power class combines high quality and real economy so effectively. Here is a transmitter that you will be proud to own. Time payments are available! Shpg. Wt. 107 lbs.

more fine ham gear from the pioneer

HEATHKIT GRID DIP METER KIT

A Grid Dip Meter is basically an RF Oscillator used to determine the frequency of other Oscillators or tuned circuits. Numerous other applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, designing new coils, etc. Features continuous frequency coverage from 2 MC to 250 MC, with a complete set of prewound coils, and a 500 ua panel meter. Has sensitivity control and a phone jack for listening to the "Zero-Beat". It will also double as an absorption-type wave meter. Shpg. Wt. 4 lbs.

Low frequency coil kit: two extra plug-in coils extend frequency coverage down to 350 KC. Shpg. Wt. 1 lb. No. 341-A $3.00
HEATHKIT ALL-BAND COMMUNICATIONS-TYPE RECEIVER KIT

Ideal for the short wave listener or beginning amateur, this Receiver covers 550 KC through 30 MC in four bands. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer type—power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—internal 95" speaker—head phone jack and AGC. Has built-in BFO for CW reception. An accessory power socket is also provided for connecting the Heathkit model QF-1 Q Multiplier. Will supply 250 VDC at 15 ma and 12.6 VAC at 300 ma. Model Alt-3

Shipping Wt. 12 lbs.

Cabinet: Fabric covered cabinet with aluminum panel as shown part 91-15A. Shipping Wt. 5 lbs. $4.95

HEATHKIT ELECTRONIC VOICE CONTROL KIT

Here is a new and exciting kit that will add greatly to your enjoyment in the ham shack. Allows you to switch from Receiver to Transmitter merely by talking into your microphone. Lets you operate "break-in" with an ordinary AM transmitter. A terminal strip is provided for Receiver and speaker connections and also for a 117 volt antenna relay. Unit is adjustable to all conditions by sensitivity and gain controls provided. Easy to build with complete instructions provided. Requires no transmitter or Receiver alterations to operate. Model VX-1

Shipping Wt. 5 lbs.

HEATHKIT "Q" MULTIPLIER KIT

This fine Q Multiplier is a worthwhile addition to any communications, or Broadcast Receiver. It provides additional selectivity for separating signals, or will reject one signal and eliminate a heterodyne. Functions with any AM Receiver having an IF frequency between 450 and 460 KC that is not AC-DC type. Operates from your Receiver power supply, and requires only 6.3 VAC at 300 ma (or 12.6 VAC at 150 ma), and 150 to 250 VDC at 2 ma. Simple to connect with cable and plugs supplied. Effective Q of approximately 4000 for sharp "peak" or "null". A tremendous help on crowded phone or CW bands. Model QF-1

Shipping Wt. 3 lbs.

...in do-it-yourself electronics!

HEATHKIT "AUTOMATIC" CONELRAD ALARM KIT

Designed to give instant warning whenever a monitored station goes off the air, the CA-1 automatically cuts the AC power to your transmitter, and lights a red indicator. Works with any radio receiver; AC-DC—transformer operated—battery powered, so long as the receiver has AVC. A manual "reset" button is provided to reactivate the transmitter. Incorporates a heavy-duty 6-ampere relay, a thyatron tube, and its own built-in power supply. A neon lamp shows that the alarm is working. Model CA-1

Shipping Wt. 4 lbs.
HEATHKIT VARIABLE FREQUENCY OSCILLATOR KIT

Enjoy the convenience and flexibility of VFO operation by obtaining this fine variable frequency oscillator. It covers 160-80-40-20-15-11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a, available on most transmitters. It features voltage regulation for frequency stability, and has illuminated frequency dial. VFO operation allows you to move out from under interference and select the portion of the band you want to use without having to be tied down to only 2 or 3 frequencies through the use of crystals. “Zero in” on the other fellows signal and return his CQ on his own frequency! Shpg. Wt. 7 lbs.

MODEL VF-1
$19.50

HEATHKIT REFLECTED POWER METER KIT

A necessity in every well equipped ham shack, the model AM-2 lets you check the match of the antenna transmission system, by measuring the forward and reflected power or standing wave ratio. Handles up to one kilowatt of energy on all bands from 160 to 2 meters, and may be left in the antenna system feed line at all times. Input and output impedances for 50 or 75 ohm lines. No external power required for operation. Meter indicates percentage forward and reflected power, and standing wave ratio from 1:1 to 6:1. Shpg. Wt. 3 lbs.

MODEL AM-2
$15.95

HEATHKIT BALUN COIL KIT

This convenient transmitter accessory has the capability of matching unbalanced coax lines, used on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance. Design of the bifilar wound Balun Coils will enable transmitters with unbalanced output to operate into balanced transmission line, such as used with dipoles, folded dipoles or any balanced antenna system. Can be used with transmitters and Receivers without adjustment over the frequency range of 80 through 10 meters. Will handle power inputs up to 200 watts. Shpg. Wt. 4 lbs.

MODEL B-1
$8.95

save 1/2 or more . . . with HEATHKITS

FREE 1958 Catalog

Send for this Free informative catalog listing our entire line of kits, with complete schematics and specifications.

☐ Rush Free 1958 catalog.
Preferred because:

**EXTRA HEAVY-DUTY**
Holds heaviest commercial arrays — ice-proof, wind-proof, moisture-proof!

**WON'T DRIFT**
Provides 3500 in.-lb. resistance to lateral thrust.

**EASIEST TO INSTALL**
*It's complete!* Mounts on shaft or flat on plate in 30-minutes.

**CONTROL CABINET:** Pin-point calibrated in 5° units. Needle operates without activating rotor. Built for 8-wire cable.

**ROTOR MECHANISM** streamlined to resist moisture, "ice-lock." Actually stronger than your antenna itself. 98 ball bearings for smooth action. Positive brake ends drift.

**YOU CAN'T AFFORD LESS! WHY PAY MORE?** In only a few months the new CDR "Ham-M" Rotor has become the "pet" of hams from Coast to Coast. Costs less than rotors that won't give you any better performance, won't hold heavier antennas, won't give you any more resistance to the elements. It's the complete rotational system—no extras to buy. At your distributor's: only $119.50!

**EXCLUSIVE OFFER:**
CDR "CALL-LETTERS" JEWELRY FREE! Handsome rhodium-finish tie-bar and key chain, both with your call-letters engraved FREE with your purchase of the "HAM-M". Both bear amateur radio emblem. Just examine the "HAM-M" and get both for only $8.60 (tax included) a $7.20 value for half price. See your CDR distributor for details.

CDR

HAM ANTENNA ROTOR

Cornell-Dubilier Electric Corp.,
South Plainfield, N. J.

The Radiart Corporation,
Indianapolis, Ind.
HERE'S HOW YOU ENTER

1. Go to one of the distributors listed here—any time during the month of October. See a demonstration of Hallicrafters' latest equipment.

2. Fill out the entry card which your distributor will supply you, including call letters and completion of, in 50 words or less, either of these two statements:
   (a) "I prefer Hallicrafters single sideband equipment because ...".
   (b) "I prefer Hallicrafters V.H.F. equipment because ...".

3. Turn in card to distributor—do not mail to Hallicrafters. Each distributor will judge his entries and select his local winner. More than 100 such local awards will be made to entrants submitting the best, most sincere and original statements in the opinion of the distributor or other individual(s) he may designate.

4. Each local winner will receive from this distributor a Gift Certificate worth $100.00 toward the purchase of any model of Hallicrafters communications equipment. Decision of the distributors' judges shall be final.

5. Local winners' names and entry statements will be forwarded to the Hallicrafters Company, where a panel of judges will select 1st, 2nd, 3rd, 4th and 5th place Grand Winners. Prizes to be awarded.
**Enter Here!**

Visit one of these distributors in October!

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- The Hallcrafters Co.
  Chicago 24, Illinois
one of these Electro-Voice microphones will meet your needs best

CHOOSE FROM THE WORLD'S MOST COMPLETE LINE:
ELECTRO-VOICE THE CHOICE OF PROFESSIONALS

Whatever your microphone problem, Electro-Voice has the solution. Because only Electro-Voice offers you such a wide selection to choose from, and only Electro-Voice has spent years of painstaking research to bring you microphones which rate BEST in every category.

Choose from carbon, crystal, ceramic or dynamic E-V microphones; choose any pick-up pattern: non-directional, cardiod, or differential Electro-Voice has them all. Look at this chart... and choose the BEST.

And, for detailed information regarding special applications, write
"I am now using the Gotham V80 vertical antenna with only 55 watts, and I am getting fantastic reports from all over the world". VP1SD

10% PRICE SLASH!

GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna can be assembled in less than two minutes, and requires no special tools or electronic equipment. In the V160, resonance in the 160, 80, 75, and 10 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V10 multi-band verticals. No guy wires needed; rugged, occupies little space, proven and tested.

Simple design and superior materials give all-band operation, and effective, omni-directional radiation. Gotham verticals are rugged, with low initial cost and no maintenance. Guaranteed Gotham quality at low Gotham prices. Perfect for the novice with five watts or the expert with a kilowatt.

10% PRICE SLASH!
TAKE 10% WHEN ORDERING

Airmail Order Today — We Ship Tomorrow
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1805 PURDY AVE., MIAMI BEACH, FLA.
Enclosed find check or money-order for:
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 □

Name ..................................................
Address ................................................................
City ........................................ Zip ....... State .........
You could work wonders if you had a Gotham Beam!

Study these specifications—compare them—and you too will agree, along with thousands of hams, that Gotham beams are of the best!

Type of Beam. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

More DX Contacts

Gain. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

Thousands In Daily Use

Matching. Matching of the transmission line to the beam is extremely simple and quick. No electronic equipment or measuring devices are required.

Alcoa Quality Aluminum

Assembly and Installation. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

Consistent Performance

 Mast. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between 3/4" and 1 1/4".

You will work the World

Standard and Deluxe Beams. Standard beams in the 6, 10 and 15 meter bands use 3/8" and 3/4" tubing elements; the deluxe models for these bands use 5/8" and 1 1/4".

In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

TriBandBeams

6-10-15TriBandBeams

$39.95

10-15-20TriBandBeams

$49.95

Do not confuse these full-size triband beams with so-called midgets. The TriBand has individually fed (52 or 72 ohm coax) elements and is not frequency sensitive, nor does it have baluns, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham TriBand Beam.

TwoBanderBeams

6-10 Two Bander $29.95

10-15 Two Bander $34.95

10-20 Two Bander $36.95

15-20 Two Bander $38.95

Each Two Bander has twin 12’ booms, and full-size half-wave elements. 5/8" and 1 1/4" aluminum alloy tubing, all castings and fittings are supplied. Assembly is easy.

Put America back to Work!

10% Price Slash!

Take 10% off when ordering

Airmail Order Today — We Ship Tomorrow

Gotham

1805 Purdy Ave., Miami Beach, Fla.

Enclosed find check or money-order for

TWO BANDER BEAMS

6-10 Two Bander $29.95

10-15 Two Bander $34.95

10-20 Two Bander $36.95

15-20 Two Bander $38.95

TRIBANDER

6-10-15 $39.95

2 METER BEAMS

Deluxe 6-Element $12.95

12-EI 16.95

6 METER BEAMS

Std. 3-EI Gamma match $12.95

T match 14.95

3-EI Gamma match $16.95

T match 19.95

4-EI Gamma match $25.95

T match 28.95

10 METER BEAMS

Std. 2-EI Gamma match $11.95

T match 14.95

2-EI Gamma match $18.95

T match 21.95

3-EI Gamma match $16.95

T match 18.95

3-EI Gamma match $22.95

T match 25.95

4-EI Gamma match $27.95

T match 30.95

15 METER BEAMS

Std. 2-EI Gamma match $19.95

T match 22.95

2-EI Gamma match $29.95

T match 32.95

3-EI Gamma match $26.95

T match 29.95

3-EI Gamma match $36.95

T match 39.95

20 METER BEAMS

Std. 2-EI Gamma match $21.95

T match 24.95

2-EI Gamma match $31.95

T match 34.95

3-EI Gamma match $34.95

T match 37.95

3-EI Gamma match $46.95

T match 49.95

(Note: Gamma-match beams use 52 or 72 ohm coax.

T-match beams use 300 ohm line.)

New! Ruggedized Hi-Gain 6, 10, 15 Meter Beams

Each has a TWIN boom, extra heavy boom mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

Beam #8 (6 Meters, 4-EI) $38.95

Beam #10 (10 Meters, 4-EI) $45.95

Beam #15 (15 Meters, 4-EI) $49.95

Name

Address

City Zone State

109
Insu-Traps
These streamline hy-gain traps are small (3" diameter) and light weight. Capacitor dielectric and coil form molded high impact styron. Each designed to take 1 KW AM, 2000 watts P.E.P. Individually factory resonated for maximum frequency accuracy. Completely weather sealed, waterproof and air tight (do not breathe) for years of stable operation. Carbon activated polyethylene covers. Guaranteed for the life of the beam. HI-Q coils well-removed from any metal mean highest efficiency of isolation.

Triaxial Gamma Match
Exclusive Triaxial Gamma Match system with coaxially formed reactance canceling capacitor built-in, makes possible for the first time a perfect 1:1 SWR on a 3-band antenna. Although factory pre-calibrated, it is also adjustable to compensate for variations which may be encountered at each installation site. Exceptional bandwidth maintains low SWR over entire band. Use of this system permits tuning array for maximum gain with no compromise to facilitate matching.

Construction
Hot dipped galvanized steel boom 1½" in dia. for maximum strength with lowest possible wind loading. Boom braces form rigid angular boom/mast assembly. Heavily plated 10Ga steel channels attach all elements to boom and boom/mast with positive grip. Elements are 6061-T6 high strength aluminum alloy. 1¼", 1", ¾" and ½" sizes are used. All hardware galvanized and iridite treated.

Gain & F/B Ratio:
Hy-Gain's HI-Q traps result in minimum element loading and full SWR, perfect performance. Longest element is approx. 32' together with full sized 18' boom spacing results in a tri-band beam with full 8 db gain and 25 db F/B ratio.

Wind Loading:
Streamlined traps (only 1½") together with steel boom construction result in smallest total wind loading area possible in a full sized tribander.

Guarantee:
Hy-Gain is the originator of the One Full Year Written Guarantee.

Two-Element, Full Size Trap Tribander
Top full size performance with 18' boom, 30' element, 18' MAH, 6' boom height and 38° element angle. 6 dB Gain. 25 dB F/B Ratio.

Three-Element, Full Size Trap Tribander
There are more 3-Eleven Trap Tribanders in use than all other traps combined. MAH 18', 30' boom length and 38° element angle. 6 dB Gain. 25 dB F/B Ratio.

Mail Orders Promptly Processed
Same Day Shipment From Stock
To save C.O.D. Charges, please include sufficient postage with your order. Any extra money will be returned.

Arrow's Export Dept. Ships To All Parts Of The World!
Globe King 500C

Complete transmitter, bandswitching 80-10M, Min. 45Db carrier suppression. 3-stage RF section, pi-net, speech clipping, reverse neg. feedback. Ceramic band and function switches. Narrow bandwidth, Forward Look.

Globe's VOX Model 10

For voice operated control, with extra contacts for auxiliary circuits. Plug in socket at rear of DSB Xmttr. Adaptable for Scout, Champ and similar Xmttrs.

W/T: $24.95  Kit: $19.95

VFO 755A 160-10 Meters

W/T: $55.95  Kit: $49.95

For 10-160M; output on 40 & 140M. Vertical drive with shock absorbing features, self-contained, well-filtered power supply with voltage regulation.

Model 666 for 80M; w/t only. $49.95

Power Attenuator PA-1

Use with Xmttr. up to 70w; input for swamping drive to linear amplifiers. Three power reduction positions. Coax input and output.

W/T: $10.95

Globe Chief 90A

Full contained, self-starting, 6-500M, with built-in power supply. Pi-Net for external VFO.

For linear amplifiers. Three power reduction positions. Coax input and output.

W/T: $27.50  Kit: $19.95

Globe Hi-Bander

Power Attenuator PA-1

For use with Xmttr. in 70w; input for swamping drive to linear amplifiers. Three power reduction positions. Coax input and output.

W/T: $12.95  Kit: $10.95

Globe Matchet Sr., AT-3

For Xmttr. of 100w CW, 75w tone. Substantial harmonic attenuation. Unbalanced output. Self contained.

W/T: $15.95  Kit: $11.95

ALL PRICES F.O.B. N. Y. C.

Prices Subject To Change Without Notice
Tapetone, specialist in frequency conversions, now brings to the air waves an amazing, new six-meter receiver that will give you consistent top performance.

**RECEIVER FEATURES:**
- Noise figure less than 3.6 db (0.5MV signal produces 10 db signal to noise).
- Long linear slide rule dial with smooth inertia tuning.
- Dial calibrated for 6, 2, 1¼ and ¾ meter bands.
- Power available from receiver for future companion 2, 1¼ and ¾ meter converters.
- Cascode RF amplifier.
- Linear detector for SSB and CW with AVC on or off.
- Coverage — 49.0 — 54.0 mc.

**CRYSTAL LATTICE FILTER ACHIEVES THESE FEATURES:**
- Band width at 6 db: 3.5 KC.
- Band width at 60 db: 12.5 KC.
- Band pass flat to ±½ db for 3.0 KC. band width.
- Image rejection 60 db down.
- Rejection of all other spurious and unwanted signals 70 db down.

**TAPETONE ALSO OFFERS YOU THESE OTHER QUALITY PRODUCTS:**

### 6 METER SERIES
with RF Gain Control to Reduce Mixer Overloading
- Model XC-50 I.F. Tuning Range 14 to 18 mc
- Model XC-51 I.F. 10 to 14 mc
- Model XC-50-C I.F. 26 to 30 mc
- Model XC-50-N I.F. 30.5 to 34.5 mc
- Model XC-50-C4 (with Dual Crystal Oscillator) I.F. Tuning Range 28 to 30 mc
- Model XC-40 (Russian Satellite Converter) RF Input: 40 mc I.F. Output: 14.4 mc

### NEW 1¼ METER SERIES
with Low Noise High Gain 417A Tube
- Model TC-220-G I.F. Tuning Range 49 to 54 mc
- Model TC-220-N I.F. 30 to 35 mc
- Model TC-220-G I.F. 20 to 25 mc

### 2 METER SERIES
with Low Noise High Gain 417A Tube
- Model XC-144 I.F. Tuning Range 14 to 18 mc
- Model XC-144-C I.F. 26 to 30 mc
- Model XC-144-N I.F. 30.5 to 34.5 mc
- Model XC-144-CE (Special European Converter) RF Input Range: 144-146 mc I.F. Tuning Range 28 to 30 mc

### REGULATED POWER SUPPLY
- Model PSR-150 available.......................... price $49.95
- Model PSR-150 Kit Form.......................... price $39.95
Over $1500 in prizes to be given away by TAPETONE, INC., Webster, Mass.

There has been a rapid growth of radio amateur 6 meter (50 mc band) activity. There are more TV stations with better antennas and operating with higher power. Other VHF communication services and man-made noise of various kinds has increased. All this has created serious problems of receiver overloading more so in city areas not considered in years gone by. Tapetone is vitally interested in this receiver design problem. To have more facts and information of these interference conditions and without regard to technical solution, Tapetone offers these prizes for:

The best description of interference conditions encountered in 50 mc reception. The judges will be guided by the most complete factual, accurate and informative entry describing these interference conditions.*

Although technical solutions may be interesting and might later be published with proper credit to the writer, the judges will not give additional credit or be guided by these suggested technical solutions.

1ST PRIZE TAPETONE'S NEW "SKY SWEEP" 6 METER RECEIVER.
2ND PRIZE TAPETONE'S NEW "SKY HAWK" 6 METER TRANSMITTER.
10 3RD PRIZES YOUR CHOICE OF TAPETONE'S 1¼ METER, 2 METER OR 6 METER CONVERTERS.
PLUS 100 HONORABLE MENTION GIFT CERTIFICATES VALUED AT $5.00 EACH.

JUDGES:
A. A. FARRAR, W1CLS, Asst. Vice Pres., Raytheon Mfg. Company
A. E. COE, W1RVO, Radio Shack, Boston.
E. C. HARRINGTON, W1JEL, Pres. Harrington Electronics
T. W. LANMAN, Pres. Tapetone, Inc.

RULES:
1. All entries must be mailed to TAPETONE, INC., 10 Ardlock Place, Webster, Massachusetts, complete with entrant's name, address and call letters clearly indicated.
2. All entries must be postmarked before December 15, 1958 and received before midnight December 29, 1958.
3. Each entry will be judged on the basis of clarity, facts, and completeness. The judges' decision will be final.
4. Only one prize will be awarded to a person. All entries become the property of TAPETONE, INC., to use as it sees fit, and none will be returned.
5. This contest is subject to all Federal, State and local regulations.
6. All winners will be notified by mail by January 30, 1959 and a list of winners will appear in March QST.

TAPETONE, INC. 10 ARDLOCK PLACE, WEBSTER, MASS.
TRADE IN BY MAIL AT RADIO SHACK!
No money down! And look at the terrific allowances that your old rig brings! There's nothing up our sleeve... all the cards are on the table. The chart lists the trade-in allowance you will receive on your old gear against the purchase of any one of the five top Hallicrafter units. All that you have to do is send in your old equipment, and pay the difference between the net price of the unit desired and your allowance in easy monthly payments. All that we ask is that your trade-ins be in operating and presentable condition.

FREE!
NEW 232-PAGE 1959 CATALOG
Crammed with ham gear, parts, kits, everything electronic!

LARGEST STOCK OF HAM EQUIPMENT IN THE EAST!
IF YOU TRADE...

BIG ALLOWANCES AND NO MONEY DOWN!

