

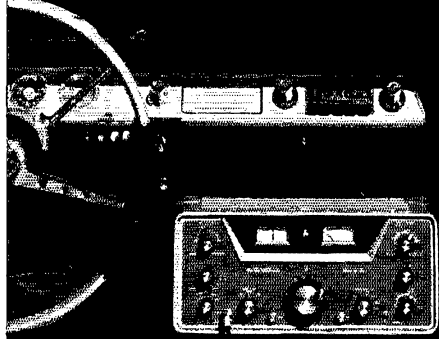


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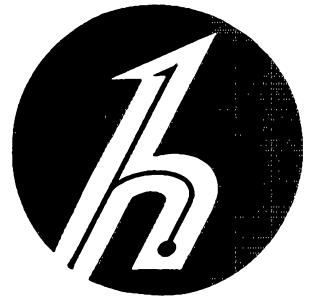
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November 1962  
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of transmitter.\*

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automatic level control):

← 1650 kc crystal filter.

\*Pat. applied for

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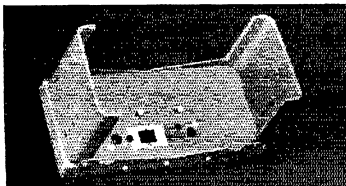
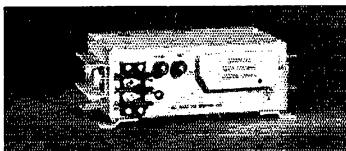
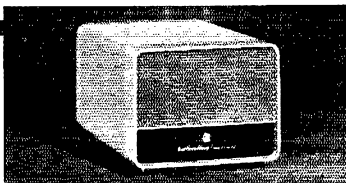
**General:** Dial cal., 5 kc; 100 kc crystal cal.; VFO tunes 500 kc; 18 tubes plus volt. reg., 10 diodes, one varicap. Rugged, lightweight aluminum construction (only 17½ lb.); size—6½" x 15" x 13".

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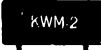





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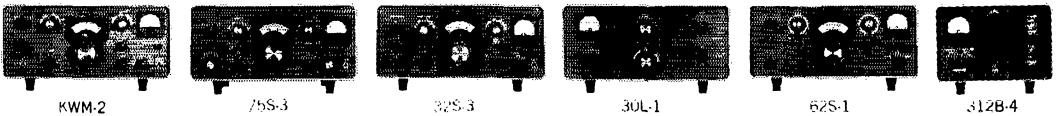
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**NOVEMBER 1962**  
VOLUME XLVI • NUMBER 11

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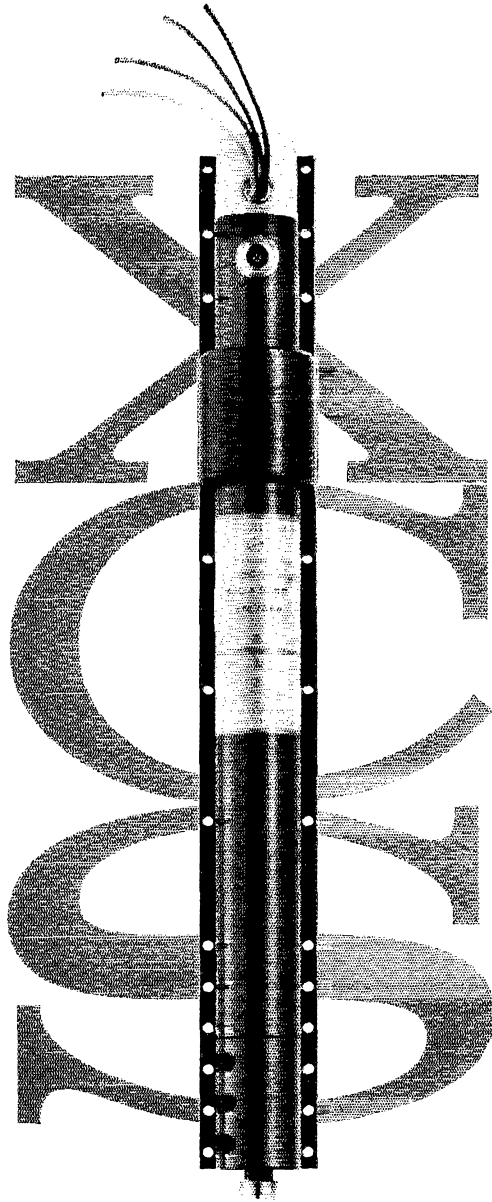
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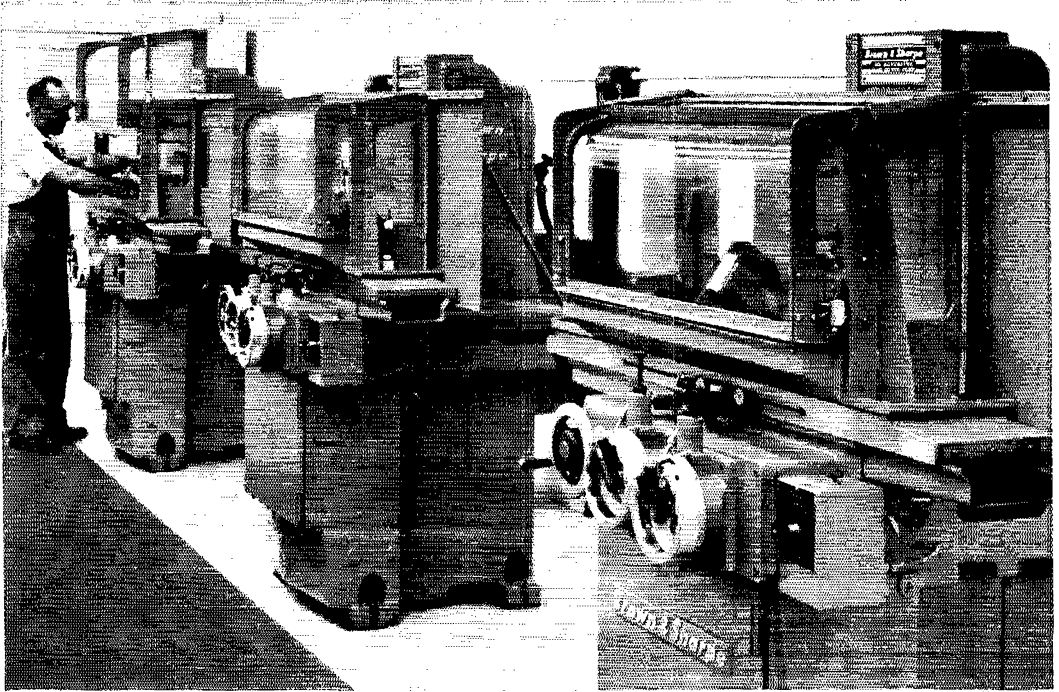