If your old equipment isn't listed in this chart, write for your allowance.

IF YOU BUY WITHOUT A TRADE...

EASY PAYMENTS FIT YOUR BUDGET!

NEW MAIL ORDER HEADQUARTERS

Radio Shack's new mail order headquarters and electronic shopping center covers 80,000 square feet. An entirely new system fills your order with the greatest speed in the industry!
ELENCO "Power Gainer"
Audio Compression Amplifier

4 TIMES POWER GAIN
Prevents Overmodulation
AM-SSB-DSB only $39.50

Write for Details
ELECTRONIC ENGINEERING CO.
Wabash, Indiana

QST BINDERS
As QSTs get older, they become more valuable. Are your 1958 copies scattered sloppily about the shack? If so, why not file them neatly. The best way to accomplish this is to place them in sturdy, good-looking QST Binders.

Finished in reddish-brown fabrikoid with stiff covers, each Binder holds 4 TIMES POWER GAIN finished in reddish-brown fabrikoid with stiff covers, each Binder holds 80 QSTs. Each—$3.00 (postpaid)

AVAILABLE ONLY IN U.S.A.

AND POSSESSIONS

AMERICAN RADIO RELAY LEAGUE, Inc.
West Hartford 7, Connecticut

Station Activities
(Continued from page 91)
building a kw. K3QDT operated K3WAS/2 at Camp Drum and handled 28 messages. K2DXE reports that during the first six months of this year NYSPTEN operated 408 hours and 49 hours in August. K7TH reports that in 2328 pages of traffic were handled. K2RIK is going n.t.m. on 6 meters with his Globe Scout 680. W7NN now has 330 watts on 2 meters and 120 watts. W2EMW received a YLCC certificate and sent in for a 210 sticker on DXCC. K2QNM received a 30-watt certificate. K2.DO is a new NC8 in NYSPTEN. Appointments: W2ATC and W2RKC as QSOs. W2A0Q is operating a BC-800. The ARAT is a transmitter built in August. K2KTZ expects to operate K2YD at Alfred this fall. Your SCM attended the 41th National Convention in Washington, D. C. Our congratulations to the gang in Rochester. The AWA exhibit was the most popular. W2GB's kw. spark transmitter, which was specially licensed, made the whole show net in Boston as a part of the outstanding non-commercial exhibit, W3QY, W3LF, W3MG, W2VG, W2YV and W2ICE handled the crowd. The September BARRA JIG contains many fine items, among them a full report. W2ICE was official photographer. W4U1T presented a v.h.f. kiting's newest show "The World Above 50 Meters." W3S2W has his equipment on display and Kelley presented "The Story of DX." The Connecticut ARA provided communications for the coming Biggest Night field trial. W2RCC with each "brace." Participants included K2UMY, W2YZA, K2LTD, K20YU, K2RBN, W2ADZ, K2AQQ, K21N, W2YLI, W2HEL, W2LE, K2TXW, and K2YPG. W2HEL made BPL, Class A; (Aug.) K2LTD 921, W2HUG 725. K2MES 229, W2ATC 194, K2RYH 135, K2GWN 133, K2CDQ 99, K2DUX 77, K2R5 63, K2YD 98, K2RTN 54, W2FGA 49, K2AQQ 47, W2OB 37, W2COB 36, W2PVI 27, K2QDT 26, W2AZB 25, W2RQF 19, W2TPY 14, K2BCL 13, K2QNM 10, K2WG 10, K2KTK 10, W2EMW 3, W2FNS 2, K2KUR 2, (Due) W2Y1T 28.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mooreka, W3UHN—SEC; UMA, RAS: GIY, G2BB and NUG, PAMs: AER and TOC, New appointment: K3-LJB as AO. WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3553 kc. Students at State College are YCQ and BZT. The new president of the Carnegie Tech. RC (NK3) is K2WZ. AW7 now has 100 DXCC confirmed. The McKean RC now meets in a new club house, K2RZA is the new call of the Amateur RC of Westminster. Upper Yoder High School, with K3AJB, pres.; and KVB, vice-pres. New General Managers are K3CEF and ZSV. UVD is building the HBB-14; K13N-6T is a student at St. Francis Seminary. K4NQ now has a Globe Champ 200. W3RE is rebuilding his rig. W2Y7J presented an exhibit portraying amateur radio at the Madison Lake, N. H. Radio Club. W3KV is planning 2-meter activity at State College. K3BPZ has a new HQ-150. Yours truly enjoyed seeing so many W. Pa. hams at the ARRL National Convention. Among those who attended were QCN, WRE, W30V, LAXU, W30G, UGY, UTR, TL, W3Q, GIY, YA, ID0 and RSB. Correspondents to GIY, who won the Tazwell speed contest at 45 w.p.m. using a stick. The Eta RC presents the following via Oscillator: K3AAY now is mobile; MLI now is operating K3WZ, who is blind, NCE, AOR; of Coke Center RC (NXV) reports the following: The club station is at 2 meters running 100 watts; Field Day was held on Negro Mt.; the club is growing and playing an important role in Fayette County's RACES program. JW is using a Johnson Scout transmitter; K3BND is attending U.C.L.A.; WST is at Penn State. Up Erie way KVB was honored for his traffic-handling from the Antarctic Expedition; at Camp Sequoyah K2ERK did duty with the summer program for the Scouts; POS, JQO, JFP and YLI furnished communications on 6 meters at the Wattsburgh Fair Grounds; K3RKW received his General Class license, KC has a new tower up; W2A0Q has a new mobile Blaine. ZPZ and JQ4 vacated out West; BGO and ANX went west to Florida; K2QMH operates on 2 and 6 meters. A new Novice at Allison Park is K39QC. QST; (Aug.) W3LW 302, BZ J5 93, LSS at W34Y 4, YA 4, LOD 2, K3AJB 1, (July) W3BLU 272, BZ 69.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzer, WOPRN—
(Continued on page 118)
OUTCLASSES THEM ALL!

4 KW P.E.P. LINEAR AMPLIFIER
NOW AVAILABLE

• Costs Little More Than Others of Half the Power
• Save 1/3 with our new Factory-to-Consumer Sales Plan

▶ 4000 watts P.E.P. Single Sideband, 1500 watts AM input.
▶ 6000 Volt power Supply.
▶ High-low Power Switch, for tuning and quick power change.
▶ Double interlocked for absolute safety.
▶ Continuous frequency coverage 3 to 30 Mc.
▶ Forward and Reflected power circuits built in. Output meter calibrated in watts, 0-3000.
▶ Plate input meter calibrated directly in watts, 0-4000.
▶ Hipersel transformers for compactness, light weight, and good regulation.
▶ Will fit in desk top space equal to average receiver. Weighs only 170 lbs.
▶ New factory-to-consumer sales plan (direct sales only) includes trade-ins, time payments, money back guarantee.

Although designed to commercial specifications, the Elenco Commander operates with excellent efficiency at legal amateur power limit, giving superior performance on five amateur bands, 10 through 80 meters.

A post card will bring an elaborate 8 page brochure.

Manufacturers of Commercial and Amateur SSB Equipment. Now in the Eighth Year.

ELECTRONIC ENGINEERING COMPANY WABASH, IND.
Single Sideband at Its Very Best!
Triple conversion HQ-170 • 20 monthly payment $17.77. $35.90 down. CASH PRICE $359.00. Radio amateur's ideal for modem techniques, dependability. Clock timer $10 extra.

HENRY HAS THESE HAMMARBUND ITEMS IN STOCK FOR IMMEDIATE SHIPMENT

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<tr>
<th>Item</th>
<th>Price</th>
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<tr>
<td>HQ-110 Receiver</td>
<td>$249.00</td>
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<tr>
<td>HQ-160 Receiver</td>
<td>$379.00</td>
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<tr>
<td>HQ-100 Receiver</td>
<td>$189.00</td>
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<tr>
<td>MATCHING SPEAKER</td>
<td>$14.95</td>
</tr>
<tr>
<td>CLOCK TIMER</td>
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Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

PRICES SUBJECT TO CHANGE
TRADE — CASH — TERMS
WRITE, WIRE, PHONE HENRY NOW
EASIEST TERMS
90 days open account or 10% down, 20 months or more. We finance at a low 6%. Payment within 90 days cancels all interest. Compare terms and prove to yourself that you save money at Henry. Write today to start your 90-day open account.

PERSONAL SERVICE
FAST DELIVERY
Your inquiries and orders handled same day. Write, phone or wire.

Big TRADE-IN
We want to trade and we trade big. Truly liberal allowances on your old equipment. Tell us what you want to trade. We also pay cash for used equipment.

A-1 Reconditioned Apparatus
Nearly all makes and models. Big savings! Ten day trial—90 day warranty. 90 day full trade back on new apparatus. Write for bulletin.

INTRODUCING COLLINS NEW S LINE
32S-1 Transmitter—3.5-29.7 mc. 175 watt PEP input on SSB; 160 watt on CW. Incorporates time-proved features of KWS-1, KWM-1 including Mechanical Filter-type sideband generation; stable, permeability-tuned VFO; crystal-controlled high frequency oscillator; RF inverse feedback for better linearity, and automatic load control for higher average talk power. 9½" H, 14½" W, 11½" D.

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<tr>
<th>Product</th>
<th>Price</th>
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<tr>
<td>32S-1 Transmitter</td>
<td>$590.00</td>
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<tr>
<td>516F-2 Power Supply</td>
<td>$105.00</td>
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<tr>
<td>75S-1 Receiver</td>
<td>$495.00</td>
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<tr>
<td>312B-3 Speaker</td>
<td>$27.50</td>
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<tr>
<td>KWS-1 Transmitter</td>
<td>$1,355.00</td>
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<tr>
<td>428A-1 Power Supply</td>
<td>$740.00</td>
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<tr>
<td>KWM-1 Transceiver</td>
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<tr>
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Write, wire, phone or visit either store today.

Henry Guarantees You...
WORLD'S Best TERMS on the NEW
Collins
32S-1 TRANSMITTER!

Send for FREE Catalog

"World's Largest Distributors of Short Wave Receivers"
A NEW CONCEPT—Hi-Power
VHF LINEARS for 6 or 2 meters

Input: Average voice power on SSB — 600 watts
on CW, FM — 300 watts; on AM — 100 watts

• New BROADBAND untuned input circuit uses 6-watt drive for 600 watt input for 50-70 meters. New output circuit gives approximately 20 db more harmonic suppression than any other in common use while matching antenna impedances between 25 and 300 ohms.

• New built-in TR switch uses gain and selectivity of output tuned circuit; has approximately 10 db gain, with one 12BH7A tube.

Excellent stability; No parasitics; TVI suppressed. By-passed RF final in shielded compartment. Designed to work with 600A, 200A, Gonset Communicators, etc.

• Built-in heavy-duty power supply furnishes 2000 volts at 300 ma.; excellent static and dynamic regulation.

• Forced-air cooled PL4D21A in class AB2; up to 60% efficient. • 6 db switchable attenuator for AM-PM (tune at 350 ma.; excellent static and dynamic regulation.

• Built-in heavy-duty power supply furnishes 2000 volts at 300 ma.; excellent static and dynamic regulation.

LA-400 Sériés Linears-75 thru 10 meters

8020 for 75A-2, -3, -4 Collins receivers $129.95
LA-400-C Kit, complété for assembly only $149.95
LA-400-CM, complete for assembly only $159.95
LA-400-CM (Aug.) $179.95

LA-400 Series Commodities

VHF LINEAR 400 Series

LA-400-0, 10B, 20A, 30B, 40A, 50B, 60A, 70B, 80A, 90B for 75A-2, -3, -4 Collins receivers $129.95
Also chokes custom designed to your requirements.

LA-400 Sériés Linears-75 thru 10 meters

LA-400-0, 10B, 20A, 30B, 40A, 50B, 60A, 70B, 80A, 90B for 75A-2, -3, -4 Collins receivers $129.95
Also chokes custom designed to your requirements.

See your distributor or write:
P & H ELECTRONICS, INC.
424 Columbia, Lafayette, Ind.

120
Another Gonset advance brings added performance and value

6 METER fixed station
COMMUNICATOR

- Coverage 50-54 mcs.
- Complete 6 meter station...50 watts input...
- Type 6146 tube with Pi Network output...
- Highly stable, calibrated VFO with spotting switch to aid tuning...
- Highly selective, sensitive receiver...
- Adjustable squelch...noise limiter... "S" meter...panel mounted loudspeaker
- Heavy duty 115V AC power supply built in

Now...Model G-50, a highly compact, beautifully designed unit, adds materially to the pleasure of local contacts...to the thrill and excitement of 6 meter DX.

Everything's in one cabinet: 50 watt transmitter with pi-network and calibrated VFO (or optional xtal)...sensitive, selective communications receiver...AC power supply. All elements are completely integrated, operate perfectly together. This is Gonset's exclusive "packaging" concept...eliminates extra cost of several individual units...gives you excellent performance, exceptional value.

Simple, straightforward in operation and adjustment, G-50 will put a crisp 6 meter signal with real authority on the air in little more than the time required for connection of antenna and power. This is the sure, easy, inexpensive way to get on 6 meters. G-50, at your dealer soon.

Model No. 3221

GONSET'S NEW 10 ELEMENT, 6 METER YAGI

Gives more than 12 db forward gain...23 db minimum FBR...tripole driven element provides excellent match...usable frequency range, 50-54 mcs...husky 16 foot boom...light but balanced and rigid construction...no sag or droop...rotated by any heavy-duty TV rotator...makes 50 watts approach a KW...

Model 3282...net 27.50.
For 37 years specializing in supplying the amateur in his complete needs...including all parts to build, modify transmitting, receiving and ham shack equipment.

Your Walter Ashe catalog is your Amateur Headquarters...a complete One Stop Radio Supermarket filled with every item, every part, every piece of newest model, famous brand name equipment you could ask for. Whether you happen to need a tuning condenser for the final of that new rig you're building— or shiny new Collins KWM-1...Walter Ashe has it in stock for immediate shipment to you!

Our big new 144-page 1959 catalog includes hundreds of brand new listings for amateur radio application as well as the very newest in Hi-Fi and Test Equipment. If you haven't received your own personal copy... be sure to mail the coupon at once!

TRADE NOW! Walter Ashe is trading higher than ever right now! Tell us what you have to trade and what you want...and we promise you the "Surprise" of your life! Your used equipment is worth more...always...for everything you need in Amateur Equipment...

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125 PINE ST., ST. LOUIS, T. MO.

WALTER ASHE RADIO CO., Your One-Stop Supermarket
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For         Rush New Catalog
         Rush "Surprise Trade-in" on my
For                       (show make and model of new equipment desired)
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WISCONSIN DISTRIBUTORS—
5832 West Lisbon, MILWAUKEE
AMATEUR ELECTRONIC SUPPLY

DELTA DIVISION
ARKANSAS—SCM, Ulmon M. Goings, WAZZY—SEC: K5CB, PAM: DYL. It looks as if 6-meter operation is still on the up-climb. Several of the boys at Hope and Nashville have gone to 6-meters. They have formed a club which meets each Tue, and are busy trying to get their. net going. The amateurs of Osceola and Greenville mourn the passing of W0RFX, recently slum on duty as a State Trooper. K1SH/5 has a new all-band vertical up. Reports are that W8ML is holding ragchews with the boys in ZL-Land. W6200L has been very cationing and visiting hams in Florida. A new ham in Osceola is K5M20C. We appreciate very much the opportunity to serve the amateurs of the Arkansas section for the next 2-year term. We also appreciate the cooperation, loyalty and trust you have shown me in the past term. I will do my best to fulfill your expectations. Your used equipment is worth more...always...

NEW ACCESSORIES

Top Name Brands

Newest Releases!

Everything in Parts!

For parts and factory built amateur equipment...

Ask about our Easy Pay Plan

Now In Our 37th Year

OM! Make Walter Ashe Your "One Stop" Radio Supermarket

...for everything you need in PARTS AND FACTORY BUILT AMATEUR EQUIPMENT

Arkansas Radio Club visited the club at Rochester, and together they toured a number of the state. The following new 6-meter quota is K5CBR for McLeod and Wright Counties, BHA for Renfrew and Selkirk Counties, GMA for Carver, and SCT for Grand Forks. Big Stone, Swift and Stevens Counties. Recently UMAB sent an envelope to the ARRL QSL Bureau and in return got back a Russian 41-card dated 1917 1947 and 1949. The stumper is that CMAB was not licensed until 1902! Traffic: (Aug.) K5MDV 401, G8X 309, J6C 69, G0X 34, W0RSC 29, KEQ 39, K5RQ 38, KEAAE 36, GYS 32, W0UMX 32, G6K 29, K52 28, KE2TC 27, W0QD 27, A9U 23, W5MU 23, W02T 22, W5KV 22, W2R 21, the K5QSN 20, K5QVX 18, W5BTBO 16, WMA 14, FGP 13, TCE 13, K5MNY 12, WMY 10, LBA 10, 12377, RDD 8, MGT 4, W0HA 2, KE8K 1. (July) W0RF 15, (Apr.) K5HUC 10.
NEW
FULL-
POWER
AMATEUR
LINEAR
AMPLIFIER
USES
PENTA'S
PL-172
BEAM
POWER
PENTODE!

With the help of Penta's 1000-watt PL-172, Hallicrafters reports, the new HT-33A delivers more output to the antenna. Penta's exclusive "vane" suppressor grid design channels electron flow in the PL-172, providing true beam performance. At maximum ratings, the PL-172 will give more than 1000 watts of Class AB, actual useful output per tube at only 2000 plate volts...more than 1500 watts per tube at maximum Class AB, ratings...gives ultra-conservative performance at maximum amateur power limits. Convenient socket providing connections for all tube terminals is available. If you're particular about linearity, distortion, power and efficiency—like Hallicrafters—the PL-172 is for you.

FREE SIX-PAGE DATA SHEET gives full ratings of the PL-172, curves, and actual test result information on Class AB, and Class C operation. Write for yours today.

ASK FOR A FREE COPY of "Transmitting Tubes for Linear Amplifier Service." This nine-page bulletin discusses linear amplifier tube requirements in detail. Graphs, characteristic curves, oscillograph linearity patterns and data show why Penta's exclusive beam pentode designs outperform four-element tubes.

PENTA Laboratories, Inc.
312 No. Nopal St., Santa Barbara, Calif.

Makers of high-efficiency power pentodes, tetrodes, triodes and diodes for rf and af use, hydrogen thyratrons and vacuum relays.
Perfect 1:1 SWR

with the NEW Hydro-gain monobanders

GAMMAXIAL Gamma Match System!

Now a feature of all three monobanders, the new, pre-calibrated (GAMMAXIAL) Gamma Match assembly with coaxially formed reactance cancelling capacitor built-in makes possible for the first time a perfect 1:1 SWR. Coax connector for 50 ohm feed included. Developed by ga-gain's engineering staff and used exclusively in the hi-gain monobanders. - 3 ELEMENTS

- Average Gain: 8% db. Average P/B Ratio: 24 db.
- 10 M - 3 ELEMENTS
- 8 lbs.
- Boom Length: 104" Longest Element: 117"
- $24.95

- 15 M - 3 ELEMENTS
- 30 lbs.
- Boom Length: 142" Longest Element: 231"
- $34.95

- 20 M - 3 ELEMENTS
- 46 lbs.
- Boom Length: 219" Longest Element: 359"
- $59.95

Carefully engineered, incorporating the latest design principles for top performance, the hy-gain monobanders are factory pre-tuned and pre-matched. Complete with easy-to-follow instructions for assembly, these three elements are sold with a 1-year guarantee. Features include large diameter elements and ruggedly built boom/mast clamps. Booms hot dipped galvanized with 48 Ibe. per set.

SEE THE COMPLETE HY-GAIN LINE . . .

A. G. RADIO PARTS CO.

939 TOWNSHIP LINE

ELKINS PARK 17, PA.

READING BRANCH

628 SCHUYLKILL AVE. 17th & VENANGO STS.

FR 4-3362 BA 8-0505

124
QUALITY...

UNSURPASSED—ANYWHERE NEAR THE PRICE!

HQ-170
For the amateur who wants the very finest in SSB receivers. Contains all the functions necessary for solid contact in today's crowded bands. 17-Tube superheterodyne. Dual and triple conversion. Separate vernier tuning. Adjustable 60 db notch filter. 6, 10, 15, 20, 40, 80 and 160 meter amateur bands.
$35900 *

HQ-160
You could pay twice as much, and get no more than the general-coverage HQ-160 quality. Dual conversion. 540 KCS to 31 MCS. SSB. Q-Multiplier. Electrical bandspread. Separate stabilized BFO. Crystal calibrator. Adjustable 60 db notch filter. 13-Tube superheterodyne. Crystal-controlled 2nd IF.
$37900

Here's the pair that's making history in amateur radio. Never before has so much genuine quality and performance been offered at such low prices. Now the amateur can choose the one he wants and be sure that he's getting the very best buy in either a straight ham band or general coverage receiver.

*Telechron clock-timer, $10 extra.
SELECTRONIC INTRODUCES
NEW SSB STATION
ON DISPLAY NOV. 8
TOLEDO PEORIA

75S-1
SSB Receiver

32S-1
SSB Transmitter

312B-4
Speaker Console

NEW Operating Convenience
NEW Simplified Design
NEW Low Prices

Low bank rates with
Selectronic's Time Payment Plan

Selectronic SUPPLIES, INC.
3185 Belleview Road
Toledo, Ohio

203 South Adams
Peoria, Illinois

K8JZP, geec., and PXX, treas., holders of amateur radio station licenses in Ohio who do not have 1958 renewal plates may write The Bureau of Motor Vehicles, Reservation Department, 275 S. Fourth St., Columbus, Ohio, and request an application form if renewal licenses were not received by August 1958. Applicants are required to pay a $2 fee each, and in addition will be required to furnish proof of valid insurance on their vehicles. The Bureau of Motor Vehicles has been instructed by the Division of Motor Vehicles to issue renewal license plates to all persons who file for renewal prior to September 15. Renewal plates will be available to the Public on September 5.