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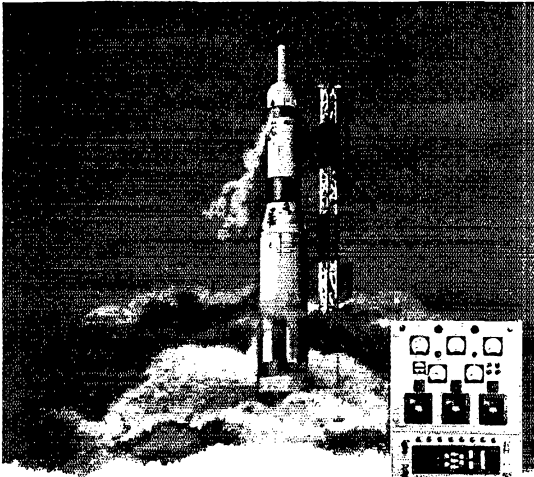
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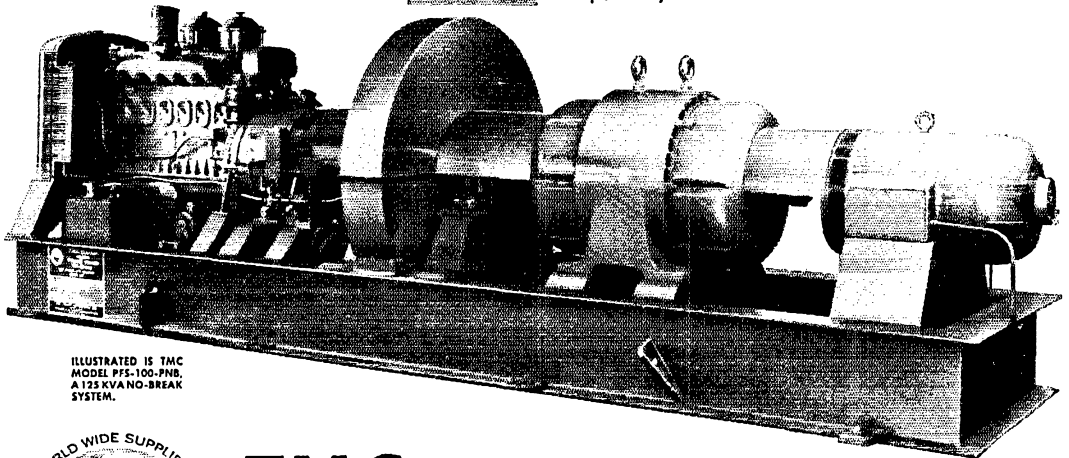
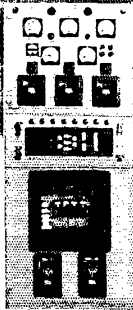
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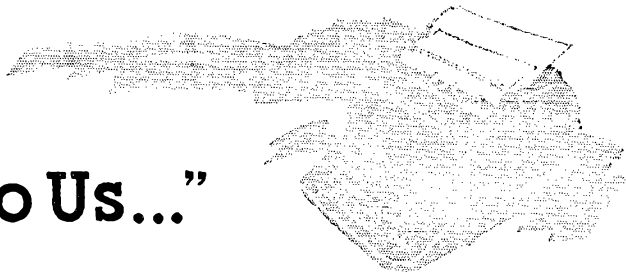
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# "It Seems to Us..."



## TECHNICIANS — AN EVALUATION

A NUMBER of Technician Class licensees seem unhappy with their lot in amateur radio. This smoldering dissatisfaction has again come to light in a recent flurry of correspondence sparked by FCC's denial of 10-meter privileges. They seem to feel that discrimination and prejudice are being practiced against them. They feel they are "second-class" amateurs. Perhaps it is time for some plain talk about this special class of license.

The Technician Class license was proposed by FCC in 1949, and was supported by the League. (Initially it carried privileges only above 200 Mc.; subsequent FCC rules changes, again with League endorsement, permitted 6- and 2-meter operation.) The basis for creation of the license is best described by quoting from the Commission's announcement at the time (emphasis added):

"... particularly to promote developments on the higher frequencies, licensing at the first level above the beginner [Novice] would permit alternate routes. One route would be for the communicator who would substantially resemble today's [General and Conditional Class] amateur. The other would be for the *experimenter or technician* who today has no precise counterpart and who would be permitted to operate only on the higher frequency bands."

In some quarters the Commission's denial of 10-meter privileges has been interpreted as a slap at Technicians. We don't agree; we think FCC has simply restated its determination to keep the original concept intact. Others argue that the Commission's reasons for denial are outmoded, or at least inconsistent; FCC's statement that the Technician Class "was not established as a communicators service" has been stretched by some complainants to suggest that Technicians are not permitted to communicate! It seems to us that what the Commission is saying is that since experimentation, not communication, is the primary objective of the Technician license, FCC will do nothing which promotes communication at the expense of experimentation. And we think that makes sense.