HARRISON RADIO CORPORATION
225 Greenwich St., New York 7, New York (also Jamaica)

HUDSON DIVISION
EASTERN NEW YORK—SCM, George W. Tracey, W2EFU—SEC; W2KGG, RAI; W2PHX, PAMs; W2HU and W2NOC, Section keys: NYN at 2000, WPN (Novice) on 2200, WHF on 2300 kHz. NYSPSTN on 3925 kc at 1800; 1PN on 3070 kc at 1500; ESS on 3550 kc at 1800; ENY (emergency) on 29450 and 34450 kc. MHT, at 2100; MHT (Novice) on 2100 kc, Sat, at 1300. August found K2UTV with a new vertical and a 24-w.p.m. certificate. Endorsements: K2EIH and K2EIC as OOs; K2EIC and K2EU as OPSs. K2ZX says that there is no comparison between the old Adventurer and the Viking I. Dur hats are up to the Albany Amateur Radio Association for sponsoring the Hudson Division Convention at the Sheraton Ten Eyck Hotel. W2FBA reports confirmed DXCC of 201, K2TEDC also reports 195/64 in the DX department. Hudson Division applicants should forward their applications directly to their Emergency Coordinator. The following (Continued on page 148)

TOWERS A LL THE WAY IT’S E-Z WAY!
See Page 148
ANY CITIZEN CAN SECURE A LICENSE
without examination or code test by filling out form 505
(packed with each transceiver) and forwarding to the
F.C.C.

MEETS ALL F.C.C. REQUIREMENTS . . .
MAXIMUM FINAL INPUT 5 WATTS, FULL AM MODULATION.
.005% CRYSTAL TOLERANCE, CRYSTAL CONTROLLED
TRANSMITTER ON ANY ONE CHANNEL.

PLUS . . .
DOUBLE CONVERSION SUPERHET RECEIVER, 115V AC OPER-
ATION, ALSO AVAILABLE FOR 6 OR 12V DC OPERATION.
FULL 2 WATT LOW DISTORTION AUDIO OUTPUT.
COVERS ALL CHANNELS.

COMPLETE . . .
WITH ANTENNA AND MICROPHONE,
READY TO OPERATE. $89.95

International Crystal Mfg. Co. INC.
15 N. LEE • OKLAHOMA CITY, OKLA.
COMMUNICATION
ANTENNAS AND ACCESSORIES

BUMPER MOUNTS...

M-2A • Single mount of alloy steel, cadmium plated. Easily adjustable to fit any width bumper. Fastened quickly with open end wrench. Receptacle, with phenolic insulators, accepts any 3/8"-24 threaded spring and/or whip. Amateur Net $5.25

M-2AS • Single mount of stainless steel except bracket and receptacle which are chrome plated brass. Amateur Net $12.60

ASP-143 • Some general features as M-2A with double chain of links with receptacle mounted between. Accepts any 3/8"-24 threaded spring and/or whip. Amateur Net $7.95

ASP-143S • Double mount of stainless steel except bracket and receptacle which are chrome plated brass. Amateur Net $23.76

SEE THIS NEW a/s DISPLAY AT YOUR DISTRIBUTORS

Now you can see and examine the complete Antenna Specialists line of communication antennas and accessories in plain view at your distributors. Check the special features and select exactly what you need for your requirements.

WRITE FOR CATALOG
Blitz Bug is another quality product by Cush Craft. This all new Lightning Arrester, for standard coaxial cable, is designed to eliminate heavy static charge build-up — protecting valuable radio equipment. There is no insertion loss from Blitz Bug; it will not affect performance or S/W/R, to 150 MC.

Only $3.95

There's no better insurance than "Blitz Bug"

Cush Craft
621 Hayward Street
Manchester, N. H.

Buy Your "Blitz Bug" from Your Distributor
HT-32 XMTR
GIVES THE WORLD'S CLEAREST SIGNAL
• Provides S.S.B. AM or CW output on 80, 40, 20, 15, 11-10 meters
• Exclusive high frequency 5.0 mc quartz crystal filter cuts unwanted sideband 50 db. or more
• Patented Bridged-Tee modulator; temperature stabilized and compensated

$675

SX-101 RCVR
SETTING NEW STANDARDS FOR DEPENDABILITY
• Complete coverage of 7 bands — 160, 80, 40, 20, 15, 11-10 meters
• Special 10 mc. pos. for WWV, plus coverage of major MARS frequencies
• Exclusive crystal controlled upper/lower side band selection
• S-meter functions with A.V.C. off
• Tee-notch filter

$395

DeMambro
RADIO SUPPLY COMPANY, INC.
1005 Commonwealth Avenue, Boston 15, Mass.
All with TELETYPE CONNECTION to MAIN STORE
BETTER STILL, COME IN — PLENTY OF PARKING SPACE

CLs has a new SX-99, W8N7T, vacationed in Colorado. KBEKN went to Florida for his, MMZ is back in Iowa and is reporting into TLCN. Congratulations to APS on making his first BPL. W5TTP reports considerable activity and interest on 220 M.c. and 720.M.


KANSAS—SCM, Carl E. R. Brown, W5GEP-Net reports: MOR, 51 sessions; QNI 240, QTC 148; NCSs, QGQ 43, GRJ 4, R5BCS, Gen. Sec.; KBEKN, Sec. — Nebraska Slow-Speed Net, EBE passed away Aug. 22.

MISSOURI—SCM, James W, Hoover, W6R6P—Net reports: MON, 51 sessions; QNI 240, QTC 148; NCSs, QGQ 43, GRJ 4, R5BCS, Gen. Sec.; KBEKN, Sec. — Nebraska Slow-Speed Net, EBE passed away Aug. 22.
YOU NEEDN'T TAKE OUR WORD FOR IT...

Reports from the field...

"For several months, I had been listening to Single Sideband on my receiver on the various amateur bands. On several occasions when I heard outstanding quality of clean cut audio, I learned these signals were from Eldico's SSB-100F. I am now the proud owner of one of your exciters."

"The engineering is excellent."

"The unit is operating beautifully and no TVI shows up on any band."

"The operation of this exciter has aroused a lot of interest and favorable comment, especially concerning the naturalness of a voice."

"I like the SSB-100F very much...Nothing but good reports."

"Everything is working in fine order and I am enjoying the SSB-100F very much indeed."

"I have been very much pleased with the SSB-100F transmitter. Reports from those stations contacted with this transmitter are invariably complimentary."

"My present opinion of the transmitter can be summarized by saying it's really good engineering design."

For further information see your dealer, or write ELDICO direct.

ELDICO SSB-100F

Type of Emission: C.W. — A.M. — SSB

Power Ratings: DC average input SSB-100 watts; A.M. input (two tone test)—60 watts. Peak envelope power input SSB-144 watts. Peak envelope power output SSB-100 watts.

Keying: Grid block, full break-in.

Harmonics and Spurious Responses: Spurious mixer products—50 db or more down. Third order distortion products—35 db or more down. TV interference suppression—40 db or more second harmonic, 60 db or more higher harmonics.

Unwanted Sideband and Carrier Suppression: 50 db minimum attenuation, through low frequency crystal lattice filter.

Frequency Stability: Control Oscillator (800 to 1300 kc) ±100 cycles after two minute warm up period. Output frequency—within 300 cycles after five minutes warm up period. Dial accuracy ±2 kc after calibration.

Tube Lineup: 22 tubes, including two rectifiers, two voltage regulators, one oscilloscope and one 8894 power amplifier.
This handy, complete transmitter will give you all the power you need in amateur radio. Use it for now; CW may go your general license. Then add the optional VFO and regular crystals and you have either AM or CW, a dual-band transmitter. Later on, you can increase your power by adding the sidebander with other equipment and tools from other manufacturers. Included: automatic heterodyne and balanced 2-tone calibration. Hand control: RF: 600 ohms, Audio: 1000-ohm balanced. Three stage RF section allows efficient operation for this size rig. Internal tone generator facilitates tuning. Inverse feedback for high quality audio. M-Net, 52-3000 ohms. Ceramic band and function switches, Speech clipping and filtering ensures perfect communication punch and narrow band width. Provisions for Ammeter and CAT frequencies. Three stage RF section allows efficient operation for this size rig. Internal tone generator facilitates tuning. Inverse feedback for high quality audio. M-Net, 52-3000 ohms. Ceramic band and function switches, Speech clipping and filtering ensures perfect communication punch and narrow band width. Provisions for Ammeter and CAT frequencies.

**VOX Model 10**

For wide-band operation or extra protection for auxiliary circuits. Plug in and you're ready for AM or CW, a dual-band transmitter. Later on, you can increase your power by adding the sidebander with other equipment and tools from other manufacturers. Included: automatic heterodyne and balanced 2-tone calibration. Hand control: RF: 600 ohms, Audio: 1000-ohm balanced. Three stage RF section allows efficient operation for this size rig. Internal tone generator facilitates tuning. Inverse feedback for high quality audio. M-Net, 52-3000 ohms. Ceramic band and function switches, Speech clipping and filtering ensures perfect communication punch and narrow band width. Provisions for Ammeter and CAT frequencies.

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AFTER ACTUAL OPERATION IF YOU RE NOT 100% SOLD ON THE

**SIDEBANDER DSB-100**

BANDSWITCHING 10-COM. 100W P.E.P.: DSB INPUT, SUPPRESSOR, 400 AM PHONE, DQX, CW

$1159 per rig.
$14.99 Down or $119.00 Cash
Kit: Formated.
$599 per rig.
$12.99 Down or $99.95 Cash

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World Radio Laboratories

3415 W. BROADWAY, CO. BLUFFS, I.A., Phone: 2-0777
Introducing A new line of companion beams to our outstanding FT-100 (W3DZZ) Beam

You Can Add to Any New Model and Build Up To The FT-100 Beam! Traps and Tubing Same on all Models.

The outstanding quality and performance of the FT-100 have been proved by hundreds of users: amateur, commercial and government.

COMPARE THESE FEATURES

✓ NO STACKING REQUIRED—all elements are at the full height yet wind resistance is held to a minimum.
✓ UNIQUE WINDMILL DESIGN—permits ready access to all parts of the beam from the tower.
✓ WIDE BAND BALANCER—affords perfect pattern symmetry with coaxial feed line. No adjustment required.
✓ RUGGED DESIGN—Booms consist of 2½" dia. tubing with .065" wall. All tubing is of 6061-T6 heat-treated aluminum alloy for maximum weather resistance and strength.
✓ NO GALVANIZED STEEL TUBING USED IN OUR BEAMS.
✓ ALL MODELS complete with chrome dipped hardware and aircraft type stainless steel clamps (to assure against corrosion and rust), assembly instructions and prints.

* GUARANTEED TO STAND 1 KW
* MATERIALS & WORKMANSHIP GUARANTEED FOR ONE YEAR.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FT-100</th>
<th>FT-105</th>
<th>FT-110</th>
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<td>BANDS</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
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<tr>
<td>BOOM LENGTH</td>
<td>24'</td>
<td>16'</td>
<td>12'</td>
<td>24'</td>
<td>16'</td>
<td>16'</td>
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<tr>
<td>FRONT-TO-BACK</td>
<td>25-30db typical</td>
<td>20-24db typical</td>
<td>12-15db typical</td>
<td>25-30db typical</td>
<td>20-24db typical</td>
<td></td>
</tr>
<tr>
<td>FORWARD GAIN</td>
<td>10-9/10db</td>
<td>10-10db</td>
<td>10-5db</td>
<td>10-10db</td>
<td>10-7db</td>
<td>10-7db</td>
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<tr>
<td>SWR</td>
<td>10-1.5/1</td>
<td>10-1.2/1</td>
<td>10-1.1/1</td>
<td>10-1.5/1</td>
<td>10-1.2/1</td>
<td>10-1.4/1</td>
</tr>
<tr>
<td>PRICE—FOB</td>
<td>$219.95</td>
<td>$189.95</td>
<td>$139.95</td>
<td>$169.95</td>
<td>$119.95</td>
<td>$59.95</td>
</tr>
</tbody>
</table>

MULTIBAND DESIGN FOR WIRE ANTENNAS—The W3DZZ design employs a concentric coil and condenser completely potted in Polyester Resin. Polystyrene insulation of concentric capacitor can withstand highest amateur transmitter voltages.

MODEL FT-200 TRAPS for 5-band antenna operation on 10-15-20-40 and 80 meters, (75 ohm feed line). Pair, postpaid ........................................... $12.50

See your local distributor or write to:

FREDERICK TOOL & ENGINEERING CORPORATION
414 FINE AVENUE FREDERICK, MARYLAND
is on 6 meters. 83's OPS, ORS and EC appointments were endorsed. AUJ/8 says someone is using his call 75 meters. ZOP is back in the hospital. HIC, in MARS, will be on 220 Mc. NF is waiting for new DXCC. GDY was at the West Coast. KN1HRA is over 100. A V.H.F. QSO Party was held at KN1HBA's QTH. KN1HGF is waiting for his General Class license. WU just finished his course and will have new minded. MEG has the call KICXN for his other QTH. RFM vacationed in New Hampshire. CXU has a summer home in Hapton, VG is busy with his boat. JAU went on a Windjammer Cruise and visited BQN in Maine. KXV is getting on the air. TYS is busy fishing. AGR is mobile. MFI is going to VR-Land. NHI vacated in Colorado. QMU is doing photo work. QMA moved to Wt-Land. JOW has a larger boat, PIW went up to Maine. RBS has moved to San Diego, Calif. COL, our Cambridge EC, says things are coming along fine. UKE is NC8 for TCPN on Mon. and joined MARS. KIBUP has been acting as NC8 for TCPN. EFT is rebuilding the rig. KIBYL will have a new rig. KN1HBT is now in Lexington. AUQ is having 117A troubles. DVB says his 117A on 72 meters is working well. LGO went to school. HWE says he had a bad summer. EU4 has been busy for 5, 6 & 14 meters. The MV-8 Net is active. KLCX is building a cubical antenna. NHJ went across the country, went to the National Convention and has a Mosley vertical. ZSU says the Dimlight Boys certificate takes no QSLs or fees. Send him calls, dates and band on your blank QSL after working 9 So. Shore 'Dimlight' members in U.S.A. (or 4 from DX) and you too can be certified. Traffic: (Aug.) BKG 1251, KIBUP 196, W1HBB 186, K1FJ 186, K1HGF 100, W1A0Q 62, K1G1Q 56, W1KXT 50, W1KJQ 48, W1KLX 48, W1KBL 40, W1KAC 40, W1KBF 32, W1M3L 32, W1NF 28, W1Q1U 28, W1Q1Y 28, W1Q1Z 28.

NEW HAMPSHIRE—SCM, John A. Knapp, W1AIJ

BKG has just raised a 20-meter beam atop a 50-ft. tower. DFI is a Trihander on a 40-ft. tower. Looks like the Pittsfield boys are really going after that DX. DGF has a new Tribander beam in operation. KGJ is getting ready for the fall contests with new dipoles for 80, 40 and 20 meters. GKR, of North Adams, has been appointed QSL Manager. for New England. AEW has a new Tribander beam finished and now has a total of 205 countries confirmed. New calls in the Pittsfield Area are K1HRA and W1NHK. AEW has just raised a 20-meter beam atop a 50-ft. tower. DPF has a Tribander on a 40-ft. tower. Looks like the Pittsfield boys are really going after that DX. DGF has a new HT-32. BUM has a larger boat, P11W went up to Maine. 1IC has a new HT-32. BUM has a new Apache working FB tower. KNIIDY has a Tribander on a 40-ft. tower. Looks like the Pittsfield Area are KN1IHT, HR-1 and W9IBH. K1KZ is on 6 meters. ZOP is back in the hospital. AUJ/8 has joined the s.s.i,. ranks, K1HGF is now a General Class licensee. KICXN is getting on the air. Dimlight members in U.S.A. (or 4 from DX) and you too can be certified. Traffic: (Aug.) BKG 1251, KIBUP 196, W1HBB 186, K1FJ 186, K1HGF 100, W1A0Q 62, K1G1Q 56, W1KXT 50, W1KJQ 48, W1KLX 48, W1KBL 40, W1KAC 40, W1KBF 32, W1M3L 32, W1NF 28, W1Q1U 28, W1Q1Y 28, W1Q1Z 28.
Transistor Power Supplies* and Components

D SERIES (Standard)
Continuous operation at 30 watts. Selective taps at 200, 250 and 300 volts; intermediate voltage at 1/2 selective taps. Both voltages can be drawn simultaneously if total power does not exceed continuous ratings. Positive or negative ground operation. Input and output filtering included except for intermediate tap.
Size: 4 3/4" x 3 1/4" x 1 3/4" Wt.: 6 oz. 6- or 12-V Input: $39.95 24-V Input: $61.95

DA SERIES
Continuous operation at 45 watts. 450 volts and 225 volts simultaneous if total power does not exceed continuous ratings. Intermittent duty to 90 watts, 450 volts at 150 MA; 225 volts at 100 MA (5 min. ea., 20 min. off). Positive or negative ground operation. Input (primary voltage) filtering; partial high voltage filtering provided.
Size: 4 3/4" x 3 1/4" x 1 3/4" Wt.: 14 oz 12-V Input: $57.50 24-V Input: $79.50

Toroid Transformers for Transistor Power Supply Application

H SERIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Current</th>
<th>Specifications</th>
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</thead>
<tbody>
<tr>
<td>H-6-450-1</td>
<td>6-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225 VDC from bridge rectifier</td>
<td>45 watts</td>
</tr>
<tr>
<td>H-14-450-12</td>
<td>12/14-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
<td>55 watts</td>
</tr>
<tr>
<td>H-28-450-15</td>
<td>28/28-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
<td>65 watts</td>
</tr>
<tr>
<td>H-6-100-125-150-D</td>
<td>100/125/150-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
<td>100 MA</td>
</tr>
<tr>
<td>H-14-100-125-150-D</td>
<td>125/125/150-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
<td>125 MA</td>
</tr>
<tr>
<td>H-24-100-125-150-D</td>
<td>150/150/150-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
<td>150 MA</td>
</tr>
</tbody>
</table>

Without Encapsulation (2 ozs.), 1-10 units: $16.00 ea. With Encapsulation (3 ozs.), 1-10 units: $16.50 ea.

HD SERIES — 2000 CPS

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Current</th>
<th>Specifications</th>
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</thead>
<tbody>
<tr>
<td>HD-14-22S-300-2-D</td>
<td>12/14-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC.</td>
<td>300 at 200 MA</td>
<td></td>
</tr>
<tr>
<td>HD-28-22S-300-2-D</td>
<td>24/28-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC.</td>
<td>600 at 200 MA</td>
<td></td>
</tr>
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HDS SERIES — 2000 CPS

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Current</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDS-14-22S-300-3-D</td>
<td>12/14-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC.</td>
<td>300 at 300 MA</td>
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<tr>
<td>HDS-28-22S-300-3-D</td>
<td>24/28-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC.</td>
<td>600 at 300 MA</td>
<td></td>
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</table>


400 CYCLE SERIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Current</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-115-1.5-400</td>
<td>12/14-VDC</td>
<td>115-V at 1.5 amp.</td>
<td>Dim: 3&quot; dia. x 1&quot; thick. Without Encapsulation (12 ozs), With Encapsulation (16 ozs). Per Unit: $76.00.</td>
<td></td>
</tr>
<tr>
<td>24-115-1.5-400</td>
<td>24/28-VDC</td>
<td>115-V at 1.5 amp.</td>
<td>Matched Pair HD Transistors: 12/14-V operation—$11.00 per pr. 24/28-V operation—$21.00 per pr.</td>
<td></td>
</tr>
</tbody>
</table>

OEM Prices on Request
All fully performance tested, 100% guaranteed. Manufactured by makers of world-famous SUNAIR H.F. Aviation Transceivers.

SUNAIR ELECTRONICS, INC.
Broward County International Airport
Fort Lauderdale, Florida, U.S.A.
item one

item two

item three
NEW MULTI-BAND ANTENNA COILS

New Plug-In type coils for the Ham, designed to operate with a standard 3' base section and standard 5' whip

THE ARISTOCRAT

- Rigidly tested & engineered—found to have "O" of 825
- Handles 500 Watts input
- Operates into a 52-ohm cable
- Positive contact—noiseless, troublefree operation
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- Factory pre-tuned—no adjustments needed

YOUR CHOICE
Amateur Net

\$14.95

No. 999
10-15-20-40-75 METERS

Now! 2 New Coils... just plug in and presto! your coil is ready for operation on the desired band! No switches, no sliding contacts, no loose connections. Built and pre-factory tested in Master Mobile's own laboratories.

Leaders in the Design and Manufacturing of Mobile Communication Equipment & Antennas

NEW HEAVY DUTY MOBILE SPRINGS

PROTECTS YOUR MOBILE ANTENNA

Heavy duty flexible mounting spring mounts on the base and holds the antenna. Special flexible "give" spring prevents sharp impacts and breakage. Lockwashers included.

MMW-7 Cad. plated, black painted ends \$4.50
MMW-7HC Heavy Cad. plated—Extra Protection \$5.50
MMW-7SS Deluxe Stain. Steel \$8.95

No. 321 BODY MOUNT
Swivel base body mount, less spring. Specially constructed diagonal bolt joint for maximum strength. \$7.95

EMERGENCY • COMMERCIAL • AMATEURS

Master Mobile Mounts, Inc.
1306 BOND STREET • LOS ANGELES 15, CALIF.

AT LEADING RADIO JOBBERS EVERYWHERE
PACIFIC DIVISION

HAWAII—SCM, Samuel H. Lewbel, KH6AED—Guam Activities: New calls are being heard from.

(Continued on page 19)
Features for best SSB and CW

STABILITY: High stability VFO has warm up drift of less than 300 cps after 15 minutes operation. Crystal-controlled, high frequency conversion establishes this same stability for all bands.

SELECTIVITY: 2.5 kc at 6 db—8.1 at 60 db. Sideband tuning control adjustable plus or minus 3 kc.

AVC: Amplified-delayed AVC. Integrating dual-action time constant circuit gives fast charge—slow discharge for modulation, but fast charge—fast discharge on short pulses. This provides some noise limiter action.

DETECTION: Product Detector for SSB, CW and AM by excited carrier method.

PLUS

OPERATING RANGE: Seven 600 kc tuning ranges cover five “ham” bands: 80M(3.5-4.1 mc), 40M(7.0-7.6 mc), 20M(14.0-14.6 mc), 15M(21.0-21.6 mc), 10M(28.0-28.6 mc), 10M(28.5-29.1 mc), 10M-(29.1-29.7 mc) and WWV-10 mc.

MAIN DIAL: Scale length 8.3"—10 kc divisions—600 kc each band—tuned with 4½ turns fast knob or 30 turns of slow knob.

SENSITIVITY: Less than 1 uv for 20 db s/n.

ANTENNA ATTENUATOR: 30 db. Switch provided to switch pad in or out.

“S” METER: Meter calibrated in “S” units to S9 and 20, 40, 60 db over S9. S9 is approximately 100 uv. “S” units are at approximately 6 db intervals.

AF RESPONSE: 300 to 3000 cps.

AF OUTPUT: To internal speaker or 4 ohms to external speaker, headphones and transmitter anti-trip.

RF INPUT IMPEDANCE: to match 50-75 ohm coax line.

BUILT-IN SPEAKER FOR PORTABLE USE.

THIRTEEN TUBES
6BZ6—1st RF
6AB4—crystal oscillator
6BE6—1st mixer
6BQ7A—V.F. oscillator
6B6S—2nd mixer
6BY6—3rd converter
6BZ6—I.F.
6BJ8—AVC amplifier and rectifier
12AU7—product detector
12AU7—L.F. oscillator and 1st AF
12AQ5—A.F. output
12X4—Rectifier
12B8A—crystal calibrator

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R. L. DRAKE COMPANY, MIAMISBURG, OHIO
Guam, and include AHU, AHW, AHX, AHY and AHZ. Several s.s.b. stations are operating. With the cooler weather arriving, activity on 10 meters is on the move. Fifteen meters is also becoming an excellent band again. For the stations who would like to work KG6, note we are currently 20 wpm speed and must abide by the FCC Regulations, i.e., within the American phone band. The KG6 and KA boys are fortunate to have DX band privileges. There are fifty actives on Guam. Send QSLs to GAHL, Box 146, Agana, Guam, M. I.

SANTA CLARA VALLEY—SCM, G. Donald Eberlein, W6HY-1—SEC: W6HY; V.M: W6ZLO—P.M: W6QPH—V.V.: W6QMI. K6PQH has been selected to replace W6QMO as manager of NCN. Jerry has resigned after doing a very good job of running the Station. Equipment: K6PQH as OES, Endorsements: K6GID as OES, W6WAI as OES. Officers of the 5th A.R. are W6CIT, pres.; K6WJ, vice-pres.; K6CU, secy.; K6QOK, treas.; K6FEE, W6RBO, W6UC, K6OFJ and K6MPN, board of directors. W6PPL has returned from vacation and is resuming his OBS duties. W6KRE is building s.s.b. exciters. W6MIG reports that KL6MLO is working on 144 Mc. W6DEF reports plans are under way to check into NCN from the C.D. Base Station. W6RE is remodeled his shack. W6YHM had his receiver serviced. K6VKG has a new QTH in San Jose. K6DYY improved the bandswitching in his shack, K6GZ is holding on to 3750 ke. at 1930. W6QMO holds a daily schedule with AUSA to pass overseas traffic. KG6KU now has a 30-ft. tower to get into the air. KG6KU reports a total of 43 states on 6 meters. W6WII has dropped the "6" from her call. W6RLP reports the PARMA had an Old-Timers Night at the September meeting. The Greater Gilroy Radio Club has been given use of the City Court Room in Gilroy City Hall for meetings. W6MYL had a short stay in the hospital, K6WJW has a Viking mobile transmitter. K6MIDZ installed a mobile rig using a 6146 in the final. W6KHM has received a certificate confirming 102 countries for DXCC while running 75 watts to a Ranger. Traffic: (Aug.) K6GZ 395, W6QMI 202, W6KBP 102, W6QPH 102, W6BY 102, W6PQH 101, W6KZ 97, W6RLP 87, W6WW 77, W6MD 77, W6PPL 77, W6GTY 29, W6YHM 25, W6DEF 24, W6MIG 12, K6FOC 7, K6VKG 4, (July) W6RLP 264, K6PQH 63, W6MIG 5.

EAST BAY—SCM, B. W. Southwell, W6QWJ—Asst

(Continued on page 142)

EAST BAY SECTION V.H.F. PARTY

The 2nd Semi-annual East Bay V.H.F. Sweepstakes will begin at 0800 PST, Nov. 22, and end at 0800 PST, Nov. 24. Call used will be "CQ East Bay Party," or "CQ F.BP" on c.w. Exchange RS(T) reports and number of QSO, starting with 001. Scoring to include total of all contacts, phone and c.w. Use any frequency in the 6 or 2-meter band. Count one point per contact except 5 for each E. Bay contact after the fifth), plus 25 points if power input under 10 watts, 25 points if receiver is independent of electric mains, 10 points if you are SEC, EC, OES appointed or registered in the AREC. Multiply total points by number of counties worked, number of counties, bonuses claimed, power input, number of contacts, plus bonuses times multiplier to get final score; also appointment held (if any), AREC status and remarks. Only single-operator stations are eligible. Portable or mobile station operation under one call, from one location only, is permitted. No cross-band contacts count. A transmitter used to contact one or more stations may not be used subsequently under more than one other call during the contest period. Other rules: (1) Scoring is not limited to East Bay Section. Contacts with outside stations may be counted. (2) To be eligible for certificate awards, at least 5 stations in the East Bay Section must be worked. (3) For each station over 5 in the East Bay Section, 5 points are claimed instead of one. (4) Certificates will be awarded to (a) highest-scoring fixed (commercially-powered) station; (b) highest-scoring portable (emergency-powered) station; (c) highest-scoring mobile (all mobile operation must be within 5-mile radius). (5) Decisions of the SEC regarding scoring shall be final.
65 WATT TRANSISTOR POWER PACK FOR
MOBILE UNITS

THE MINIATURIZED TRANSISTOR POWER SUPPLY

MODEL PS-6-12

SIZE: 6" x 3" w x 1" h
WEIGHT: 1 lb. 2 oz.
INPUT VOLTAGES: 6-7 v and 12-14 v
INPUT CURRENTS: 12 amps or 6 amps
AT NO LOAD: 1.5 amps or 0.8 amps
OUTPUT VOLTAGES: 200 and 400 v
OUTPUT CURRENT: 40 ma at 200 v; 135 ma at 400 v
TOTAL OUTPUT RATING: 65 w nominal
TEMPERATURE RISE: 20° C above Ambient 20° C
EFFICIENCY: Full Load—85%.

This special designed POWER SUPPLY used withTransmitters rated to 65W. continuous duty, or 75W. intermittent duty, will also supply a receiver with 200 V. @ 40 MA, continuous duty. Highly recommended for use in all MOBILE TRANSMITTER-RECEIVERS, e.g. automobiles, boats, trucks, motorcycles, aircraft, where power source is 6 or 12 V. Paralleling doubles ratings. $49.50

MODEL PSK-6-12 KIT FORM

Identical to Model PS-6-12, except in Kit Form. Complete schematic and detailed assembly instructions included. Pre-tested quality assured components included, no other parts to be purchased. Simple to assemble in Heavy Aluminum Case...you save cost of labor. $39.50

MODEL PST-6-12; POWER TRANSFORMER

INPUT VOLTAGES: 6-7 v or 12-14 v
OUTPUT VOLTAGES: 200 v and 400 v
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DUTY CYCLE: 25% to 85 watts
Toroid supplied with 6' leads, Teflon wrapped, epoxy resin coated, proven for salt water use. Unit designed for your own particular power supply. $14.00

NOTE: ALL ITEMS EIA GUARANTEED.

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( ) MODEL PSK-6-12 at $ _______ each
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SHIP TO: _________________________________
ADDRESS: _______________________________
CITY: ___________________ STATE: ______

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NEW "DC Transformers" especially designed for DC transistor circuits, with an efficiency of 80% to 85% for the entire supply, are available from Triad. The types listed here are standard Triad catalog items you can get from your Triad distributor. For a complete listing of all Triad transistor transformers, please write for your copy of Catalog TR-58.

(Continued on page 144)

SCM: Mary E. Loraen, W9P1R, SFC; W9CAN, FCA; W9LOW, W9ZFP, W9LJZ, K9EDN, K9JN, W9COG. W9YX visited W9JW, W8TI has a DX score of 206/205. W9COZ is a radio shop teacher at Berkeley High School. W8ASJ reports traffic low because of vacations, but QST bulletins still are being put out. K9ZBL is building a new antenna coupler using a DX bands to a 120/30 total. K9GOH and K9GK made BPL this month. Congrats, W9V6BW, W9V6KR, W9V6IK, W9V6S and W9V6BO are the Novices in Walnut Creek. W9V6BBB is a radio shop teacher at Las Lomas High School. MABS Director K9CR retired from the U. S. Air Force and will go on with a new call at an Iowa QTH. W9GWL has a new 60-ft. tower with 2- and 6-meter beams, and built a new SWR bridge. Six out of ten in W9LOW’s code class are now Novices, FB, K9MPA is a new member of the MDAEC, K9EHX has a new car for mobile. W9GLS is stationed at the U. S. Navy Base in San Diego. K9XW has a new rig and trap doublet. K9QKD has a new DX-100. K9LVE is building a mobile rig. W9QCM/KA signed up for another year in Lotus Land. W9GQN is the Texas for an exall QSO with his brother, K9BOY. W9CGS has a new jr. OM operator. Congrats, W9HOP has a new mobile rig. The XYL of K9ZWL, FB, K9DRZ is coordinator of the C.D. and Disaster Agency, City of Martins, and is a member of RACES, K9HIB and K9EHX are new Official Mobile Units, K9OQH is the new manager of the NCN. Congrats to W9QA5U on a job well done. K9QN is a new General Licensee. K9GKR is a new OES and has a 30-ft. mast with rotatable five-element 8-meter beam and new Commsorator III. BCNL all next month.

Traffic: Aux, W9CFN 543, K9QHC 128, W9JOH 30, W9JOH 312. K9QHC and K9GK made 300 QSOs using that rig with the eight 807s, K9MZN and his XYL should have a recording to send in. K9GK is the new manager of the NON. Congratulations. W9KDL, W9CJO, W9GZ, W9LQS, W9GZQ, W9GZS 20, W9ASJ 13, W9PBR 12, K9OKK 2. (July) K9ZWL 51.

SAN FRANCISCO—SCM, Fred H. Luthmacher, W9OPL—Summer vacations have come and gone and according to reports there is much activity among members and operators in this section readying their stations for emergency communications for the coming winter. W9CGA reports that he is getting out so well on 2 meters that the Sonoma County Net sent him one of their net frequency crystals. K9HIB has given a new diamond to W9GQA’s daughter. He first met her at W9GQA’s shack. W9KNC has moved into his new house at Inverness and got out on FB on a new antenna. W9LRF had a handy article printed in another magazine. K9GQK (the Legal Eagle) is working 40-meter phone using that rig with the eight 807s. K9QKN and his XYL have moved to Daly City but ItTTY bulletins still are being put out. K9ZBL is building a mobile rig. W9GQA’s two sons are on the air and also a post card from Italy. W9HYC worked F08AT, and new Correspondence is held next month.

TOWERS

ALL THE WAY IT’S E-Z WAY!  

See Page 148

ELECTRONIC SUPPLY

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SACRAMENTO VALLEY—SCM, LeVaughn Shipley, K9DFF—Every now and then in this column we see a story one wants to pursue further. The story of K9DFF is such an opportunity. K9DFF has a new swl and trap doublet. K9QKD has a new DX-100. K9LVE is building a mobile rig. W9QCM/KA signed up for another year in Lotus Land. W9GQN is the Texas for an exall QSO with his brother, K9BOY. W9CGS has a new jr. OM operator. Congrats, W9HOP has a new mobile rig. The XYL of K9ZWL, FB, K9DRZ is coordinator of the C.D. and Disaster Agency, City of Martins, and is a member of RACES, K9HIB and K9EHX are new Official Mobile Units, K9OQH is the new manager of the NCN. Congrats to W9QA5U on a job well done. K9QN is a new General Licensee. K9GKR is a new OES and has a 30-ft. mast with rotatable five-element 8-meter beam and new Commsorator III. BCNL all next month. Traffic: Aux, W9CFN 543, K9QHC 128, W9JOH 30, W9JOH 312. K9QHC and K9GK made 300 QSOs using that rig with the eight 807s, K9MZN and his XYL should have a recording to send in. K9GK is the new manager of the NON. Congratulations. W9KDL, W9CJO, W9GZ, W9LQS, W9GZQ, W9GZS 20, W9ASJ 13, W9PBR 12, K9OKK 2. (July) K9ZWL 51.
HARVEY has it!

The Completely New S-Line from Collins. The Latest addition to its distinguished single sideband series of amateur radio systems.

THE COLLINS 32S-1 TRANSMITTER $590.00

The 32S-1 is an SSB or CW transmitter with a nominal output of 100 watts for operation on all amateur bands between 3.5 and 29.7 mc. Input power is 175 watts PEP on SSB or 160 watts on CW.

Oscillators: Double conversion circuit is used with CR-18/U crystals in the HF oscillator. A VFO tuning 2.500 to 2.700 mc, provides 200 kc bands. A crystal oscillator operating on either side of the Mechanical Filter passband provides carrier for SSB generation and choice of upper or lower sideband.

Frequency Range: 80, 40, 20, 15, and 10 meter amateur bands. Easily retuned to frequencies between amateur bands by using different crystals.

Output impedance: 50 ohms.

Frequency stability: After warm-up over-all stability due to temperature, humidity, pressure and voltage variation is 100 cps.

Calibration accuracy: 1 kc.

THE COLLINS 75S-1 RECEIVER $495.00

The 75S-1 provides SSB, CW and AM reception on all amateur bands between 3.5 and 29.7 mc. It is capable of coverage of the entire HF spectrum between 3.5 and 20 mc by selection of the appropriate high frequency beating crystals.

Frequency Range:
- 80 meters—3.4 to 4.0 mc.
- 40 meters—7.0 to 7.4 mc.
- 20 meters—14.0 to 14.4 mc.
- WWV—14.8 to 15.0 mc.
- 15 meters—21.0 to 21.4 mc.
- 10 meters—28.5 to 28.7 mc.

Choice of three 200-kc portions of 10 meters: 28.5 to 28.7 mc.

Frequency Stability: After warm-up, over-all stability due to temperature, humidity, pressure and voltage variation is 100 cps.

Calibration accuracy: 1 kc.

Visual Dial Accuracy: 200 cps all bands.

Electrical Dial Accuracy: (after calibration): 300 cps all bands.

Backlash: Less than 50 cps.

Sensitivity: The CW sensitivity is better than 1 microvolt (with a 50-ohm dummy antenna) for a 10 db single-plus-noise-to-noise-ratio.

Selectivity: 2.1 kc Mechanical Filter for SSB; 0.5 kc (not supplied) for CW; 4.0 kc IF transformer passband for AM.

THE COLLINS 30S-1 LINEAR AMPLIFIER

The 30S-1 Linear Amplifier rounds out the S-Line to make a single, complete, high powered amateur SSB station.

Frequency Ranges: 3.5—4.0 mc; 7.0—7.3; 14.0—14.4; 21.0—21.45; 28.0—29.7. Covers entire spectrum from 3.5 to 30 mc by retuning cathode circuit.

Output Impedance: 50 ohms.

Input Impedance: 50 ohms unbalanced.

Power Input: SSB-1 kw average, CW-1 kw.

Power Output: SSB—1000 watts PEP with 40 db signal to distortion ratio; 1300 watts PEP with 35 db signal to distortion ratio.

CW—600 watts with 1 kw input.

Controls: Band Change, Multimeter, Filament, H.V., Bias Control, Tuning, Loading.

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516F-2 AC POWER SUPPLY operates from 115V AC, 50-60 cps to provide all voltages for the 32S-1. $105.00

516E-1 DC POWER SUPPLY operates from 12V DC to provide all operating voltages for the 32S-1 and 75S-1 for mobile or portable operation. $225.00

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The Bud Console Assembly consists of a number of units which are adaptable to control or testing centers of 3 standard sizes while a combination of these can provide practically unlimited expansion possibilities.

The components of the Bud Console Assembly comprise pedestals, ball cornered sides, ball cornered doors, panels, tops, drawers and other units, all beautifully finished, ready for assembly.

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Although Jeri lives in South San Francisco she took us under her wing along with the San Joaquin Valley operation. When our Central Valleys Net folded the few remaining members were asked to join NCN. Let’s hope that we can encourage interest and have our own traffic net again soon. W6HJP attended the National ARRL Convention in Washington, D. C. He says he will have his 1000-watt s.s.b. rig in Sacramento shortly—having completed 20 years in V. S. Air Force, W6QYX recently turned engineer. Listen around the bands for some of Bob’s new innovations. The North Hills Club of Fair Oaks (K6QWL) and the Camellia Capital Chirps of Sacramento set up a fine amateur station at the California State Fair. All equipment—receiver, transmitter, beam, tower, etc.—was donated for the occasion by various manufacturers. Most of the equipment used was seen for the first time for amateurs in this area. The League donated some real FR literature for this job of public relations. All official appointees who recently received cards from the SCM are urged to return their certificates for endorsement. Traffic: K6YBV 609.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JIP—K6H11 is president of the Pleasant Valley Radio Club. K6BB is putting together an Apache transmitter. W6R1G is building a new rig with an M13 in the final. W6GJF, KN8UH, W60VI and K6SFX furnished communications for a boat race using 2 meters. K68FX got his General Class license. The Turlock Amateur Radio gang helped out again with a controlled burn by supplying communications. Those helping were W6GYN, W6NKH, W6NQR, W6JRE, W6XTK, K6D3JM, K6EHE, K6NX, W6FCA and K6KAL. W6ZXZ is on 40 and 10 meters. W6KCH is having v.f.o. problems. W61JE is getting his 300 watts back on the air. I would like to correct an earlier report, to wit, W6D4C was not the winner of the TR switch, not W6PBF, K6BHZ is on 20-meter s.s.b. with 180 watts, K6L3J is on 20 meters with a KWM-1, W6ONX was reported to have key clicks with his TOS. W6N4K is on 75-meter mobile with 15 watts. K6QOR is on 40-meter s.s.b. W6PSQ has a new s.s.b. adapter for his HRO using a mechanical filter. W601T is heard back on 75-meter mobile. K6EIT has a new Triband Quad. The Fresno Amateur Radio Club helped out with the CP telephone on both 75 and 8 meters. K6KYW is with Collins in Burbank and is on 75-meter mobile. W6TTE has moved up into the mountains, north of Fresno. K6GQX is forming a new group. K6QXM on 80, W6OCG, with the Navy in Japan, with a scooter climbed up Mt. Fujiya. Traffic: W6ADB 110, WUSY 9.

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Smaller (only 6½" high) and more compact, the new S/Line maintains superior Collins standards in performance and operating convenience. Improved and simplified single sideband design incorporates time-proven features of the KWM-1, KWS-1 and 75A-4. (See the 4-page insert in this issue for complete technical specifications.)

Collins new S/Line will be on display beginning Nov. 8 at all three of our locations. Call, wire, write or stop in.

S/Line Net Prices

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
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<tbody>
<tr>
<td>32S-1 Transmitter</td>
<td>$590.00</td>
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<tr>
<td>75S-1 Receiver</td>
<td>$495.00</td>
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<tr>
<td>30S-1 Linear Amplifier w/power supply</td>
<td>$105.00</td>
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<tr>
<td>516F-2 Power Supply</td>
<td>$185.00</td>
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<tr>
<td>312B-4 Speaker Console</td>
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<td>312B-3 Speaker</td>
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Two tetrodes in the RF section are connected as high-Mu grounded grid triodes. Intermodulation distortion products of a grounded grid amplifier are far less than those generated in a conventional grounded cathode circuit because of the inherent negative feed-back. Increased driving power requirements are off-set by recovery of most of the driving power in the output circuit.

This RF section will boost your signal to the maximum allowable. Quality of materials and workmanship is unsurpassed. Tuning and loading are precise over the 80, 40, 20, 15 and 10 meter bands. Why not look at your favorite dealer and take a look at the Model L-1000-A or just drop in at your favorite dealer and take a look at the Model L-1000-A. If he doesn't have it in stock write the factory.

*Price R-F Section only $240.00 less tubes, cabinet and power supply, but complete with bias write the factory for details.

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Ever since B&W first came out with their grounded grid linear amplifier, amateurs from all over the country have been clamoring for just the RF section of the unit.

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Two tetrodes in the RF section are connected as high-Mu grounded grid triodes. Intermodulation distortion products of a grounded grid amplifier are far less than those generated in a conventional grounded cathode circuit because of the inherent negative feed-back. Increased driving power requirements are off-set by recovery of most of the driving power in the output circuit.