We do not feel that the true Technician is a "second-class" amateur. If there are such, it is because they have met the license's first aims in a second-class manner. We have, indeed, railed against some Technicians who have no further interest in amateur radio than acquisition of a 6- or 2-meter transmitter solely so they can talk. We shall continue to decry trends which we believe are not in the over-all interests of amateur radio, whether the problem is in the Technician field or some other. But the true Technician is as much an amateur as any other licensee. To the extent he is limited in his frequency privileges, he has chosen this route himself. The other route remains entirely open, awaiting only his decision to take it.

"We feel," one of our correspondents argues, "that it is time the Technician came into his own." Yet it is evident from the letter that by "coming into his own" he does not mean the Technician should hitch up his belt, set his jaw and tackle the opportunities which have been set before him. He is really saying that FCC should lower the objectives to coincide with what some Technicians are already doing (*only communicating*).

The complaints continue: "The Technician operates under the most trying and difficult conditions imaginable; in a new territory, with new techniques, and in fact, carrying the burden of new and experimental work in amateur radio v.h.f. and u.h.f. regions by the very nature of his class of license." Our compliments to the author of this sentence, who has so beautifully stated the case for Technicians. He means it, however, in a negative sense, crying out against "injustice." We regard it wholly in a positive sense, laying down the challenge of specific objectives.

We think Technicians should be proud of such a status, rather than decrying it. After all, most of the progress in amateur radio has been built on challenges! When all problems are solved, when no more challenges exist, we all might as well fold up and turn our frequencies over to some other service. QST

**COMING A.R.R.L. CONVENTIONS**

January 19-20, 1963 — Southeastern Division, Miami, Florida.  
March 15-17, 1963 — Michigan State, Saginaw, Michigan.  
April 26-28, 1963 — New England Division, Swampscott, Mass.  
July 5-7, 1963 — Rocky Mountain Division, Albuquerque, N. Mex.  
October 4-6, 1963 — ARRL National, Cleveland, Ohio  
October 11-13, 1963 — Southwestern Division, San Diego, Calif.

**OUR COVER**

There's an old saying in ham radio that accomplishment is 90% operator, 10% station. Of course, that ten per cent must be carefully organized and efficient. With Sweepstakes coming up, we thought you ought to see how one prominent W6 station has got all his transmitter and receiver units carefully interconnected and labelled, ready for the contest. (Old-timers will recognize the many hours of work that have gone into an installation such as this. Newcomers will begin to understand why nowadays we call it "radio," not "wireless."

This is W6ULS, and for the front view you should refer to page 29 of the May, 1962, *QST*. The operating room is actually a walnut-panelled room with wall-to-wall carpeting, and visitors never suspect the "skeleton in the closet." Says W6ULS, "Anyone wants to shake down the circuitry for 10 or 15 years before going on a wild cleanup campaign, right?"

**IMPORTANT NOTICE**

*Change of Address*

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

**Strays**

The hams of the Canal Zone are now issuing a phone award to those amateurs who handle KZ5 traffic with regularity. The service award is not issued spontaneously, however; hams who think they may be qualified, on the basis of regular traffic work with stations in the Zone, are invited to write for full information. The QTH is: Crossroads Amateur Radio Club, Box 2603, Cristobal, Canal Zone.

tracking stations and scientific organizations in South America, but are also received in other parts of the world. Monitor the following stations and frequencies: WIWO, 9650; WBOU, 9750; WBOU, 11,905; WDSI, 15,270; WBOU, 15,325; WIWO, 15,405.

The Voice of America, in conjunction with the U. S. National Academy of Sciences, transmits special space news broadcasts Tuesday through Sunday from 0330 to 0335 GMT, containing the latest information (including orbit data and radio frequencies) on satellites. These *Spacewarn* broadcasts (in English) are intended for use by

At the recent South Jersey Radio Association Picnic W3MXW was showing W3LFC a small a.m./f.m. portable receiver. Tuning the f.m. band, they came across a strong A2 signal at just about 100 Mc. Being old hands at transmitter hunts they started searching the area, and sure enough, down by a lake they found a piece of bell wire nailed to a fence post. Lying in the water was the coax, which was found to run to a cardboard box near a picnic table. In the box was the hidden 50-Mc. transmitter. Unfortunately, neither Joe nor Walt had registered for the hunt, so they were ineligible to claim the prize!



In recognition of the Delta Division ARRL convention held on September 1st and 2nd, the Mayor of the City of New Orleans proclaimed the week of August 27 through September 3 as Amateur Radio Week in New Orleans. Shown here (l. to r.) are Marvin B. Farmer, K5USO, Convention Chairman, and F. L. Arceneaux, K5SGK, Co-Chairman, receiving the proclamation from Mayor Victor H. Schiro.

# How To Run Your Linear

## What It Can Do and What It Shouldn't Do

BY GEORGE GRAMMER,\* W1DF

Although amateurs always have operated and, by the nature of the service, always will operate in an environment of interference, much of the interference is avoidable. One such type is the spurious radiation that falls outside the necessary communication band. This article takes up one special case, the linear amplifier, and the spurious radiation that results from its mistreatment. Other aspects of the spurious-radiation problem will be treated in subsequent articles.

NO MODE of communication used by amateurs is free from a tendency to occupy more bandwidth than is actually needed. This is merely a way of saying that the devices we use are something short of perfect. Nor is it realistic to expect that perfection will ever be reached. In some degree, spurious radiations — those outside the frequency band essential to the intended communication — always will be with us.

Pessimistic? Only on the surface. The fact is acknowledged simply to emphasize a more pertinent one: The present state of the art offers the technical means for generating signals that are acceptably free from spurious radiation. Moreover, these means are commonly incorporated in equipment.

For example, the application of well-known principles can develop a single-sideband signal in which the output in the unwanted sideband is 30 db. below the peak-envelope output in the desired sideband. That is, a signal peak of a kilowatt in the desired sideband will generate no more than one-watt peak in the "undesired." While not wholly negligible, this is hardly the sort of power level destined to make a big noise in the world.<sup>1</sup>

The state of the art gives a measure of the spurious radiation, and thus interference to others, that is technically unavoidable. But most of the spurious that causes interference troubles isn't of this nature. It is strictly in the unnecessary classification. The deficiencies which cause it are not in the equipment but in the operator. A major one is simply lack of knowledge of how things are supposed to work. This can be overcome. A less pleasant one is lack of good citizenship — deliberate misuse of the equipment for some hoped-for advantage. Whether this can be overcome is dependent on moral pressure from those who believe in letting others have the same chance for good contacts that they want for themselves.

\* Technical Editor, QST.

<sup>1</sup> Except, perhaps, within a few hundred yards of the transmitter. But here the receiver becomes suspect, because it is quite capable of manufacturing its own spurious from the exceptionally strong "desired" that it is trying to eliminate. Under such circumstances the interference probably would be there even if the transmitter were perfect.

Most hams would stay within decent bounds if they knew how. Their equipment has the capability of good performance, so it's mostly a question of appreciating that it does have limitations. These vary with the kind of emission — c.w., s.s.b., a.m., and so on. As they can't all be covered at one sitting, let's look at s.s.b. first.

### S.S.B. Spurious

A single-sideband transmitter has four principal sections:

- 1) A balanced modulator, in which the carrier is suppressed and the two sidebands are generated. This usually operates at a fixed frequency.
- 2) A means for suppressing one of the sidebands.
- 3) Circuits for shifting the remaining sideband to the desired amateur band.
- 4) A linear amplifier for building up the output power.

Spurious frequencies can be generated in any

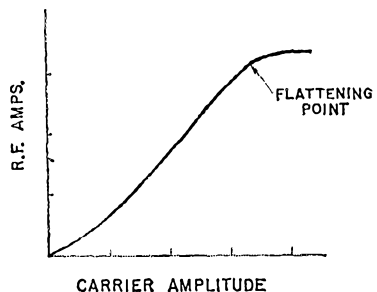
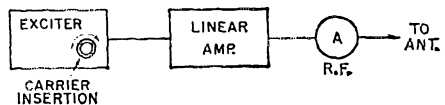


Fig. 1—Simple test setup for determining the proper operating limits of a linear amplifier. The curve below is typical of what would be obtained if the amplitude of the signal at the grid and the amplitude of the linear's output could be measured accurately. However, it isn't necessary to make such measurements to find the flattening point.

of these four sections, but in practice the contributions of the first three usually are much less bothersome than that of the fourth.<sup>2</sup> These three sections operate at rather low signal levels, in most designs. This is a favorable condition for minimizing the distortion that is the root cause of spurious.

We'll therefore lay aside the first three at this point, not because they will not later require attention, but because doing something about No. 4, the linear amplifier, is much more urgent. Possibly not doing so much about the amplifier itself as about its operator, because it isn't use but *abuse* that accounts for most of the unnecessary QRMs.

### The Envelope Peak

The evidence strongly suggests that the main reason for the abuse of linear amplifiers is that the operator doesn't understand the difference between peak and average power. You can't just say "power is power" and let it go at that. In s.s.b., the only meaningful way of rating a linear amplifier is in terms of the *peak-envelope* power it can handle without exceeding some specified degree of spurious output.

The peak-envelope power doesn't show on a meter, and therein lies the difficulty. Only an oscilloscope pattern gives a visible measure of it; even then you have to know what to look for. In voice transmission, peaks come along irregularly and fleetingly; they don't last long enough to let a meter show them.

If your transmitter has provision for inserting an adjustable amount of carrier up to the c.w. level, you can get the "feel" of it by performing a simple experiment. Connect an r.f. indicator

<sup>2</sup> This is not so in every case, of course. It can be assumed that the statement is accurate in the case of factory-built equipment that is in good alignment. It is also accurate for homemade transmitters that have been properly designed and adjusted.

to the output end of the transmitter (Fig. 1). An r.f. ammeter is good because its calibration will be reasonably accurate, but the more common rectifier-type r.f. voltmeter will do. (Many such voltmeters tend to give square-law rather than linear response, but this does not affect the end result.) Start with the carrier balanced out, and then gradually increase the inserted-carrier amplitude. Watch the output meter as you do this.

If the amplitude of the carrier voltage at the linear's grid and the amplitude of the output current in the transmission line can be measured, both with good accuracy, the relationship between the two will be something like the graph in Fig. 1. Doubling the driving voltage will double the output current (or voltage) — that is, the plot of the input and output amplitudes will be essentially a straight line — *up to a point*. After a while you will find that the output stops increasing as you continue to increase the carrier level. The point where the plot begins to depart from straightness is the flattening point. When the amplifier is driven by an s.s.b. signal instead of with unmodulated carrier, the proper peak-envelope level is just below this. As you go farther into the flattening region with an s.s.b. signal the spurious output rapidly increases. (On your carrier insertion test nothing of the sort happens, because at least *two* frequency components have to be present before spurious is generated. With voice, there are many such frequency components.)

The flattening point can usually be observed quite plainly in this test even if the r.f. indicator is not very linear. Above some setting of the carrier control there is simply no change in the linear's output amplitude. When you find this region, back off on the carrier insertion until the output starts to drop. This is the proper peak-envelope level in most linears, particularly in the Class AB<sub>1</sub> type where the flattening point is usually unmistakable.