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I'll be looking for your visit, letter, or phone call—and the mutual pleasure of serving you, OM. TNX

73, Bill Harrison, W2AVA

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- SEC: NT, OBSt: IA, KQD, SOG and W4MK, PAM:
- BJ and CXW, OES: K6BQG, K6CII and KFY, OUS:
- ORT and RRV, OBS: K5BTU. The Lunar Amateur Radio
Club's officers are WTN, pres.; NVY, vice-pres.; and
NYX, secy.-treas. KQD's reports were received from
Nebraska while en route to Iowa to visit relatives and
friends. She planned to visit with BDR, LGG, SCA, LCX
and RRV before heading for the western states. The
big time spotting pigeons turned loose each Sunday by
K8JXP, BON, HXP and VYP are retiring directors of the
Denver Radio Club. The LCL-YL girls are stocking
small clothespins as their emblem. K6JPF, K4EPD,
K5CII, VD7X, WYX, SIN, LO and others furnished
comfortable accommodations for the Annual World's
Championship Ham Race over Mosquito Pass, an altitude of 13,500
feet. E6A, the Pueblo College club station, operated from the
state Fair Grounds, NIL, K6MZN, R lvFC, K6BQG, K6PDZ,
NCB, SKB and others helped out: 42 messages were handled. Traffic: (Aug.) K6DKW 56, W6KPG 46,
K6MDK 60, NIL 120, DON 112, K6K 100, HJP 36,
EDJ 41, HT 60, E6Y 55, WCHB 56, WAX 47, TYY 41,
QOJ 43, (July) W6MK 54, K6HBN 21, W6NIT 19,
UTAH—SCM, Thomas H. Miller, W72WJ—Ast.
SCM: John H. Sampson, 70CX, SEC: FSC, PAM: BBN,
RM: UTM, V.H.F.-PAM: FF; PM: K6QX, the UARC (Salt Lake)
held its annual piume at Storm Mountain and had a tourn-
out of over 60. BOD won the left-footed court contest
and the father-son team, KN3COM and W7JBV, won the
antenna-stringing contest. LCX received the BRAT
(Brotherhood Radio Amateur Trafficists) Award and also
a TWN (Twelfth Regional Net) certificate. The Beehive
Club had pretty rough going this summer because of band
conditions and not lack of personnel. JBY is now QRS.
BHI erected 65-ft. antennas to support an all-band
transmitter and has just finished transmitting on
3000 kc. in the final. PDH is filling in for the Beehive
Club. The Colorado Springs gang has been busy each
week spotting pigeons turned loose each Sunday by
K6JXP, BON, HXP and VYP who are retiring directors of
the Denver Radio Club. The LCL-YL girls are stuffing
small clothespins as their emblem. K6JPF, K4EPD,
K5CII, VD7X, WYX, SIN, LO and others furnished
comfortable accommodations. The New Mexico City
City Amateur Radio Club had its annual picnic Aug. 24. There was a big attendance of
213 registered. The SCM, SEC, PAM and 2 ECs were there. A big delegation from El Paso was over for the
day also. New Mexico, Texas and Arizona were represented. A new EC for the state is KSWLX. Welcome to
the ranks and very glad to have you from Las Cruces. Traffic: (Aug.) K6SP 1277, W6DWB 469, K6KL 13,
LE 13, WAGD 11, K5JF 7, WBBP 4, CIN 3, K5LFF
1, LXN 2, L6WN 1, (July) K6PK 33, K6T 10.
WYOMING—SCM, L. D. Brown—W7AMU—The Casper
and Cheyenne Clubs are sponsoring a bill for call letters on license plates. The Sheridan Club is sponsoring the
1960 Hamfest. AEC was elected County Clerk. K4MD of ARO and DTD have new rigs and receivers. BX, 84 years
old, has been in a coma for several weeks. ARO is a
new ham in Wyoming. K4IB moved to a new house,
his rig has gone to the University at Laramie, mobile. DWU and IDO are working on club by-laws. LQK is president of the
Cheyenne Club. PHY is trying to keep the sheep and
rivers separate. YXM is new in Casper. UPR is on 2
meeters. NAC is in the Air Force headed for Korea. MIA
and LFW are engineers at KSRV-TV. COL is not control-
led for the Pony Express Net and will have an alternate
soon. Twenty-three stations checking in on the Pony
Express Net. W7JY, K72W and K7AHI are new stations
checking in on the Pony Express Net.

SOUTHWESTERN DIVISION

ALABAMA—SCM, Clarke A. Simms, Jr.—WH1XK—
SEC; E6H, PAM: RHG and KA4TO, RM: RHG, LQK:
K4YD, MIA: 3 and 31OB existers. The Mobile Club a truck with
communications equipment. CEF a double side-band trans-
mitter, YX2 a new 6-meter converter. YUO a 50-
foot tower and a three-element beam for 15 meters. The
(Continued on page 150)
A quality-communications receiver offering all the advantages of receivers costing hundreds of dollars more, PLUS several all-new features for better performance. Biggest value ever for amateur and short-wave listener alike.

SPECIFICATIONS: General Coverage: 540 KCS to 31 MCS continuous tuning. • 5 KCS dial markings up to 10 MCS, and 10 KCS markings above 10 MCS. • 13-tube, dual conversion, superheterodyne with automatic noise limiter. • 14 tuned circuits in IF. Crystal controlled 2nd oscillator. • 60 db slot filter. Adjustable plus/minus 5 kc of center frequency. Adjustable depth. • Q-multiplier: Peak and frequency controls. • Separate linear detector for CW and SSB. • Separate, adjustable B.F.O. marked for upper and lower sidebands. • Electrical bandwidth. Improved dial readability. • Built-in crystal calibrator (100 KCS). • Dial resets on both dials. • S-meter for easy tuning and read-out of signal strength. • Exclusive Auto-Response for optimum listening.

Price: Only $.379.00

Mail Orders Invited * HAM HEADQUARTERS

RADIO
PRODUCT SALES, INC.

1501 SOUTH HILL STREET • LOS ANGELES 15, CALIFORNIA
beter omni-directional radiation

Shakespeare WONDEROD

Now — an efficient distributed-load antenna built into a Shakespeare Wonderod! You can mount this shortened antenna on trunk or fender... where radiation pattern is best. Superior Shakespeare fiberglass construction, using high grade dielectric materials to reduce power loss.

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Special 40 & 80 meter bumper mount antennas in 8' lengths — $21.

*marked for intermediate frequencies.

Amateur net

COLUMBIA PRODUCTS CO.
Box 5207, Columbia, S. C.

Subsidiary of the Shakespeare Co.

150

—look for the spiral markings of genuine Shakespeare Wonderods.
Fall is here and winter not far behind, so get away from those slippery roads and the mobile rig and treat yourself to the newest in fixed station equipment. Any information not contained here will be furnished upon request. So write us soon — we love to open mail.

**COLLINS 325-1 TRANSMITTER**

**TYPES OF EMISSION:** SSB — upper or lower sideband — keyed tone.

**POWER INPUT:** 175 w PEP on SSB, 160 w on CW

**FREQUENCY RANGE:** 80, 40, 20, 15 and 10 meter amateur bands — full coverage of any 14 200-kc bands selected by means of crystal switch. Easily returned to frequencies between amateur bands by using different crystals. Crystal provided for one 200 kc segment of 10 meters.

Price subject to change. **$590.** Less P.S. and Acc.

**COLLINS 755-1 RECEIVER**

**FREQUENCY RANGE:** 80 meters — 3.4 to 4.0 mc; 40 meters — 7.0 to 7.4 mc; 20 meters — 14.0 to 14.4 mc; WWV — 14.8 to 15.0 mc; 15 meters — 21.0 to 21.6 mc; 11 meters — choice of three 200-kc portions of these bands; 10 meters — 28.5 to 28.7 mc

Price subject to change. **$490.** Less P.S. and Acc.

**COSMOPHONE “35”**

Dual Tuning Controls permit either:
1. Transmitter to track with either channel of receiver.
2. Transmitter and receiver frequencies to be independently controlled. The transmitters and receiver frequencies interchange at the flip of a switch. Transmits or receives on 10, 11, 15, 20, 40 and 80 meter bands with one-knob band switching. Transmits or receives SSB suppressed carrier (upper or lower), single sideband with carrier or CW.


Cosmophone “35” loss power supply **$799.50 net**
P35 Power Supply **$139.50 net**

**REYCO MULTIBAND ANTENNA COILS**

**KW-40**

These coils are the standard five band coils to provide operation on 10-15-20-40 and 80 with an approximate length of 108 feet. Weight 6 1/2 oz.

**Length 61 in.**

**KW-10-15-20**

Cuts resonant in designated bands to provide perfect dipoles in each band. Using these coils together with a pair of KW-40 coils five band operation can be obtained with a total length between 85 and 95 feet. Weight 4 oz.

**Length 52 in.**

All coils High Q and Tensile Strength. Waterproofed. Guaranteed to handle a full KW.

Price per pair
- KW-10 **$11.50**
- KW-15 **$11.50**
- KW-20 **$11.50**
- KW-40 **$12.50**

**TIME PAYMENTS**

18 Months to pay, insurance at no extra cost

**24 HR. SERVICE**

on stock items

**WRITE UNCLEDAVE**

W2APF

with your needs and problems.

**WE SPECIALIZE IN FOREIGN TRADE**

FREE! **NET CONTROL**
- LOG SHEETS
- MESSAGE PADS
Coaxial Terminal Triodes:

Thoriated-tungsten filament tubes for broadcast transmitters.

You may convert your present AM or communications broadcast transmitter with the most modern high power electron tube available for driver, modulator or final output section.

Machlett coaxial triodes are available for transmitters or induction or dielectric heaters 3kw to 50kw and higher.

You will realize gains in tube life as well as significantly lower operating costs.

Write today for information on converting to...

Machlett Laboratories, Inc.
Springdale, Connecticut
EASIEST TERMS — Our own liberal financing with only 10% down, up to 24 months to pay and easy terms to fit your budget.

HIGHEST TRADES — We need your used equipment to keep up with our high turnover of re-conditioned gear. Check any deal now — you’ll always do better on your trade-in at Burghardt’s.

FASTEST DELIVERY — Our huge stock, prompt handling and centralized location makes it possible to get you the equipment you want FAST! All orders processed the same day received.

SATISFACTION GUARANTEED — You’re covered on every sale by Burghardt’s “no risk” policy which means if you’re not satisfied — return your equipment within 10 days and your money will be refunded!

NEWEST CATALOG —
Catalog #758 just released.
Loaded with the latest in new and used amateur equipment. It’s the most up-to-date catalog available — get your free copy today!

Ready for fast delivery — the completely new Collins S/Line single sideband amateur radio system. Burghardt’s — always stocked with the latest in fine amateur equipment — will give you fast service on any S/Line unit. Check all the great new design features in this outstanding Collins station — then check Burghardt’s for a top deal and quick delivery on the unit of your choice!

325-1 TRANSMITTER — SSB or CW transmitter with nominal output of 100 watts. Operates all amateur bands between 3.5 and 29.7 mc. Input power is 175 watts PEP on SSB or 160 watts on CW. Unit incorporates many of the time-proven features of the famous KWS-1 and KWM-1 — built throughout to the highest standards of excellence.
325-1 Net $590.00

312B-4 SPEAKER CONSOLE — 312B-4 integrates the 325-1 and 75S-1 into an easy-to-work-with operating system. Unit houses a speaker, RF directional wattmeter, and several station control functions. Unit is the perfect accessory for new S/Line system.
312B-4 Net $185.00

75S-1 RECEIVER — Provides SSB, CW, and AM reception on all amateur bands between 3.5 and 29.7 mc. Unit has dual conversion with crystal-controlled first beating oscillator, bandpass first IF, mechanical filter, permeability-tuned VFO, and excellent AVC characteristics for SSB reception. Loaded with advanced, new features for top performance.
75S-1 Net $495.00

ACCESSORIES

312B-3 SPEAKER — Contains a 5” x 7” speaker and connecting cable. Attractively styled to match receiver and transmitter.
312B-3 Net $27.50

516F-2 AC POWER SUPPLY — Operates from 115 V AC, 50-60 cps. Provides all voltages for 325-1.
516F-2 Net $105.00

516E-1 DC POWER SUPPLY — Operates from 12 V DC. Provides all operating voltages for 325-1 and 75S-1 for mobile or portable operation.
516E-1 Net $262.00

305-1 LINEAR AMPLIFIER — Provides full legal power for SSB, or 1 kw input for CW. Frequency coverage is consistent with the 325-1 and 75S-1. Correct tuning and loading are immediately indicated by a meter — all controls are set up for fast, convenient operation. 305-1 rounds out S/Line to make a complete, high powered amateur station.

COMING SOON — Watch for Burghardt’s bargain-loaded January Clearance Sale ad — packed with fabulous equipment buys!
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**SPECIAL ITEMS**

FT-241 5 SB 5 matched pairs...

**NOVICE BAND FT-243 Fund. or DC-34 Freq... $1.29**

**HERMETICALLY SEALED CRYSTALS**

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**SEND FOR CATALOG — SE HABLA ESPAÑOL**

Include 5c per crystal for postage. Calif: add 4% Tax. No C.O.D.'s. Prices subject to change. Ind. 2nd choice; substitution may be necessary. Min. Order $2.50.

**U. S. CRYSTALS, INC.**

1342 So. La Brea Ave., Los Angeles 19, Calif.

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**WASHINGTON, D.C.**

1342 So. La Brea Ave., Los Angeles 19, Calif.

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**NEW PRODUCT ANNOUNCEMENT**

**GUARANTEED CRYSTALS!**

**HERMETICALLY SEALED CRYSTALS** $5.00 spec. .050 or .093

Amateur & Novice Fund. — .01% tol. ea. $2.50
Marine & Aircraft Fund. — .005 tol. ea. $4.10

10 to 30 Meg. tol. .005% ea. $9.75
Overtones: 30 to 54 Meg. tol. .005% ea. $4.10
54 to 75 Meg. tol. .005% ea. $4.25
75 to 90 Meg. tol. .005% ea. $5.40

Special! FT-243 Prec. Calib. to 1st Decimal

2 Meters
- Exit: 6010.6 x 18 = 114,190
- Exit: 6010 x 18 = 114,180
Note: — 10 KC difference between the above

6 Meters
- Exit: 8340 x 6 = 50043.6
Note: — 3.6 KC difference between the above

Calibrated FT-243 as exam. above. spec. ... ea. $1.19
Thin-Line FT-243 — 6 Meters,
50 meg. to 52.44 meg. ... ea. $1.79
52.45 meg. to 54 meg. ... ea. $2.39
2 Meters, 144 meg. to 145 meg. ... ea. $1.79

Hermetically Sealed Fund. .01 Tol. ... ea. $2.50

**NOVICE BAND FT-243 Fund. or DC-34 Freq... $1.29**

80 Met. 3761-3748 Steps of 1 KC, FT-243 or DC-34
160 Met. 8003-8004 Steps of 1 KC, FT-243 only
Dbl. to 40 Met. 3576-3591 St. Steps of 1 KC, FT-243 or DC-34
15 Met. 5276-5312 Steps of 1 KC, FT-243

**WEST GULF DIVISION**

NORTHERN TEXAS — SCM, L. L. Harbin, W6BNG
Aest. SCM: E. C. Pool, W6KNO, SEC: K6AEM, PAM: B6G and W6FAT, RA: K6G, to the)... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi... 2002, W6FAT. SCM, L. L. Harbin, W6BNG, has just 2 counties to go for WACCU! W6FYF was appointed as Sec. of SCM. Congrats! W6FAT got... W6FAT for a new one and with W6OPU, W6EA, W6AM, W6OUE, W6UKM, W6CM, W6OBE, and W6KJQ on the job for the WESCON Show on the Historical Exhibi...
SAVE 33 1/3 - 50% on LAFAYETTE KEYS and AMATEUR EQUIPMENT

NEW! SEMI-AUTOMATIC "BUG" SUPER SPEED TELEGRAPH KEY

Fully the equal of keys selling at almost twice the price! 7 adjustments for speed and comfort, so important in developing the right timing when using a "bug". Heavily weighted with solid steel block in base. Speed adjustable 10 wpm to as high as desired. ¾" silver contacts; weight scale for reproducible speed settings. A real bargain for radio amateurs and professional CW operators! 6¾" long x 3" wide x 2½" high, exclusive of knobs and feet. Shpg. wt., 3½ lbs.

MS-435 Semi-Automatic "Bug".......................... Net 8.95

NEW! CODE PRACTICE SET

Economical and practical code practice key and buzzer unit for learning code. Telegraph key chrome and nickel plated with both adjustable spring tension and contact clearance. The high frequency buzzer has frequency adjustment with locknut to keep tone constant. Screw type plug (jack terminal) for headphone connection. Works with inexpensive 1½ volt battery. Heavy black molded phonoic base and buzzer housing. Base 4½" x 2½" x 1½". Weight 2½ lbs. 2 lbs. MS-438 Code Practice Set (less battery). 1.95

BATTERY Burgess 2........................................ 1.13
MS-369 Stethoscope Headset .......................... 1.69

AUDIO LEVEL VU INDICATOR

NEW! Precision loudness meter. Calibrated in Volume Units and percent, with 20 db variable attenuator. Ideal for setting output level in paging and music systems; removes guesswork when used as sound level indicator with tape recorders. Highly damped meter; responds to average level of voice and music. Impedance 10,000 ohms; sensitivity 1.4 volts for 0 VU. With capacitor for blocking DC to prevent burnout, 4" w x 2-3/16" h x 1-3/8" d. Shpg. wt., 1 lb. IMP0RTED E AS IMPORTED.

LAFAYETTE TM-20 Audio Level Meter ........ Net 5.95

NEW! STEREO BALANCE IMPORTED VU METER

Removes guesswork in providing perfect balance of the 2 amplifier or preamplifier channels in any stereo system, can be used as record level indicator with stereo tape recorders, and for balancing stereo tuners. Impedance 10,000 ohms; calibrated 20 db attenuators, capacitors for blocking DC. Calibrated in Volume Units and percent; highly damped, reads average voltage of voice or music. Sensitivity 1.4 volts for 0 VU. Shpg. wt., 1 lb.

LAFAYETTE TM-40 Stereo Balance Meter ...... 8.95

ILLUMINATED SCALE VU METER

NEW! Imported VU Meter

JEWELLED BEARINGS 2% ACCURACY

MEETS ACCEPTED VU METER SPECIFICATIONS

A high-quality precision built unit, only 3½" square, 2-5/16" x 1½" silvered dial face, 1-11/16" overall depth. Black point, highly legible black calibrations. Clear optical glass front. "B" scale, has 0-100% on upper scale, -20 to +3 VU on lower scale. Reads 99% of applied VU in 0.3 secs., with overshoot between 1-1½%. Calibrated for 0 VU when 1.228 volts sine wave AC applied through external high series resistor from a 600 ohm source with 600 ohm load. 6-8 volt scale illuminating lamp. Shpg. wt., 1 lb.

TM-80 ........................................ Net 7.50

NEW! MINIATURE Panel Meters

155

NEW MINIATURE HIGH SENSITIVITY MULTITESTER

20,000 OHMS PER VOLT DC - 10,000 OHMS PER VOLT AC

A terrific buy in a hand-held, compact, light, accurate, completely wired instrument. Has a 36 µA movement, 1% precision resistors and simple selector switch with calibration markings protected against wear. Scales: Volt DC and AC, 0-5, 25, 100, 500, 1000; Ohms: 0-6k-600, 250-1000, 600, 2500; Decibels -70 to -44 in 2 ranges. Size 4½" x 2¼" x 1½". Shpg. wt., 1 lb. Complete with batteries and test leads. Import to save you money.

AR-660 Miniature Meter .............. Net 22.50

Lafayette Radio

165-08 Liberty Ave.
JAMAICA 33; N. Y.
Include postage with order.

DEPT. VK
By Design...
COLUMBIA CD
Most Linear
STEREO CARTRIDGE

In the Columbia Constant Displacement cartridge, motion of the stylus is transmitted directly to the two wafers that generate the output voltages. This is accomplished by a simple lever, frictionless and featherweight. The precise mechanical design assures that, regardless of frequency, the output voltage is essentially constant for a given displacement of the stylus.

Discover for yourself that the Columbia Constant Displacement cartridge is designed to reproduce all the exciting breadth, depth and realism of stereo records. Remember, this cartridge was designed by Columbia Records drawing on its over 60 years of recording experience. Get the best. Insist on the Columbia CD cartridge.

SPECIFICATIONS
Diamond stylus........0.0008 inch radius
Recommended needle force....5 to 7 grams
High compliance...superior tracking, reproduction
Open-circuit voltage........0.5 volts
Extended stereo range..................20 to 16,000 cps
Channel separation........in excess of 20 db
Complete compatibility...........stereo and monaural
4 speeds...................33 1/3, 45, 78 and 16% slower

OBS-HYTRON,
Danvers, Massachusetts
A Division of Columbia Broadcasting System, Inc.

Traffie: W5ACK 246, RKB 218, BOO 89, KHEZ 47, JZN 81, JUB 82, PXY 52, FTX 20, WSLR 29, KSDNQ 17, IBB 15, ACD 12, W5RKI 3.