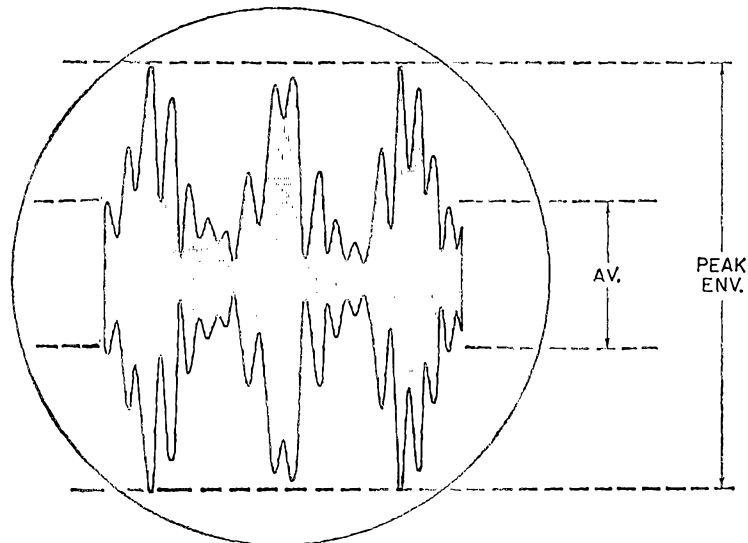


Fig. 2—An s.s.b. signal will have this general appearance on an oscilloscope when the amplifier is operating within its capabilities.

### Average Amplitude

Having found the flattening point, leave the carrier adjustment there and connect in a key, preferably a bug. Make a series of fast dots, trying for ideal spacing—space and dot both the same length. Watch the output indicator. If it's an r.f. ammeter, it should read just about half what it did at the peak-envelope level. If it's an r.f. voltmeter with poor linearity, the reading may be considerably less than half. The meter is now reading *average*, not peak-envelope, amplitude, and if your dot/space timing is perfect you're seeing the average output amplitude with a 1 to 2 average-to-peak ratio. Remember that *fast dots* have to be used so the meter doesn't have time to get up toward the peak level.

With voice modulation, the ratio of average to peak almost never is any higher than this, and generally is considerably less. If you regularly use an r.f. indicator in your s.s.b. transmissions and it has been reading higher than what you've just seen, better turn down the audio gain control until you don't go over this dot/space reading at any time. Even such a reading may be too high for *your* voice.

The r.f. output amplitude, which is what was looked at in this test, is zero with a linear when there is no r.f. at its grid. This won't be true of the amplifier's plate current, usually, because there is nearly always a certain amount of "resting" current. However, the linear's plate current can easily be correlated with r.f. readings. Simply observe the plate current that corresponds to the two conditions—peak-envelope and average—and especially the average plate current with the fast dots. This is the value of plate current that you should never exceed when you talk.

The test as described is at best a rough-and-ready way to find out the greatest permissible meter swing. Its principal value is to bring home the difference between peak-envelope and

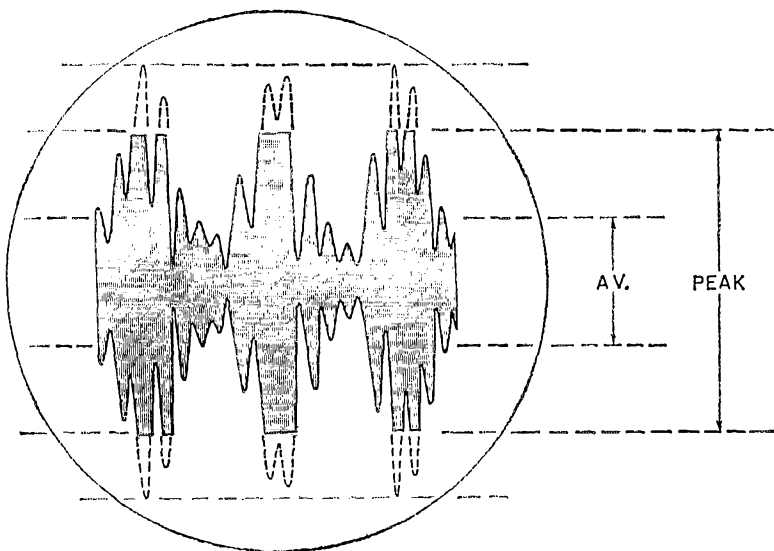
average when the signal amplitude is varying, as it does in a modulated signal. But even this optimistic reading may come as a somewhat unpleasant surprise in view of what you've been doing customarily. The proper average reading may be considerably less, for your voice. With an oscilloscope you can not only establish the proper levels but also can keep tabs on your transmissions continuously.

### Oscilloscope Pattern

Whether or not you have a scope, the type of picture you would see on its face will further illustrate the difference between peak-envelope and average power. Fig. 2 shows what an s.s.b. signal might look like when displayed on a scope. The scope shows the amplitude of the voltage variations in the signal, against time. The signal in this picture is assumed to be properly generated and amplified, and would produce no spurious output frequencies. Notice that even the highest peaks are clean—the tips are rounded somewhat like the tips of a sine wave are rounded. The tips may be a little hard to see in an actual display using a 60-cycle sweep, because only the lower voice frequencies would be wide enough to be distinguished in the scope picture: the higher-frequency components would tend to look more like straight vertical lines. However, they can be seen if the sweep is expanded enough, even if this means that a large part of the picture is off both sides of the screen. You only need to see a small part to appreciate what's going on.

The drawing indicates the peak amplitude of this envelope. It also shows the *average* amplitude of this particular waveform (determined graphically in this case). Here the ratio of peak to average is about 3 to 1, so if the peak-envelope amplitude was represented by an r.f. current of 2 amperes the average meter reading would be  $\frac{2}{3}$ , or 0.67 amp.

Fig. 3—The signal of Fig. 2 with peaks clipped, caused by driving the amplifier into the flattening region.



Now imagine this same waveform applied to the grid of a linear amplifier which is being driven into the flattening region. The amplifier clips off the peaks as shown in Fig. 3, where the height marked "Peak" represents the maximum possible output amplitude — the peak-envelope amplitude for that amplifier. There are several distinguishing features in this picture. One is that the peaks are no longer nicely rounded but are clipped off flat. Furthermore, the signal is at the peak level a lot of the time — far more than in Fig. 2, where only occasional peaks got up to the highest level. This means that the ratio of peak to average is lower — or, relative to the peak level, the average meter reading is higher. The peak-to-average ratio here has dropped to 2.4 to 1, so if the meter reads 2 amp. at the real peak-envelope level it will read 2/2.4, or 0.85, on a flattened signal such as this. More satisfying to the eye than the properly-amplified signal of Fig. 2, no doubt, since the ammeter's pointer swings almost twice as far.<sup>3</sup> But this flattened signal is putting a lot of its power into regions that aren't of any benefit to a receiver that is tuned to it. At this stage a lot of operators who might not otherwise know it are aware that you're on the air. But they are not *pleased* to know it.

With continuous scope monitoring you can easily determine whether your output is within proper bounds, once the peak-envelope level has been found. To find it, start talking with the audio at a low level and gradually increase the gain until the tips of the highest peaks just begin to be clipped. Then keep *below* this level with your audio. A few checks will show how far up the plate meter or r.f. meter should kick when you're just reaching the right peaks. You may find it easier to watch a meter than the scope face while transmitting.

Keeping the output clean will take a good deal of self control. But it pays off: Not only will

<sup>3</sup> There are far worse cases than this in practice. The clipping shown in Fig. 3 is really moderate, compared with what frequently goes on.

others no longer have reason to cuss your operating tactics, but your signal will sound better. You'll be a decent citizen.

### Amplitude vs. Power

This discussion has been in terms of amplitude — current or voltage — because that is what meters and scopes show. Power, which is proportional to the square of the amplitude, is what is talked about most. In the fast-dot experiment, the average amplitude was one-half the peak amplitude, so the average power output was one-fourth the peak power. In Fig. 2, where the amplitude ratio is 1 to 3, the average output power is one-ninth or about 11 per cent the peak power. Going into the flattening region of the linear raises this to nearly 18 per cent of the peak power, in the example in Fig. 3, but the increase is accompanied by most undesirable results.

If you've attempted to correlate the plate-meter readings of your linear with the average r.f. output amplitude of a *properly* amplified signal, it should be clear by now that d.c. input has only a vague relationship to either peak-envelope amplitude or power. The only justification for rating a linear amplifier in d.c. input is that measuring input is the traditional way of setting a power figure that can be used for the purposes of government regulation. What the amplifier actually can handle is determined by its *peak-envelope* rating. If you're shopping, it pays to concentrate on the p.e.p. rating, and find out what that rating is based on — what percentage of spurious, and how it is calculated and measured. With the equipment you now have, forget about d.c. input except as a plate-meter reading that you've established as the *right* average for your voice when a voice peak is just below the flattening point. Unless, of course, the figure runs over a kilowatt! But that isn't likely, with any of the current transmitters on the market, or with high-power linear-amplifier designs that you've seen in **QST**—

## Strays

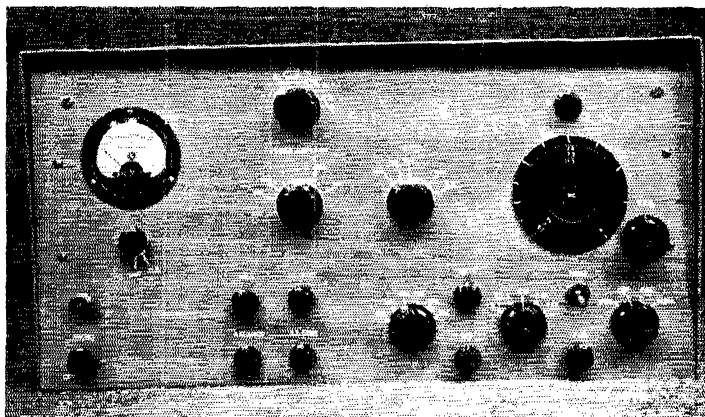
"The heck with sideband—I'm gonna stay on c.w."



(Photo by K8UWD)



Panel layout. The microphone connector and gain control are to the extreme left. The meter switch is below the meter. Grouped to the left of lower center are controls for VOX sensitivity and r.f. limiter (above), mixer balance and a.f. limiter (below). At the lower right are the band switch, excitation and v.f.o. calibrate controls, mode switch, final-amplifier power switch and a.m. drive control, and the function switch ( $S_1$ ). On the upper portion of the panel, near center, are the loading control ( $C_{26}$ ) above, and controls for the final multiband tuner and driver tuning. The small knob above the v.f.o. is the carrier-balance control.



## Filter-Type Sidebander

### Multiband 100-Watt (P.E.P. Output) Unit

BY JOHN ISAACS,\* W6PZV

Features of this filter-type s.s.b. transmitter exciter are r.f. and audio limiting, VOX control, and provision for c.w. and a.m. operation. Complete power-supply information is included.

THE hobby of amateur radio is many things to many people. The author is one of those who derive enjoyment from the construction of equipment. This includes new equipment plus the modification (improvement?) of existing commercial and surplus equipment. If one places a monetary value on his spare time, then it is not difficult to prove that the purchase of commercial gear will "pay off" in the end. The advocates of this philosophy are obviously in the majority and the author has no wish to convert anybody. The information presented here concerns the author's latest "project" and it is hoped that it will be of some interest to those who still like to "roll their own."

The design and construction of a multiband exciter requires a lot of time. There are bound to be mistakes. It is best to make as many of these as possible on paper before the first hole is cut. After all, you aren't going to construct several prototypes before making the final unit. A good approach is to benefit by the experience of others. An idea here, an idea there. Everything helps.

A set of objectives is always necessary for any worthwhile project. The author had these in mind for his new exciter:

- 1) Multiband operation with no plug-in coils.

- 2) Provision for c.w., a.m., s.s.b. and f.s.k.
- 3) Voice control and antitrip on s.s.b.
- 4) Built-in stable v.f.o.
- 5) About 100 watts peak output.
- 6) Some provision for r.f. or a.f. limiting.
- 7) Good carrier and sideband suppression on s.s.b.