OKLAHOMA—SCM, Richard L. Hawkins, W5FEC—SEC; KKB, KF, FMX and DIZ; KJ, CMX, KMB, resided as PAM for 40 meters. DHZ was appointed to take his place. AOZ resigned as Asst. SEC and KC of Oklahoma County. Thanks for all the Fine radio. Sandy, KEMY felt left Oklahoma City for a new job so resigned as president of the OKCARC. UVQ took over as president. EWC was appointed Oklahoma State AF MARS Coordinator. New officers of the Chisholm Trail ARC are KMBZ, pres.; GRI, vice-pres.; UGA, secy.-treas.; KENJU, act., warr. We congratulate KJQV and KJMT, who have dropped the "N." KNOVU was granted his Ph.D in chemistry by Texas A & M, MIR], moved to North Carolina on vacation and reports many exciting contacts. NS has a new Apache. Does that make him a "Southman"? AOZ renewed his OO appointment. NS bought himself a Thunderbolt and his wire a new radio. Were the two events somehow connected? Oklahoma's Ham of the Month: JXN for his many hours of work and accomplishments as RM. Traffic: KXCA 284, W5ICG 109, JXAI 94, FEG 43, MGK 45, KLGV 38, INC 38, W5CXX 21, MLX 21, COL 20, KSDCA 19, BGI 13, W5KY 12, PNG II, WLV 4.

SOUTHERN TEXAS—SCM, Roy K. Eagle-ton, W5QSM—SEC; QKF, RM; KKBPS, PAM; ZIN, KJTP has a new Triband beam, QKF, QFA, QEM, ZMR, W5BRX 3, K5COZ and K5CFA attended the convention in Oklahoma City. K8QHR has 23 states and Hawaii confirmed on 40 meters with 10 watts. K8QNN worked 32 states using 10 watts. K8QWN worked 6 meters on Field Day and made 25 contacts. He also has a new tower and eight-element beam. DIW and EGD are new on s.s.b. UMY is back on with a pair of 4/125 As in Class A. K6JSN is after DX with a new Coupler. K5BNR has a new EC at Beaumont. A new DK, AQK and BKG are vacationing in the Northeast. ATR is a new OO. HKE is on ORS and K8QBT is a new RA, all in Houston. Sorry to lose FCX as RM, but because of circumstances beyond his control, he felt he couldn't handle the job as he should. QKF, the SEC for Southern Texas, has asked me to express his appreciation to the South Texas Emergency Network members for their courtesy in relinquishing their drill time and helping to keep the frequency clear while the mobiles at Beaumont were hunting the 8-year-old boy who was lost. He was found, in about one hour. KS4A is in Philadelphia and New York as guest of the RCA Corporation. K6JJC has a new 73A-4. Sorry to have missed the column, but work piled up while on vacation and the time slipped by. Traffic: (Aug.) K5QEA 109, W5EGB 98, ZIN 90, K5KMW 83, JCC 13, JZ 79, TXEGD 122, K5BSZ 88, W5ZIN 77, KANZ 63, JCC 17, OEA 16, W5UWY 14, LGT 12, URW 7, K5QPL 2, QIR 2.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WBD—Asst. SCM: Aaron Solomon, JCC, SEC; AEB, Congratulations to the Maritimes Area Amateur Radio Operators on their fine performance in sponsoring the Truro Convention. Some hamfest highlights: The TR Memorial Trophy for meritorious service was awarded to VN. The President's plaque (NSARA), donated by the late FJ, was awarded to AAR, EK won the Brown-Holder DX Trophy. The VE1 Contest Cup was presented to Y. Mobile award winners were ZATZ (high power), GA (home-built), BE (commercial installation). Congratulations and best wishes to FQ and his XYL on their recent marriage. The new address of the VE1 QSL Bureau is P.O. Box 653, Halifax, N. S. Newly-elected officers of the NSARA are VN, pres.; GA and FR, vice-pres.; VR, secy.-treas. New appointments include XR as EC (York County, N. B.); VO1 news: AF has moved to Cornerbrook, AI has a new 618 c.w. rig, DX-40, AO is NCS for the Newfoundland Net. RD operates as FPRAK when on St. Pierre. RF is mobile on 75 meters. HI and BY were active again. RD has his A3 endorsement, CZ is Newfoundland Radio Club president, EX is ex-9MPBCA. DQ is back from the South. RU is e.d. communications manager. New appointments include FR, BD, DK (the YDL of DQ). Traffic: K3DKZ/VO1 79, VE1OM 16, PZ 12, AEB.

ONTARIO—SCM, Richard W. V82NG—Reports are few this month, probably because of vacations. KM was ARRL representative at the Timmins Hamfest held in that city. The Hamilton Hamfest was a big event in spite of the rain. Among those present were ADA, AKC, KM, DSM, CDX, DZA. AJG, NG, DHO, AML, CDQ, DHE, RG and a great number of the usual characters. CDX won the hidden transmitter hunt on 75 meters. DPO also was in attendance. The Nearboro Club

(Continued on page 158)
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P.S. See the Collins 4-page insert in this magazine for all the technical specifications on the new S/Line.

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W8DED is offering a small 50¢ desk calendar with country prefixes printed on the back.
Seven men adrift on an island of ice twelve feet thick, a mile above the Arctic Ocean floor, floating just 450 miles from the North Pole in bone-chilling minus-40-degree temperatures: that was the hazardous setting for Project Ice Skate — one of America’s significant contributions to the International Geophysical Year.

On this isolated team of adventurous volunteers was Field Engineer Mike Swiercz — the group’s communications expert and only civilian. With him were three Army polar specialists, two Eskimos, and a Jesuit priest who doubled as an Arctic veteran.

Flown from Pt. Barrow, Alaska, to their wind-whipped ice floe on April 5th last year, this hand picked crew was left to observe and measure Arctic phenomena. With special instruments they studied Arctic conditions of geomagnetism, gravity, oceanography, meteorology and seismology. For eight months their sole contact with the outside world was by radio.

"Radio communication was better than anyone had thought possible," reported Mike. "I had an antenna up four days after we landed on the ice, and that same day we were talking to the men at the South Pole and later listened to Sputnik’s ‘beep-beep’ as it passed overhead."

Asked if the dangers of the icy wilderness and the fight against endless cold didn’t grate on the men’s nerves, Mike replied, “No, that’s Hollywood stuff; we all got on just fine. Remember, there was plenty of interesting work to be done, and the food was very good. I’m glad I asked for the assignment.”

We, at the Philco TechRep Division in Philadelphia, are proud of Mike Swiercz’s contribution to the IGY. His experience as a Philco TechRep doing an exciting job is, however, only the first of a series profiling the fascinating and unique adventures of our TechRep engineers and technicians to be published here in the months ahead.

WANTED: Ambitious Engineers & Technicians for choice locations in U.S.A. & throughout the world with electronics and communications experience in the following fields

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Recommended Tube Types
(Continued from page 25)

To outline the reasons for choosing a particular tube for a certain application over another of very similar characteristics would exceed the primary purpose of this article. The types chosen will be found to apply on an average basis for the function given. Thus, with the help of this chart of Recommended Receiving-Tube Types, it will be much easier for you to design your own “dream receiver” around 23 tubes than to attempt the task faced with an assortment of some 2000-odd tubes!

Such as 1-volt difference in cut-off bias on control grid.

The “Mickey-Match”
(Continued from page 26)

principles are the same.

If you have an extremely low-power transmitter, the forward readings on the 80- and 40-meter bands may be less than full scale, or even half scale, with the sensitivity pot full out. This can be overcome by using a longer piece of coax for additional pick-up. You can coil up as much of the stuff as necessary, with no effect on the performance. However, a full-scale deflection isn’t actually necessary to the functioning of the instrument, just so enough of a forward reading is obtained to allow a good comparison with the reflected reading.

Variable Frequency Oscillator
(Continued from page 28)

The standoff insulators on which \( L_1 \) is mounted are Millen No. 31003. Sharp-eyed readers will note an extra padder in the \( 4 \times 5 \times 6 \) box, one not shown in the circuit diagram. This was used originally to get coverage on 11 meters.

Adjustment

Getting this v.f.o. operating is no particular problem. The only adjustments required are the padder-capacitor settings, in order to establish the proper tuning ranges and band spread, and to choose the capacitor values in the keying system.

To adjust the band spread, first set the switch \( S_1 \) in the 80-meter position and with the tuning dial set to 0, adjust \( C_2 \) for a signal at 3500 in your calibrated receiver. Then, tune up to 4000 kc, and check to ensure that you can indeed reach that frequency before you run out of dial. The second set of adjustments comes with \( S_1 \) in the 7–28 position. This is simply a trial and error sequence with the goal being 3500 (7000) kc, at 0 on the v.f.o. dial and 3650 (7300) at 100 on the v.f.o. dial. The way to go at it is to set \( C_3 \) arbitrarily at half capacitance, and then set \( C_1 \) for 3500 kc, at 0 on the v.f.o. dial. Having done that,
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**NEW**

Transcon MARK II

6 or 10 Meter VFO or Xtal Xmitter & Xtal Controlled Broad Band Converter

Improved model. Phone or CW, Push-to-talk operation. Carbon or Xtal mic. Constant modulation indicator, TVI suppressed, Quick switch to B.C. Up to 4 watts using auto radio or home station receiver for power supply—12 watts with external supply. Compact 5 x 5 x 7", 6 volt and 12 volt operation. 8 or 10 meter models. Switch on rear panel to demodulate Final & supply audio drive for Transpower or any other higher power amplifier.

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Hammarlund Model HQ-170 Triple Conversion Receiver

The HQ-170 is "hot," it offers the amateur a practically endless combination of tuning techniques whereby optimum reception of SSB/CW and AM/MCW may be achieved. Using vernier tuning, adjustable bandwidth, and the basic, precision front-end of the HQ-170, the user has full control over SSB signals as well as adjacent, or co-channel signals. Provides 10 db signal-to-noise ratio at 1.5 µV Am or approximately .5 µV CW, or better depending on bandwidth. The front-end provides tuning of the 6, 10, 15, 20, 40, 80 and 160 meter amateur bands. Designed for use with a single wire flat-top, a folded dipole, or doublet antenna. Separate antenna terminals are provided for 6-meter reception.

Amateur Net (Less clock) $359.00
Amateur Net (With clock) $369.00

**Transcon H308 Voxbox**

A.M. Voice Control

Here for the first time is a small compact Voice Control Box adaptable to any A.M. rig. No time wasted, only buttons to push. Designed for crystal or dynamic mic. Controls: Audio Gain, Relay Adjust, and Time Delay. D.P.D.T. relay for transmitter control. Operating B plus voltage 150 to 225 VDC. Filament voltage 6 VAC, 6 VDC or 12 VDC. Size: 2½" x 4½" x 4¾".

Amateur Net $27.50

**Transcon Twin Noise Squelch**

Can be installed in any car radio rapidly, Tubes: 6AK5 & 12AX7. DC power input: 150 Volt, UC to 225 Volt. DC. Filaments: 6 or 12 Volt, Noise Level Attenuator: 50. Size: 2½" x 4½" x 4¾".

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For both mobile or fixed station use $11.95

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Built-in VFO, fully TVI suppressed, bandswitching 160 through 10 meters, small size, self-contained, including power supply and modulator, 75 watts CW, 65 watts phone, P-n-p network output.

Amateur Net (Kit) $229.50
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**Hailicrafters Model SX-101**


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**Sub-Miniature 0-200 Microammeter**

A high quality instrument made to rigid U.S. Govt. Spec. by International Inst. Co. (Model 100). Only 1" in diameter. Ideal for limited space applications & transistorized circuits. A natural for the transistorized grid dip oscillator as described in June '58 QST.

Amateur Net $3.95 ea. 2 for $7.50

**Weston 2" 0-500 microamperes**

A giveaway at $2.95 ea. 2 for $5.50

**Weston 1½" 0-1000 microamperes**


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Same as used in W2EWL SSB Rig—March '56 QST. 3 sets of CT windings for a combination of impedances: 600 ohms, 5000 ohms, 22,000 ohms. (By using the center taps the impedences are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2½" x 4½" x 3/4". Brand new. Fully shielded.

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As you probably know, the place in New York City where you always find the newest and best Ham equipment is Terminal. A good case in point is the new NATIONAL NC303 Ham Band receiver. Naturally you'll find it here, in stock, ready for off-shelf delivery, replete with new features like these:

Front panel SSB selector with "IF Shift", eliminates retuning or detuning. "Q" multiplier provides 60db rejection notch which may be tuned continuously across entire passband. Separate notch frequency and depth controls. 5-position IF selector provides sharp, SSB-1, SSB-2, medium and broad selectivity. Automatic noise limiter for AM, separate double-ended manual limiter for CW and SSB. Tone switch cuts highs, lows, or both. Plug-in accessory WWV calibrator provides 1 microvolt sensitivity on 10 mc, doesn't affect dial calibration or frequency coverage. 40:1 tuning dial with logging scale. Covers 160-110 meters. Dual conversion, all bands. Crystal controlled 2nd converter. Ten-scale slide-rule dial, readable within 2 kc without interpolation, up to 21.5 mc. 15 tubes.

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Sporadic-E Skip
(Continued from page 86)

Summary of High-Band TV DX Loggings
June 9, 1955 — Edward Sparks, W5LID, Odessa, Texas, received Channels 7, 9 and 11 from Cuba, 1315 to 1330 CST. Signals were weak and fading. Richard Lowry, Temple, Texas, logged Havana Channel 7, 1413 to 1416 EST. Signal was weak and fading, but may have been receivable prior to 1413.

June 27, 1955 — Robert Soybold, Dunkirk, N. Y., saw KHQA, Channel 7, Hannibal, Mo., 1658 to 1710 EST; video good, audio fair. This was during a widespread skip opening that included double hop between the East and West Coasts on lower channels. The distance was only 790 miles, unusually short for high-band E-layer possibilities.

July 1, 1955 — Richard Lowry, Temple, Texas, logged XEX, Channel 7, Mexico City, during a very strong E opening on lower frequencies. Reception was at 2335 EST, with fair signals. Distance: 900 miles.

January 19, 1956 — Richard Lowry saw XEQ, Channel 9, Mexico City, during a strong opening to Mexico City and the East Coast on lower frequencies at 1830 EST.

August 2, 1957 — Robert Grimes, Little Rock, Ark., received YVLV, Channel 9, from Maracaibo, Venezuela, near 2000 EST. Bedford Brown, Hot Springs, Ark., saw YVLV also, at 2220-2240, and Venezuela. Channels 2, 4 and 5, and Brazilian Channels 2 and 3. This appears to rule out tropospheric effects, because of the wide range of frequencies involved. The distance, 2300 miles, is odd for a high-band logging for 60, giving all this work an air of mystery. Signal strengths were all good, with Channel 9 the best.

...Strays...

W1WFR, newly moved to Pittsburgh, promptly joined the South Hills Brass Pounders and Modulators, and found that a fellow member was W3WFR.

The W1 said he had just returned from Holden, Mass. The W7 immediately replied that he was happy to QSO a member of the clergy. — W1FR
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on 28 mc. phone with 12 watts and received 59-plus
on five continents with 3 watts using a home-made
beam designed from specifications in this Handbook!

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Enclosed is 15c per book (covers packing, shipping
cost). (Cost prepaid on three or more books).
Name__________________________
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Enclosed find: □ check □ cash □ money order

163
Five-Way Antenna Coupler

(Continued from page 48)

using an 18-foot whip. This was about a 600-mile haul. Then, loading a 200-foot wet string supported by a regulation-size kite. I worked eleven different stations in seven call areas on 80-, 10-, 15-, and 15-meter c.w., with the best DX being W6WNI, who gave me a 409 report. Using the wet kite-string antenna, however, presented one major problem. The wind would dry the string out in about 10 minutes' flying time. I would then have to pull in the string, soak it a few seconds in salt water, then reel it back out. Another time, using the same kite to hold up the end of a 200-foot wire, many stations were worked with excellent signal reports.

For the ham with space limitations or plans to work portable with short antennas, this antenna will provide an easy way to load any antenna that is used.

3 It's the truth, so help me! — W4UWA.

DXpedition or Vacation?

(Continued from page 50)

Leaving St. Pierre was an experience never to be forgotten as was the first contact from there. We had checked through customs that morning only to be called back, boat and all, just as it was pulling out from the dock, in order that we might officially sign out, an oversight on somebody's part that morning. We hated to leave, having made many friends, including an American couple vacationing there who presented us with a huge loaf of French bread and a couple of bananas for the trip. Two Newfoundland buffaloes who snored loudly in the next room gave us a half gallon bottle of Napoleon cognac for the trip, which later was discovered to have colored water, and of course there were the many "Au revoir," and "See you next year." And next year they shall!

Several comments were overheard on the air about St. Pierre being great for ham radio but "I can't see using my vacation for such a trip." Well, I can assure you I've never had a better nor more interesting one and next year we'll take the XYLs all the way. I'll not go into detail about the trip except that it was a calm and pleasant one. The Miquelon is a larger boat, a converted Coast Guard cutter, and carried some twenty-nine passengers. Both boats had wonderful crews, and although it's not the Waldorf, we wouldn't have wanted anything changed. Passage is twenty dollars each way with two meals, and as far as I'm concerned a real bargain. I did lose a bottle of champagne on the way through customs but gained many new friends and a different outlook on amateur radio as reward. Total cost was about three hundred dollars each which also took care of our XYLs and children back on the mainland, and also included about fifty dollars in extras such as gifts for the folks back home.
from CARTON to CONTACT in 47 minutes!

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The Model 14-AV is only 21 feet high and weighs just 13 pounds. It incorporates the exclusive Hy-Gain Supporting mast and assembly which increases the electrical length of the mast, maintaining high efficiency on 30 meters.

Model LG-80 loading coil adds 80 meter operation to the 14-AV Vertically. Only, $3.95 Ham Net. Combination mast and radial mounting kit complete with hardware, $9.95 Ham Net.

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Completely factory preassembled and ready for further final assembly, these Hy-Gain Multi-band Traps are excellent Twin mounted SWR of 2 to 1 or less across the entire band for which they are designed. 32 ohm coaxial feed line. True 1/4 wave matched resonance and makes possible low angle DX radiation.

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Acting as an insulator of resonant frequencies but allowing radio energies of other frequencies to pass freely the Hy-Gain Insu-Trap becomes an automatic electronic switch which isolates various sections of the vertical to make it the proper length for each band. Hy-Gain Traps are exclusive adjustable traps./Fold and unfold the factory-vegetated mounting bracket to a high degree of efficiency. Each model is definitely weatherproof and difficult grass, water or condensation can ever enter. Enclosed in carbon activated polyethylene cover and tap assembly the Hy-Gain Insu-Trap is rated to take the full maximum legal input power. Traps are only 1" x 5", weighing just 6 oz. each.

the Self Supporting 14-AV

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for 6*, 10, 15, 20 & 40 M

NYLON BASE MOUNT

Fiber Glass impregnated 10 lb. base assembly makes possible self support. Heavy cast aluminum mounting bracket is adjustable for various mast sizes of mast. Weatherproof internal coaxial tubing supplied.

MODEL 12-AV

The Model 12-AV is only 13.5 feet high and weighs just 12 pounds.

Combination mast and radial roof mounting kit complete with hardware, $8.95 Ham Net.

Order Model 6MK, $4.95 Ham Net.

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HOW'S DX?
(Continued from page 68)

How's DX?
(Continued on page 69)

NET $17.95

MARINE FREQUENCY CRYSTALS - All marine frequencies from 3500-3200 KC. 0.05% tolerance. 0.005% tolerance.

RADIO CONTROL CRYSTALS - 25.75 MHz. Angled crystals 1/2'' pin spacing, specifically pin diameters...0.03 - 0.093. 0.05% tolerance.

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DC-24 holders...$1.25

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10% Tolerance

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80 meters...$3.50
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3.500KC hermetically sealed frequency marker crystal...$3.50 ea. for FT-243 Crystals.

3.750KC hermetically sealed frequency marker crystal...$3.75 ea.

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NEW SSB STATION

32S-1 TRANSMITTER
175 Watts PEP Input
80 through 10 Meters
10 DB RF Feedback
Automatic Load control
Upper and Lower SSB, CW

75S-1 RECEIVER
Sensitivity—1 uv for 10 DB S/N
Upper and Lower SSB, AM, CW
Broad Position for AM
Crystal Calibrator
2.1 (furnished) and .5 kc Mechanical Filter

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Portland 5, Oregon
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Dear OM;
Please send me information about the New Collins SSB Equipment.

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

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Standard output frequencies:
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For U.S.A., only

SOLD TO

HANDEL

MAXIMUM LEGAL POWER — WITH EASE!

Bill the 10-meter phone band on there
to lower wire runs VR2DA
over the Lotele with a lower.
VHF DX record is now right up to VR2DK's back yard but the next-nearest
ham is 70 miles away...

Sentiments are back in

deadlines. This time it's KIMC10 and XVBF/VAZK11 using mostly 10 and 20 meters on special IGY
assignment due to terminate immediately if not sooner. KSAS
grabbed 'em on the first bounce...

Receipt of a 150-watt sender by ZL3VY courtesy W8LLMR, 7 should help ease Chatam pressure. Neighboring ZL312A (ZL3AUX, ex-
VR2CN) was swiftly wanted by W9Z2 and PW3 and all c.e.

W8YN remarks, "VK6K6D closed shop on August 30 and probably won't get back on the air
for at least returns to Western Australia." VKs now can reach 3000 watts, you know...

OKKARA diggers have VK2AIR

twining with ZM6 and VR6 CPDXionary probabilities and K90BY (WP2PV) also is hampered by Tonga to a

nation...

ZL1ABZ seasons his 14-Mc. techniques after months of the 75-meter grizz.

WGDXC hears that W7MGT

was No. 1 2-meter customer for Mike...

V81LFT is said to be QRT until January or February... The

Wallis intentions of FK9AS were frustrated by licensing
tests which, in the last analysis, let HFSK and FW8T0

though other obstacles were readily surmounted.

Here, as KF17K's 1.8-megahertz conversion kicks the

conversion magnetism were eliminated by a rehab with League Vice-President
W5NW, their first personal QSO after thirty years of on-the

air association. KOSN and CSYB & Co., underlaid heavy

multiband Antigun artillery to better the other with fierce

VY2AT fuzzy in early September. A Dominica demolish-
detail followed, W6TL DX duet, and simultaneous

VP2AR flanking attack from Montserrat...