The author's previous experience with s.s.b. had been limited to the phasing type of exciter. Results were not always satisfactory because of a continuous need for adjustment to maintain reasonable carrier suppression and a low order of sideband suppression. There are several successful commercial designs which employ the phasing method and many staunch advocates of same. Just for a change then, if for no other good reason, it was decided that the new exciter would employ the filter method. The new McCoy 9-Mc. crystal filter<sup>1</sup> looked particularly promising. Also, the relatively new circuits using the 7360 tube appeared to offer advantages. A search of the literature revealed numerous good designs, including those found in some well-known commercial units. A design by W6TEU<sup>2</sup> and an adaptation by K4EEU,<sup>3</sup> looked especially interesting. Although the basic signal-generating circuits are somewhat different, you will notice a strong resemblance between the author's exciter and the two just mentioned. The problem of what to do in the audio section was solved by the "Omnivox," which was designed by W4PFQ<sup>4</sup>. His circuit was used almost intact. It includes

<sup>1</sup> "New Apparatus," *QST*, November, 1961.

<sup>2</sup> Bigler, "A Sideband Package," *QST*, June, 1958.

<sup>3</sup> Kelley, "A Phasing-Type Sidebander," *QST*, November, 1959.

<sup>4</sup> Hoase, "The Omnivox," *G.E. Ham News*, Jan.-Feb., 1961.

\* 1300 California Ave. Compton, Calif.

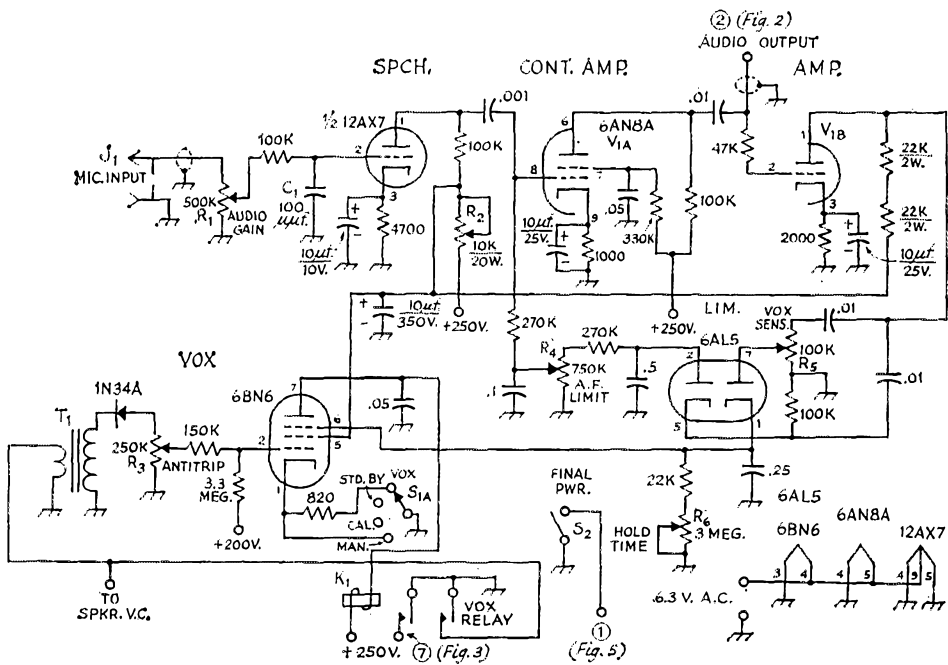


Fig. 1—Audio and VOX-control circuits. Resistances are in ohms and fixed resistors used by the author are rated (conservatively in most cases) at 1 watt, unless indicated otherwise. Except for  $C_1$ , capacitances are in  $\mu\text{f}$ . Capacitors are 600-volt paper except for those marked with polarity, which are electrolytic.

- $C_1$ —Mica.
- $J_1$ —Microphone connector.
- $K_1$ —D.p.s.t. relay, 5000-ohm coil (Potter & Brumfield LM11). Use series resistance, if necessary, to limit coil current to rated 6.3 ma.
- $R_1$ —Audio-taper control.
- $R_2$ —Slider adjustable. Set for 105 volts.

- $R_3, R_4, R_5, R_6$ —Linear-taper control.
- $S_1$ —3-pole 4-position rotary switch (CRL 1415, one pole not used). See Fig. 3 for other sections.
- $S_2$ —S.p.s.t. toggle switch.
- $T_1$ —Universal output transformer, 10,000 ohms to voice coil.

a.f. limiting in addition to standard features such as VOX and antitrip.

### Low-Level Sections

The circuit of the audio section is shown in Fig. 1. The article on the Omnivox contains a detailed description of this section. You should be able to obtain a copy of the article by writing to the publisher. Briefly, the microphone output is amplified by one section of a 12AX7 (second triode is not used) and the pentode section of a 6AN8. The output goes to the 7360 balanced modulator and the 6BE6 a.m. modulator (Fig. 2). The output is further amplified by the triode section of the 6AN8. The output of this section is then rectified by the two sections of a 6AL5. The negative d.c. output of one rectifier is fed to the control grid of the pentode section of the 6AN8. The amount is adjustable by a potentiometer,  $R_4$ , which is the a.f. limit control. The amount of this limiting is adjustable over a wide range. The second rectifier section produces a positive d.c. output which is applied to one of the grids of the 6BN6 relay tube. When this voltage is sufficiently large, the tube normally conducts and the VOX relay becomes energized. Voltage from the receiver speaker circuit is

stepped up in  $T_L$ , rectified, and the negative d.c. is applied to another grid of the 6BN6. This voltage acts to prevent the operation of the VOX relay on signals from the receiver speaker.

The s.s.b. signal is generated at 9 Mc. in a 7360 (see Fig. 2). This tube performs the functions of a crystal oscillator and a balanced modulator. Actually, two crystals are used. These are supplied with the McCoy 32B1 s.s.b. filter. They are at 8998.5 kc. and 9001.5 kc. The passband of the filter is centered on 9000 kc. and is symmetrical. Sideband selection is

Band	Number of Turns		
	$L_8$	$L_9$	$L_{10}$
80	23	60*	60*
40	21	33**	33**
20	15	21	21
15	10	21	21
10	6	9	8
10	Same as above		

All coils are close-wound on  $\frac{3}{8}$ -inch polystyrene rod with No. 22 enameled wire, except \* wound with No. 30, and \*\* wound with No. 26.