"Our August FO8AT jaunt was quite successful," opines SDXSC

stalwart W6K6MI. "We would like to have worked 7000 stations but preliminary estimates are

around 3000. Our ops faced many problems and I hope all DXers will

appreciate their efforts."... The move back to Port

Virginia for KG1DLS, says KIRJS...

In an effort to promote contacts with overseas American areas. K24UX

wants to verify your qualified confirmations from here.

The 20-meter grizz. of 20 K-permitted countries on the DXCC List, our mainland

excludes. The diploma is dubbed "20-K" and all contacts must date on or after January 1, 1955. Check with kHz

full spec...

K7DQD reports brisk trade at St. Pierre while signing F5SWB in early September...

W0BN Z

finds newcomer F5UAP in the multiband and 3-element squarer...

VP7NA's DX-10 is out after a 114-Mc. c.w. DXCC according to K2QXG's obser-
vations...

OA4HZ, a Connecticut Yankee in Lima, does okay on 40 c.w. with a 25-watt H66slingshot. But

K3JYF hears he's somewhat disheartened by QSL returns; of directional CQs who chicken out and reply to improper

of the ten-meter band...

"We ought to have Bermuda tickets...

W2JBL blasts callers who don't answer — and then complain about other improper an-

swers... One would go so far as to bawl out AC1AA for an-

swering one's CQ JÀ/KA, of course, but we know what

George means...

W5GTA takes to the noisy walsy-with-juicy-DX types who crack the same pile-ups
every morning with the same old sweet nothings while those

with less robust signals QRX.

Ten Years Ago in "How's DX?" — In November 1948

the LFS1B (Listen for My Buddy) booms up for casti-

gy...

Eighty meters is quick...

Bob's QSOs with ZL3Z2DRG

pursuits. On seventy-four phone GWBV

has been working numerous 2W plus F49LA GR 146-5 VR3P

4Q6 1RJ and 4ZL

K5AF, UP69s AA and AG top a

magnet 10-meter crop...

Ten-meter phone items include one H0DPP possibly in the Galapagos, V87PS,

VR5W and Z58A...

On fruitful 20 c.w. we find AC4YN, AR1WW, EK1GW, F18B AB, ZZ, FM5BD,

FT4AN, HZ4W 24 AB, HI6s AB BE BC, JR 2ANT 2CDJ

3Z6E 8ABW A9K SI, K9WJ, KB1, KB2AB, MBAB, MBAB, MP1AB, P18X, Pks 2KK 3XIN 4PQ,

TRIP, V87A DR PH IX, VU4AC, roaming Was 1EEC/KW0

32W34/F2P XV9Q 3FV1 4KCE 23 P blessings on them.

Truck #MCF/C1, VR51, Z63s LA IUN XY, Z109AA and

4UN/Rhodes...

Miscellaneously, we welcome T1A HR and PL back from their successful San Marino rau-

cous and also note that tricky Taisei Uruguay now inclu-

include AG3 (U. S. military), MF2 (British military) and IT

Photos of popular TISN and VO4X round out

the "How's DX?" column while quarterback leaves calls signals on a rotatory-

rhombic beam.
The Bandmaster Z-Match Antenna Coupler, featuring the improved M. C. Jones Micro-Match Circuit, is a combination antenna matching device, 50 ohm Dummy Load, R.F. Wattmeter, and Forward-Reflected Power Meter, designed to provide high efficiency antenna matching.

The tuning arrangement covers from 3.5 to 30.0 megacycles, while matching a 50 ohm input to reactive and non-reactive loads from 10 to 2500 ohms without switching coils. The R.F. Wattmeter is in the circuit at all times, and the Dummy Load may be used to tune your transmitter before going on the air, in accordance with F.C.C. regulations. The Micro-Match circuit is built-in, with a panel switch to read Forward or Reflected Power.

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AGAIN AVAILABLE — T-90 BANDMASTER TRANSMITTER AND POWER SUPPLIES AND R-9A DOUBLE CONVERSION RECEIVER.

See your dealer — if he can't supply you, you may order direct from factory.

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- Excellent workmanship — superior design — yet economical in cost
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MM2 scope with adapter — tells all about your and the other fellow's signal.
The Powerful 600 L Linear — and the Sensational NEW 100V TRANSMITTER
Output: 100-watt SSB, PEP; 40-watt AM

Order from W9ADN at ORGANS & ELECTRONICS, Box 117, Lockport, Ill.

Correspondence from Members

(Continued from page 70)

plural pronoun "we" in the singular... Dr. Bergen Evans reminded us on his TV program recently that we have the best authority for the use of the singular "we", the King James Bible. "Let us make man in our image and after our own likeness." (Genesis 1, 26)

Maybe we ourselves have rocks in our head. — Few C. Holmes, W5VAA

Editor, QST:

When that uncountable pronoun "we" is used on the phone bands in my shack, it definitely does refer to two distinct personalities, me and my home-brew pair of 809s. Anyone who has ever built up a rig that may be temperamentally on occasion is very careful to stay on its good side and not to anger it. I find that an occasional, polite, on-the-air acknowledgment of my rig's efforts helps me to keep it in a good humor.

— James T. Hanlon, W4TV

CONTESTERS' RCFGEST

New Lyme, Connecticut

QST uses many pages each year to tell us slow rag-chewing hams about the hot contest operators, and in the September issue there's a tale of true confession by one of these experts.

However, we live still don't know who is the best. There is no official star we can worship: no Mickey Mantle, no Teddy Nadler, no Louis Armstrong. So let's find out just which operator should be enshrined in the Amateur Hall of Fame, just who is the real McCoy. Obviously, a contest is the way to do it.

The contest should be on c.w. only, since you ARRL boys seem to think that a.m. phone is not here to stay and that e.s.a. is only an engineer's dream. It should last for 24 hours so the sleepless wonder can neglect their families for a day and a night and prove their youthfulness by operating straight through. And of course there must be multipliers; otherwise the bookkeeping might be as easy as the operating.

Only those who have finished first, second or third in each ARRL Section in the SS and in each Section and country in the DX Contest during 1958 should be eligible to take part. This will keep down the number of entries and will give the ubiquitous "CQ no contest" men a better chance of maintaining contact while they grime to each other.

You can see that although the quality of the contestants will be the highest possible, the number will be low. So the problem is how to make the affair exciting, or, as one of the non-integrated entrants might describe it, the most fascinating little old contest you all just ever had.

And here's my solution—positively the greatest:

NEGATIVE MULTIPLIERS.

It works like this: Suppose WSXXX uses two bought receivers, a home-built v.f.o. with amplifiers on 10, 15, 20 and 40, a telephone pole and two commercial towers, and beams he put together himself. His station has a good location on a hill and he has a 35 w.p.m. ARRL Code Speed Certificate.

After multiplying his number of contacts by the number of countries worked on each band and by the number of countries worked on each band and then subtracting his score by —.5 because he uses a home-built v.f.o., then by another —.5 for each home-made amplifier. The use of commercially built equipment must be encouraged — after all, QST advertisers have to live — and any fuddy duddy company. The use of the towers, provided the towers were actually bought, carries no penalty, but a multiplier of —.3 applies for each of the home-built beams. It's —.3 instead of —2.5 for the 35 w.p.m. speed certificate.

You may change the values of the other multipliers after you have one of those meetings I hear you're always holding

(Continued on page 174)

1 A colloquialism, not referring to L. McCoy, the Novices' Big Brother.
For Mobile And Fixed Stations

Everywhere You Go You'll See Tecraft In Action — dependable under every kind of condition — dependable for the finest performance.

Complete With Crystal and Tubes Amateur Net $59.95

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UNUSUAL OPPORTUNITY

for inexperienced man who wants on-the-job training in TV transmitter operation. First phone required.

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GENERAL SPECIFICATIONS

- oscillator employs standard, typ. ft. 243
- 8 mc crystals in Pierce circuit
- uses dynamic or crystal microphones
- provisions for metering all stages
- high level class "A" plate modulation
- highly efficient class "C" RF amplifier stage operates straight through at output frequency
- no frequency multiplication in final stage
- matches either 52 or 72 ohm antennas
- may be used as exciter to drive high powered transmitter
- tuned and air-tested, with crystal and tubes supplied — ready for operation
- all models employ tail end speech amplifier / driver, and 2 6AQ5 tubes as class A Modulators
- requires 6.3V or 12V AC or DC for filament and 250V DC for plate supply
- compact — only 9 1/4" L x 5 1/2" W x 5 1/2" H
- shipping weight, 5 lbs.

Model TR-20/30 — (6 meter band) 6AU6, Osc. 5763 but/dbl 6360 power amplifier 20-25 watts input.

Model TR 20/144 — (2 meter band, or CAPS) 6AU6, Osc. 5763 but/dbl 3763 but mult. 6360 final amplifier; 20 watts input.

Model TR 20/120 — (11 meter band) 6AU6, Osc. 5763 but/mult. 6350 but/mult 6360 power amplifier; 20 watts input.

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Write for information on these courses to:
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Tired of formulas and living on ur roof?
Wanna enjoy ur hobby and live-a-little too?

If so, latch onto and install a TELREX Model TB-7E.
It's the only no-compromise one-transmission line "Tri-Band" providing satisfying top-man-on-the-frequency results on 3-bands:
3 elements, 7 db on 10 meters;
3 elements, 5.5 db on 15 meters;
2 elements, 5.5 db on 20 meters; F/B . . . 22 db on 10, 19 db on 15 and 20; no traps to break down, or tricks and formulas to fiddle with!

How much for top performance and the finest materials, too?
only $158.00 f.o.b. AP — N.J.
Wanna write instead? Complete tech. info. free!

ASBURY PARK 2, NEW JERSEY
Telephone: PRospect 5-7252
the specially-designed Mosley Match... built-in for stability, fully pre-tuned... does the job!

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End leaky condensers — protects Xformers — even in basements. Automatic — never needs attention!

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Two sizes fit any RX,TX or Electronic Equipment, 24” attached cord solders to power supply terminals. Mounting clips and simple instructions included.

Original equipment in Hallicrafters SX-101 and over 12 leading Electronic Organs.

Money back if not satisfied after 30 days trial. PLUS 5 Year Written Guarantee.

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Anywhere in the world.
Airmail order today—we ship tomorrow. State models required. Sorry—No C.O.D.’s. Send $4.95 each: Check or M.O. to:

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Before you buy or trade for that 75S-1 or 32S-1
SEE WARD • W2FEU
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Collins 75S-1 SSB Receiver
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Upper and Lower SSB, AM, CW
Crystal Calibrator
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Net Price ........................ $495.00

Collins 32S-1 SSB Transmitter
175 Watts PEP Input
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Time Payments Arranged at LOW BANK RATES

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MORE RADIATED POWER
WITH MARK HELI-WHIP* ANTENNAS
The greater efficiency of MARK HELI-WHIP Antennas is proved dramatically by actual on-the-air tests. Spiral wound on a fibre glass rod, the HELI-WHIP matches 50 ohm cable with extremely low SWR. Both single band (10-15-20-40-80M) and 3-band (10-15-20M) types load beautifully without traps or adjustments. Single band 10 and 15 meter HELI-WHIPS are 4 ft. and others are only 6 ft. They actually improve the appearance of your car. Special trunk or fender mounts available. Order from your Ham gear Supplier.

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Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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TECHNICIAN - NOVICE - GENERAL
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MOD. 240 WITH MOBILE CONNECTIONS & AG SUPPLY. 1.6 to 30 mc. with Hi-Q plug-ins. For Phone or CW, Novice, General, CAT. Industrial. Complete with 8 x 14 x 8 cabinet; tubes, 40 meter coils & crystal. Wt. 30 lbs. $79.95.

80, 40, 10 meter coils $2.91 per band. 160 meter coils $3.60.

MODEL 130 FOR 120 to 130 WATTS — NOW $169.50

MODEL 242 FOR 6 METERS OR 2 METERS — 45 WATTS INPUT — 6146 FINAL. Complete with features. 45 to 50 watts input. Three KF stages with cab. as 240. $89.95.

80, 20, 10 meter coils $2.91 per band. 160 meter coils SUPPLY. l.o to 30 me. with Hi-Q plug-in coils. For MOD. 240 WITH MOBILE CONNECTIONS & AC VFO—$49.95 — ANT. TUNER $20.00 LESS COILS

6146 high efficiency straight-through final. 100% plate transmitter, designed especially for 6 meters. Check these SwinRing link matches 52 — 300 ohm antennas. Same mobile connections, A.C. power supply, tubes, xtal. MODEL 242 FOR 6 METERS OR 2 METERS — Complete with 8 x 14x8 cabinet; tubes, 40 meter coils

62 Berkeley Street Valley Stream, New York

Send full amount or $25 with order — balance C.O.D.

LETTINE RADIO MFG. CO.

The World Above 50 Mc.

(Continued from page 88)

up to the European record.

We almost got a new 10,000-Mc. record Sept. 6. On the day W7JIP/T was set up on 4000-foot Marya Peak, near Corvallis, Ore. W7LHL/T was in business on Gass Mountain, a 4200-foot elevation near Granite Falls, Wash. Two-meter gear was used for liaison, over the 265-mile circuit. Both stations were ready for a 10,000-Mc. try at 1100, at which time the 2-meter signal was S9, but on its way down. W7LHL first heard W7JIP's 10,000-Mc. tone after a little tuning, but it was very weak and fading in and out. By 1230 there was nothing left on 10,000 Mc., and the 144-Mc. signal was down to S2 after about 1300. The 2-meter signal remained poor throughout the afternoon, but it built up after 1800. At 1850 the 10,000-Mc. signal was heard again, this time weak, but steady. The expeditions ran out of time and had to dismantle, but another try will be made at a later date, probably next year.

W7JIP was feeding 300 milliwatts output from a Varian X-13 to a 30-inch dish. W7LHL used a Varian V-262 oscillator, a balanced mixer and a 30-Mc. l.f. with 1-Mc. band width. His reflector was also 30 inches in diameter.

OES Notes

KIBML, Bethlehem, Conn. — Best tropospheric opening of the year Aug. 31. Heard 144-Mc. stations as far south as W4KH, North Carolina.

W4FOM, Southington, Conn. — When using a lamp as a dummy load the relative power can be determined easily by using an exposure meter, provided the latter is held in a constant position with respect to the light source.

W4GJ, Hanover, Conn. — Have completed mobile transmitter covering 160 to 2 meters, in two plug-in r.f. units.

W4HDQ, Canton, Conn. — Now on 220 Mc., with 250 watts, phone and e.w., and 65-element array. Find coverage under normal conditions is about comparable to that on 50 and 144 Mc. Will be on e.w. during aurora and tropospheric openings whenever possible. Presently on 220.02 Mc.

W4LOE, Windsor Locks, Conn. — Note more use of e.w. on 50 Mc. than ever before. Hope trend continues as aid to DX work.

W4MWB, Westport, Conn. — Keeping m.e.w. skeds with KE2SY on 145.3 Mc. for code practice. Will accept calls from others interested in improving code ability.

W4NJE, New Tuscum, R. I. — Low-power DX is possible on 220. Heard W4UBY, 390 miles, when he was running a 6360 final stage. Also hearing several New Jersey stations on 432 Mc.

K4EUS, Chester, Va. — Heard 16 states on 144 Mc., via aurora Sept. 4.

W4NPR, Ft. Lauderdale, Fla. — First transatorial scatter of full season heard Sept. 5. CESAE and OAAE were in for 50 minutes, beginning at 1945 EST.

K4MW, Augusta, Ga. — Experience on 50 Mc. indicates that high power is not necessary in most DX work. Far more important is a good head; at least 5 elements. This need not be exceptionally high, so long as it is in the clear. A good rotating system is important, in order to zero in quickly on signals coming from unknown directions. A ground-plane antenna is very useful at times, and it may be used to provide us a signal as a directive array when the skin is right for its radiation angle.

K505J, Hazard, Ky. — Would like 220-Mc. skeds. Can work crossband from 50.58 or 50.91 Mc.

K6QK, Vallejo, Cal. — Oscillator using 6AF4A made to work up to 1700 Mc. Though efficiency was very low it should make fine local oscillator for 1215-Mc. receiver. Double-hop sporadic-E skip to 4th call area on 50 Mc. Aug. 31.

K6QMK, Paradise, Cal. — Caught TE opening to L3 and CE Aug. 18, beginning at 1945, and double-hop ES to Alabama and Florida Aug. 31.

W0YTM, Sherman Oaks, Cal. — Tests with K60AC, Inglewood, on 145 Mc. show no signal via direct path, with low power and small beams. When both stations aim at Mt. Wilson a consistent signal is maintained both ways. Signal varies regularly with the time of day, dropping from SS at 1500 to close to the noise at 2100.

K6FQG, Gambill, Ind. — DSB in use for past two months (Continued on page 176)
Plytubular Construction

No Traps, Coils, Baluns or Gadgets
No Insulators at Points of High Voltage.
No Element Tuning—All Fixed and Full Size.
No Ungrounded Elements Exposed to Lightning.
No Plastic to Support or Insulate Elements.

No Inefficient Single Line Feed.
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No Excessive Weight—Only 67 lbs.
No "Special Method" Ratings.
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The 9L-101520RG is a better beam on 10, 15 and 20 than the average stacking of three separate single band beams having 8 dB gain and 24 dB F/B. All three tuners reach-able from the tower for unity matching.

Plytubular construction is a process of fabricating multi-ply aluminum booms and elements, permitting smaller diameters for greater strength and less ice loading, wind loading, vibration and torque.

Investigate before you invest!

2 meter corner reflectors and YAGIs available soon
See your distributor or write—

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Place your order with us today to insure prompt delivery

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1500 KC to 2000 KC $2.00 ea. postpaid
2001 KC to 8995 KC $1.30 ea. postpaid
8996 KC to 11000 KC $2.30 ea. postpaid

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PLATED TYPE IN FT-241A HOLDERS. ALL CHANNELS 370 to 514 KC (Except 500 KC) $1.00 ea. postpaid, 500 KC ... $1.75 ea. postpaid.
Channel groups accurately matched—No extra charge.

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VERY THIN CRYSTALS
AVAILABLE IN VERY THIN FT243 CASES, ORDER BY FUNDAMENTAL FREQUENCY $2.00 ea. postpaid

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SATISFACTION GUARANTEED OR YOUR MONEY BACK!
WITH ILLINOIS ORDERS—Please include sales tax.

CRDSTALS, INC.
ODELL, ILLINOIS

FEEDBACK
Reference to MASER principle, October QST, page 83, should say December 1957 QST, instead of 1947.

Happenings of the Month
(Continued from page 81)

allow stations in the Radio Amateur Civil Emergency Service to use the frequencies in the 220-225 Me. RACES band for radio remote control of base stations and to "use 6F2 emission in the 50.35 to 50.75 Me band . . ."
3. The petitioner, in support of its request for amendments necessary to permit remote control operation by RACES stations in the 220-225 Me. band, alleges:
(a) Remote control is not presently permitted on a frequency available for utilization by RACES stations, which fact "is hampering progress in the development of the full capabilities of the service";
(b) Terrain conditions in the areas where many "Civil Defense Control Centers" are situated make maintenance of "the required primary communication links" impossible without physically relaying messages so long as remote control operations are not permitted;
(c) Use of wire lines for the remote control of RACES base stations will hamper the "mission" of amateur radio in Civil Defense, "to supply emergency communications," because "if all wire lines are intact after attack, RACES will not be called upon to play more than a minor role in communications."
(d) Adoption of the requested amendments would make RACES stations more effective in their missions and would enhance the value of the Radio Amateur Civil Emergency Service in time of disaster.
4. Arguments advanced by the petitioner in support of the requested amendment of Section 12.231 (a) (2) so as to allow use of 6F2 emission by RACES stations when operating on frequencies between 50.35 and 50.75 Me. include the following:
(a) 6F2 emission is presently permitted when RACES stations are operated between the frequencies 38.35 and 38.75 Me. and the characteristics of such frequencies are substantially identical to the characteristics of frequencies between 50.35 and 50.75 Me.
(b) Authority to use 6F2 emission when operating on frequencies between 50.35 and 50.75 Me. as well as when (Continued on page 170)

Hereinafter sometimes referred to as RACES stations.

CHALLENGING OPPORTUNITIES
in Sales or Engineering for qualified men of experience in electronic engineering or customer relations work. Write: Personnel Manager
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No noticeable sag!

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West Hartford 7, Connecticut

operating on frequencies between 53.35 and 53.75 MHz is required "in order that simultaneous transmission and reception of radio telegraphy signals be maintained, thereby affording maximum use of available frequencies at greater speed of transmitting and receiving."

(c) Rules presently restrict emissions on frequencies between 50.35 and 50.75 MHz suitable for telegraphy to type A emissions and equipment necessary for utilization of such emissions in radio telegraphy is unsatisfactory, not readily available and more expensive than that which would be required to utilize 6P2 emission.

(d) "Permission to use 6P2 in the 50.35 to 50.75 Megacycle band will encourage the Radio Amateur Civil Emergency Service to develop radio telegraphy communications in civil defense networks" and will aid in "increasing the speed with which traffic can be moved" by RACES stations.

5. The requested amendment of Section 12.64 (b) would, if promulgated, permit not only RACES stations but also other amateur radio stations to be authorized for conduct of remote control operations on frequencies in the 230–235 MHz band. Remote control operations by such stations is presently permitted only on "frequencies within amateur frequency bands 420 MHz or higher." The requested amendment of Section 12.231 (a) (2) which would permit use of 6P2 emission by RACES stations on frequencies between 50.35 and 50.75 MHz, would not provide for such use of 6P2 emission by other amateur radio stations operating on these same frequencies. Authorizations for operation of RACES stations are issued only to persons holding an amateur radio operator's license and "an appropriate amateur radio station license." Therefore, it would appear that if provision is made for use of 6P2 emission by RACES stations on frequencies between 50.35 and 50.75 MHz, similar provision should be made in Section 12.111 (h) for use of this emission by other amateur radio stations.

6. The requested amendments appear to have sufficient merit to warrant issuance of a Notice of Proposed Rule Making envisioning effectuation thereof.

Amendment of Section 12.111 (h) so as to permit use of 6P1 emission by amateur radio stations operating on frequencies between 50.0 and 54.0 MHz is also being proposed.

7. Proposed amendments of Sections 12.64 (b), 12.111 (h) and 12.231 (a) (2) of The Commission's Rules are contained in the Appendix attached hereto and are issued pursuant to the authority delegated to the Commission by section 301 (e) and (i) of the Communications Act of 1934, as amended.

8. Any interested person who is of the opinion that the proposed amendments should not be adopted or should not be adopted in the form set forth herein, may file with the Commission on or before November 20, 1958, written data, views or briefs setting forth his comments. Comments in support of the proposed amendments may also be filed on or before the same date, Comments in reply to the original comments may be filed within ten days from the last day for filing said original data, views or briefs. The Commission will consider all such comments prior to taking final action in this matter.

9. In accordance with the provisions of Section 1.54 of the Commission's Rules, an original and fourteen copies of all statements, briefs or comments filed shall be furnished the Commission.

**FEDERAL COMMUNICATIONS COMMISSION**

Mary Jane Morris
Secretary

Adopted: September 17, 1958
Released: September 19, 1958

(Continued on page 180)
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NEW 5 position IF selector for sharp SSB-1, SSB-2.
NEW WWV converter provision (interference free).
NEW hi-speed 40-1 tuning dial with logging scale.

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STREET ..................................................................
CITY ................................................................. STATE ....

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KW-10-15-20 Coils resonant in designated bands to provide perfect dipoles in each band. Using these coils together with a pair of KW-40 coils five band operation can be obtained with a total length between 85 and 95 feet.
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KW-40 12.50

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APPENDIX

IT IS PROPOSED TO AMEND PART 12, AMATEUR RADIO SERVICE, AS FOLLOWS:

1. Amend Section 12.64(b)(3) to read as follows:

(b) In the event that operation of an amateur transmitter from a remote control point by radio is desired, an application for a modified station license on FCC Form No. 610 or FCC Form No. 602, as appropriate, should be submitted with a letter requesting authority to operate in such a manner stating that the controlling transmitter at the remote location will operate within amateur frequency bands 220 megacycles or higher and that there will be full compliance with subparagraphs (1) through (5) of this paragraph. Supplemental statements and diagrams should accompany the application and show how radio remote control will be accomplished and what means will be employed to prevent unauthorized operation of the transmitter by signals other than those from the controlling unit. There should be included complete data on control channels, relays and functions of each, directional antenna design for the transmitter and receiver in the control circuit, and means employed for turning on and off the main transmitter from the remote control location.

2. Amend Section 12.611(h) to read as follows:

(h) 50.0 to 54.0 Mc using types A1, A2, A3, and A4 emissions and narrow band frequency or phase modulation for radiotelephony or radiotelegraphy 51.0 to 54.0 Mc., using type A9 emission, and on frequencies 52.5 to 54.0 Mc., special emission for frequency modulation (radiotelephone transmissions and radiotelegraph transmissions employing carrier shift or other frequency modulation techniques).

3. Amend Section 12.621(a)(2) to read as follows:

(2) For use by all authorized stations:

<table>
<thead>
<tr>
<th>Frequency Band</th>
<th>Authorized Emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.55-29.75 Mc.</td>
<td>0.1A1, 0A3, 0A4, 0F3</td>
</tr>
<tr>
<td>29.45-29.65 Mc.</td>
<td>0.1A1, 0F1, 0A3, 0A4, 0F3</td>
</tr>
<tr>
<td>50.35-50.75 Mc.</td>
<td>0.1A1, 0A2, 0A3, 0A4, 0F2, 0F3</td>
</tr>
<tr>
<td>53.35-53.75 Mc.</td>
<td>0.1A1, 0F1, 0A2, 0F2, 0A3, 0A4, 0F3</td>
</tr>
<tr>
<td>145.17-145.71 Mc.</td>
<td>0.1A1, 0F1, 0A2, 0F2, 0A3, 0A4, 0F3</td>
</tr>
<tr>
<td>146.79-147.33 Mc.</td>
<td>0.1A1, 0F1, 0A2, 0F2, 0A3, 0A4, 0F3</td>
</tr>
<tr>
<td>220-225 Mc.</td>
<td>0.1A1, 0F1, 0A2, 0F2, 0A3, 0A4, 0F3</td>
</tr>
</tbody>
</table>

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RADIO TECHNICIAN

Minimum 5 years practical experience maintaining and installing standard commercial communications equipment. Emphasis on V.H.F. fixed and mobile radio transmitters and receivers, both broad band and narrow band. Some experience desirable with carrier equipment, HF mobile equipment, HF fixed stations transmitters and receivers, and television equipment. For work in Saudi Arabia.

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180

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Russian Amateur Radio

(Continued from page 64)

of requirements (here somewhat shortened):

1. High Frequency. Take first or second place in DOSAAP USSR or international contests, work all 15 republics in 3 hours, work 100 districts in 12 hours, find two "foxes" operating in the 80-meter band (and at least 4 km. from the "hounds") in an hour. (So far, 104 Russian hams have qualified for this award.)

2. V.H.F. and U.H.F. Take first or second place in All-Union competition, set a new All-Union record in v.h.f. and u.h.f. communications, make 200 QSOs (at a distance of at least 5 km.) in the 38–40 Mc. band in 12 hours, in the 144-Mc. band make 15 QSOs with at least 10 different stations in 12 hours (must be at least 50 km., distant), on 420 Mc. make 15 QSOs (at least 10 km., distant) in 12 hours, make 20 QSOs on 38–40 Mc., at a distance of 3000 km., in 12 hours, find two "foxes" operating between 38 and 144 Mc. (and at least 4 km. from the "hounds") in 50 minutes.

3. Sending and Receiving. Copy letter text on a typewriter at a speed of 200 letters per minute and figure text at 150 figures per minute, send letter text at 140 letters per minute and figure text at 100 figures per minute, copy by hand letter text at 180 letters per minute and figures at 140 per minute.

Each of these major divisions is divided into three subdivisions, reflecting various levels of achievement. It was reported that by the end of 1957 some 42,000 persons had won these awards.

Russian amateur radio contests are treated as sports competitions. Before a lengthy contest (four hours or more), participants are urged to take only light foods, and, to maintain their endurance during the contest, they are urged to eat omelets and to drink strong sweet tea, coffee, or cocoa. During international code-speed competitions, Russian participants wear sweat shirts with the letters "SSSR" (USSR) emblazoned across the front of the shirt.

Miscellaneous

a. The Russians claim that one Sergei Zhidkovsky built "the world's first amateur radio receiving-transmitting station." This was in the fall of 1914. Since there were no other amateur stations on the air at that time, Zhidkovsky was forced to receive signals from military stations in Kiev, Odessa and even Paris.

b. The youngest "Master of Amateur Radio Sport" is 17-year-old Dimitry Alekseevsky, of

(Continued on page 184)
IT'S HERE! A Six Meter Phone Transmitter

WITH ALL THESE FEATURES...

- Front Panel Tuning
- 3 - Position Crystal Switch
- 2E26 Final - Coaxial Output
- Uses 8 mc. Crystals
- Crisp, Clean Push-Pull Modulation
- 2 Tuning Meters
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THE NEIL ALPHA 6 SIX METER PHONE TRANSMITTER

TRANSMITTER (approx. 3x8x12) with Tubes and Crystal... $78.50
Matching Power Supply (300v @ 200ma - 6.3v @ 3.65a) 39.95

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MOST COMPLETE STOCK OF TRIAD IN NEW YORK

Melville Radio Corporation
Wholesale Distributors of the BEST In Electronics
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EASY TO LEARN CODE

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★ 10 db gain on 10 & 15
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c. The number of Russian ham stations increased 10.2 times from January, 1955 to October, 1957. In January and February, 1958, more than 50 new high-frequency stations went on the air. (I have never seen an absolute figure for the number of Russian hams.)

d. 1500 to 2000 women now participate in the annual YL short-wave contests. Radio provides prizes for this (and other) contests.

e. Hidden transmitter hunts are called "fox hunts." Direction-finder receivers are carried on the back (no mobile operation is permitted).

f. I would say that ham radio in the Soviet Union is not restricted to well-heeled individuals. This would not be in line with the government's aim of making radio a mass movement. The government, in fact, subsidizes ham radio, just as it does other hobbies having military application.

---

**Strays**

First Army MARS will sponsor a 26-hour course in "Basic Electronics" beginning Nov. 5. These lectures will be given on 4030 kc. a.m., immediately preceding the technical net session (see page 53), and lasting one hour (from 2000 to 2100 EST). The course will be given in cooperation with the Ft. Monmouth Signal Corps School and will use the ARRL Handbook as a study guide.

Dr. Jack Herbstreit, Chief of the Tropospheric Propagation Research Section, NBS, and W0IIN, has been named by the IRE to receive the Harry Diamond Memorial Award "for original research and leadership in radio-wave propagation." The award is presented annually to an outstanding engineer in government service.

During the September V.H.F. QSO Party, K2VDR worked W2DZA and K2DZA, W2SEU and K2SEU, and K2ICM and K1ICM.

Another coincidence for you to suffer through. VE2XR's brother-in-law is VE5XR.

W7KCN found that the name of this town in Washington is pronounced just like the familiar war cry.
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CHARM BRACELET & DISK
Sterling silver........... $15.50

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To receive amateur or commercial teletyped messages by radio, you need the following equipment: (1) Good communications receiver. (2) A TELEWRITER CONVERTER which plugs into the receiver phone jack. (3) A Polar Relay which plugs into the back of the Teletype Converter. (4) A small 110 volt, 60 ma. D.C. power supply. (5) A teleprinter (teletype) machine, which is an electric typewriter controlled by radio signals. Used teleprinter machines are available from $75 up. Teletype Converter $90.00. Polax Relay $14.75. For additional information write: Tom, W1AFN.

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- Plumber’s Delight—finest aluminum
- Design Center.......................... 50.5 Mc.
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1:1 at design center. Less than 1.5:1 within 2 Mc.
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NEW BOOKS


It's easy to lose track of a satellite if for some reason observations have to be discontinued for several days. Although attempts have been made to broadcast up-to-date tracking information for the use of observers (QST, April 1958, page 59), in recent months these predictions have had to be limited to satellites that would be visible optically over some part of the United States. With the help of the new Satellite Prediction Kit and a change that is scheduled to be made soon in the form of the CAP broadcast, both radio and visual observers should be able to figure out for themselves the most favorable times for making observations, at their own exact locations. The authors of this booklet have worked out a calculation method based on modified orbital elements — these can be broadcast in quite compact form — which, requiring nothing more than the ability to follow directions and do simple arithmetic, leads to the desired information.

Using the method described in the book, predictions can be made for several days in advance, since the orbital elements do not change rapidly. A fresh set of orbital data, available from the broadcasts, should be used if the interval is longer than about a week, but it is not necessary to get the corrected elements daily.

"Do-it-yourself" prediction data has been badly needed. This kit will be welcomed by all who are interested in keeping up with the satellites.


In going into its third edition the G.E. Transistor Manual is definitely in the best-seller class — according to G.E., close to a quarter of a million copies of the first two editions were distributed. Obviously, to attain such a circulation the book must have elements that satisfy a wide variety of needs, particularly in the practical-application department. The new edition continues to have the same sort of appeal, but in considerably greater volume.

The Manual has three divisions, broadly speaking — basic principles, practical circuit applications, and characteristic data on commercially-available transistors. The applications section constitutes the major portion of the book — 104 pages out of the total. Of particular interest to the home experimenter are the chapters on radio circuits and h-f.

(Continued on page 188)

CANADIAN AMATEURS—
We are now manufacturing Amateur and Commercial antennas—Write for free brochure describing our new Beam Antenna series.

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"DEPT. CA"
LINDSAY, ONTARIO, CANADA
FIRST NEW PUNCH DEVELOPMENT IN 20 YEARS . . . OBSOLETES EVERY OTHER PUNCH NOW ON THE MARKET

WALSCO

"L.T." LOW TORQUE CHASSIS PUNCH

CUTS a cleaner hole with 50% less effort!

A brand new electro-coating process (which can't wear off) reduces friction, thus lowers torque. You get a much cleaner hole with much less effort. The Walasco "L.T." Chassis Punch requires no lubrication of any kind and will give perfect service almost indefinitely. Available in a wide variety of sizes, round, square, key and D shapes.

Full information on these extra-easy to use "L.T." punches is available from your Walasco distributor or by writing direct to Walasco.

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For 10, 15 and 20

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circuits. The former covers converters, i.f. amplifiers, a.v.c., and reflex circuits, and includes twelve pages of complete receiver diagrams covering practically everything from a one-transistor set to superhets with Class B audio output. The hi-fi section has a discussion of tone controls as applied to transistor circuits, and gives practical circuit data for pickup and recording-head preamplifiers as well as power amplifiers up to 10 watts output. Another part of the book describes a.c. power-supply arrangements suitable for transistor circuits — something that often seems to be neglected when power amplifiers are under discussion. Other topics covered include unijunction-transistor applications, "logic" circuits, tetrode transistors, and silicon controlled rectifiers. There is also a discussion of transistor characteristics and ratings as they should be interpreted from published information, detailed specifications on G.E. transistors, and a listing, with ratings, of all registered (E.I.A.) transistor types on which information was available at mid-year.

Oscilloscope Techniques, by Alfred Hans. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 5½ x 7½ inches, 224 pages, including index. Paper cover, $2.90; cloth, $4.60.

This is a very practical-looking book on the oscilloscope, with the accent on using the instrument for doing all sorts of jobs. After a few opening chapters on the principles of the cathode-ray tube and the circuits used in oscilloscopes, the text takes off into the world of measurements that can be made with the scope. Beginning with voltage and frequency, running through distortion and complex wave forms, clipping, differentiation and integration, it gets into such things as plotting vacuum-tube and transistor characteristics, magnetic properties, modulators of various types, receiver trouble shooting and testing (including television receivers), and winds up with a chapter on identifying oscilloscope faults — all well illustrated with actual pattern photographs. The owner of a scope should find plenty in it to stimulate his use of the instrument and widen its field of application.

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W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
W2, K2 — North Jersey DX Association, Box 55, Arlington, New Jersey.
W3, K3 — Jesse Biehler, W3KT, P.O. Box 400, Baltimore, Pa.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Robert Stark, W5OLG, P.O. Box 201, Grapevine, Texas.
W6, K6 — Horace R. Greer, W6TT, 414 Fairmount Avenue, Oakland, Calif.
W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
W8, K8 — Walter F. Musgrave, W8NGW, 2735 E. 187th St., Cleveland 10, Ohio.
W9, K9 — J. F. Oberz, W9DSO, 2811 Gordon Drive, Florence, Ill.
W0, K0 — Alva A. Smith, W0DLM, 235 East Main St., Caledonia, Minn.
VE1 — L. F. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — George C. Good, VE2TA, 188 Lakeview Ave., Pointe Claire, Montreal 33, Que.
VE3 — Leslie A. Whetham, VE3QL, 32 Sylvia Crescent, Hamilton, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward VE5DP, 99 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 835 10th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1684 Freeman Rd., Victoria, B. C.
VE8 — W. L. Geary, VE8AW, Box 531, Whitehorse, Y. T.
VE9 — Ernest Ash, VE9AA, P.O. Box 8, St. John's, N.fld.
K0 — E. W. Mayer, KP4K, Box 1061, San Juan, P. R.
K16 — Andy H. Fuchikami, KJ6BA, 5666 Nanao Dr., Honolulu, T. H.
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To its distinguished series of single sideband amateur radio systems, Collins now adds the S/Line. This attractive, completely new line combines the quality and performance of the KWS-1, 75A-4 and KWM-1. Individual S/Line units on which several system configurations can be built are the 32S-1 Transmitter, 75S-1 Receiver, 30S-1 Linear Amplifier, 516F-2 Power Supply, 312B-4 Speaker Console and 312B-3 Speaker.

32S-1 TRANSMITTER

The 32S-1 Transmitter has a nominal output of 100 watts for SSB or CW operation on all amateur bands between 3.5 and 29.7 mc; input power is 175 watts PEP on SSB or 160 watts on CW. The 32S-1 may also be used without modification to excite the 30S-1 Linear Amplifier.

The transmitter covers the entire spectrum from 3.5 to 30 mc except for the 5.0 to 6.5 mc range. Crystal sockets, crystals and band switch positions are provided for 10 200 kc bands, with the standard amateur configuration equipped for: 3.4-3.6, 3.6-3.8, 3.8-4.0, 7.0-7.2, 7.2-7.4, 14.0-14.2, 14.2-14.4, 21.0-21.2, 21.2-21.4, 21.4-21.6. Crystal sockets and band switch positions also are provided for three 200 kc bands between 28 and 29.7 mc, with a crystal supplied for 28.5-28.7 mc. A fourteenth position, corresponding to the WWV position on the receiver, can be used for one additional 200 kc band in the 9.5-15.0 mc range, if desired.

The 32S-1 features: Mechanical Filter type of sideband generation; stable, permeability tuned VFO; crystal controlled high frequency oscillator; RF inverse feedback for improved linearity; automatic load control for higher average talk power, and provision for switching to transceiver operation with the 75S-1 Receiver controlling the transmitter frequency.

The associated 516F-2 Power Supply is housed separately in a matching cabinet with ample room for additional station accessories. Power supplies for 115 v ac and 12 or 28 v dc employed with the KWM-1 Mobile Transceiver may also be used for the 32S-1.

32S-1 Price $590.00 (Less Power Supply)

75S-1 RECEIVER

The 75S-1 provides SSB, CW and AM reception on all amateur bands between 3.5 and 29.7 mc. It is capable of coverage of the entire HF spectrum between 3.5 and 30 mc by selection of the appropriate high frequency beating crystals.

The standard amateur configuration includes crystal sockets, crystals and band switch positions for: 3.4-3.6, 3.6-3.8, 3.8-4.0, 7.0-7.2, 7.2-7.4, 14.0-14.2, 14.2-14.4, 21.0-21.2, 21.2-21.4, 21.4-21.6. Crystal sockets and band switch positions are also provided for three 200 kc bands between
28 and 29.7 mc with one of the sockets equipped with a crystal for 28.5 to 28.7 mc. A crystal and band switch position is also provided for 14.8-15 mc for reception of WWV and WWVH for time and frequency calibration data.

Features incorporated in the new receiver include: dual conversion with crystal controlled first beating oscillator; bandpass first IF; stable, permeability tuned VFO; RF amplifier designed to minimize cross modulation products; Mechanical Filter; product detector; excellent AVC characteristics for SSB reception with full RF gain; 150 volt B+ for vacuum tube plates; silicon diodes instead of a conventional high vacuum rectifier; selection of three degrees of selectivity — Mechanical Filters for 2.1 or 0.5 kc, or conventional IF transformers for AM.

The VFO and HF crystal oscillator in the 75S-1 may be used to control transmitter frequency through the use of two plug-in patch cords. The ac power supply for the 75S-1 is self-contained. However, the 12 or 28 v dc supplies for the KWM-1 may be utilized, as with the transmitter, and a power connector at the rear of the 75S-1 disables the internal supply when the external supply is used.

75S-1 Price (2.1 kc Filter only) . $495.00

30S-1 LINEAR AMPLIFIER

The 30S-1 is a single tube, grounded grid linear amplifier with frequency coverage consistent with the 32S-1 and 75S-1. It provides the full legal power input for SSB (1 kw average) or 1 kw input for CW, requiring 70 to 100 watts excitation (from the 32S-1 or KWM-1, for example). The amplifier tube is the Eimac 4CX1000A.

RF inverse feedback is employed for better linearity, and automatic load control voltage is fed back to the 32S-1 or KWM-1.

The power supply for the 30S-1 is located in the lower portion of the cabinet. There is also a compartment for the 516F-2 Power Supply used with the 32S-1.
ACCESSORIES

312B-4 SPEAKER CONSOLE

This unit integrates system control of the 32S-1, 75S-1 and accessories.
It contains a speaker; an RF directional wattmeter with 200 and 2000 watt scales for measuring antenna and transmission line performance, and several station control functions.
A FUNCTION switch provides selection of: NORMAL station operation; RECEIVE ONLY, with transmitter audio circuits disabled, and TRANSMIT ONLY, with receiver disabled and transmitter VOX actuated. Another switch enables the operator to mute transmitter and receiver audio quickly.
312B-4 Price $185.00

312B-3 SPEAKER

The 312B-3 includes a 5" x 7" speaker and connecting cable, housed in a cabinet attractively styled to match receiver and transmitter.
312B-3 Price $27.50

516F-2 AC POWER SUPPLY

Providing all voltages for the 32S-1, this unit operates from 115 v, 50-60 cps. It is housed in a matching cabinet and may be mounted on the desk top or in an out-of-the-way location. Space is available behind the front panel grill for custom mounted station accessories.
516F-2 Price $105.00

516E-1 DC POWER SUPPLY

Operating from 12 v dc, the 516E-1 provides all required voltages for the 32S-1 and 75S-1 for mobile or portable operation. Circuits are completely transistorized for maximum efficiency and minimum maintenance. A 28 v dc supply, the 516E-2, may also be used with both units.
516E-1 Price $262.00

COMPLETE DETAILS IN S/LINE BROCHURE

see the S/line at your
Collins dealer during S/month
Nov. 8—Dec. 8