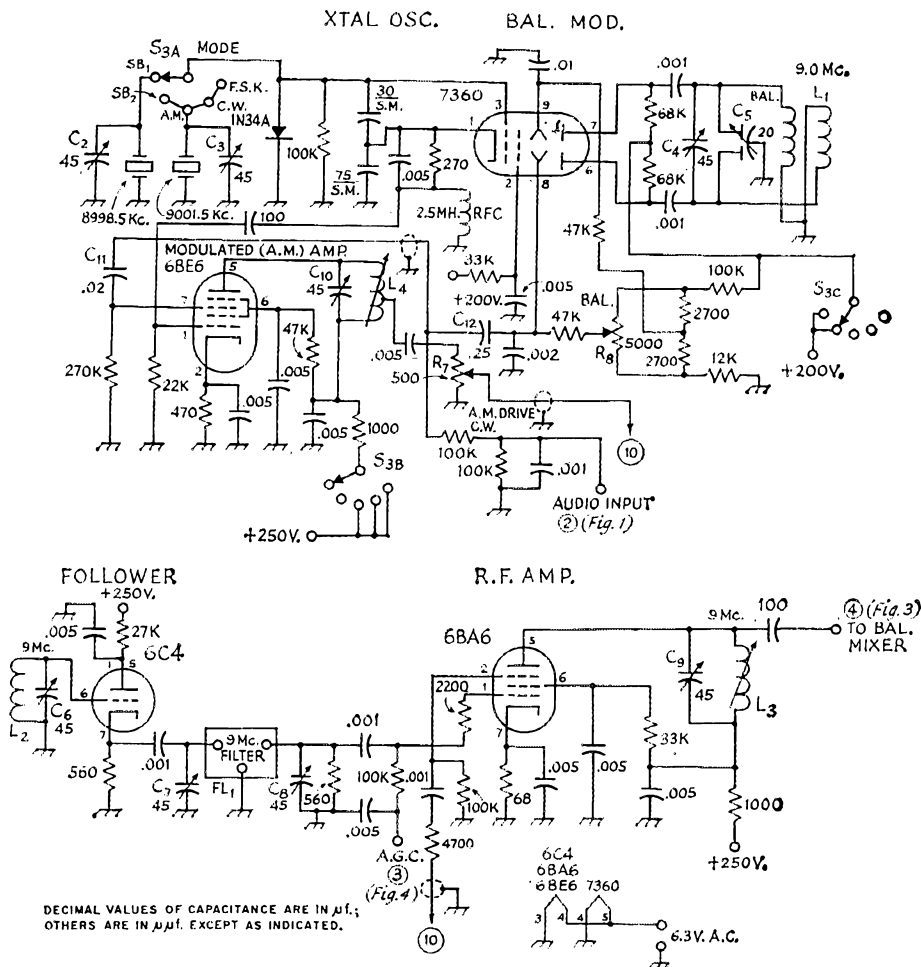


Fig. 2—Sideband and a.m. generator circuits. Resistances are in ohms and fixed resistors used by the author are rated (conservatively in most cases) at 1 watt unless indicated otherwise. Fixed capacitors of less than 0.001  $\mu\text{f.}$  are mica or silver mica (SM); others are disk ceramic, except as listed below.

- C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>6</sub>, C<sub>7</sub>, C<sub>8</sub>, C<sub>9</sub>, C<sub>10</sub>—7—45- $\mu\text{mfd.}$  ceramic trimmer (Centralab 822-BN or equivalent).
- C<sub>5</sub>—Differential capacitor (Johnson 19MA11/160-311).
- C<sub>11</sub>, C<sub>12</sub>—Paper.
- FL<sub>1</sub>—Sideband filter (McCoy Electronics 32 B1).
- L<sub>1</sub>—32 turns No. 26 enam., bifilar-wound on  $\frac{3}{8}$ -inch polystyrene rod.
- L<sub>2</sub>—38 turns No. 26 enam., close-wound on  $\frac{3}{8}$ -inch polystyrene rod. Form is placed parallel to form

- of L<sub>1</sub>, forms spaced  $\frac{3}{4}$  inch center to center.
- L<sub>3</sub>—30 turns No. 26 enam., close-wound on  $\frac{3}{8}$ -inch ceramic iron-slug form (Miller 4400 form).
- L<sub>4</sub>—Same as L<sub>3</sub>, tap at 7 turns from ground end.
- R<sub>7</sub>—Carbon control, linear taper.
- R<sub>8</sub>—Linear-taper control.
- S<sub>3</sub>—3-pole 5-position ceramic rotary switch (CRL P-272 index, 2 type RRD wafers, one pole of rear wafer [crystal switch] not used).

made by connecting one or the other of the crystals into the circuit. The filter cuts off the unwanted sideband and also provides about 10 db. of carrier suppression. Unwanted sideband suppression is said to be better than 40 db. McCoy now makes a Model 48B1 filter for operation on 9 Mc., and it has an unwanted-sideband suppression of better than 55 db. It costs more, of course.

At 9 Mc. it is necessary to provide the 7360 with both a resistance and a capacitance balance. Also, the plate coil is bifilar wound. After the initial adjustment of the capacitors, only an

occasional adjustment of the potentiometer is required to maintain the carrier suppression. Following the 7360 is a 6C4 which is used as a cathode follower to provide the necessary match to the crystal filter. The output of the filter is amplified by a 6BA6 to get the signal up to a level for mixing.

Most commercial exciters make some provision for a.m. operation. This is done usually by carrier insertion or by unbalancing the modulator. In either case, the results leave a great deal to be desired. The proper ratio between carrier and sideband (s) is difficult to maintain. Also, a

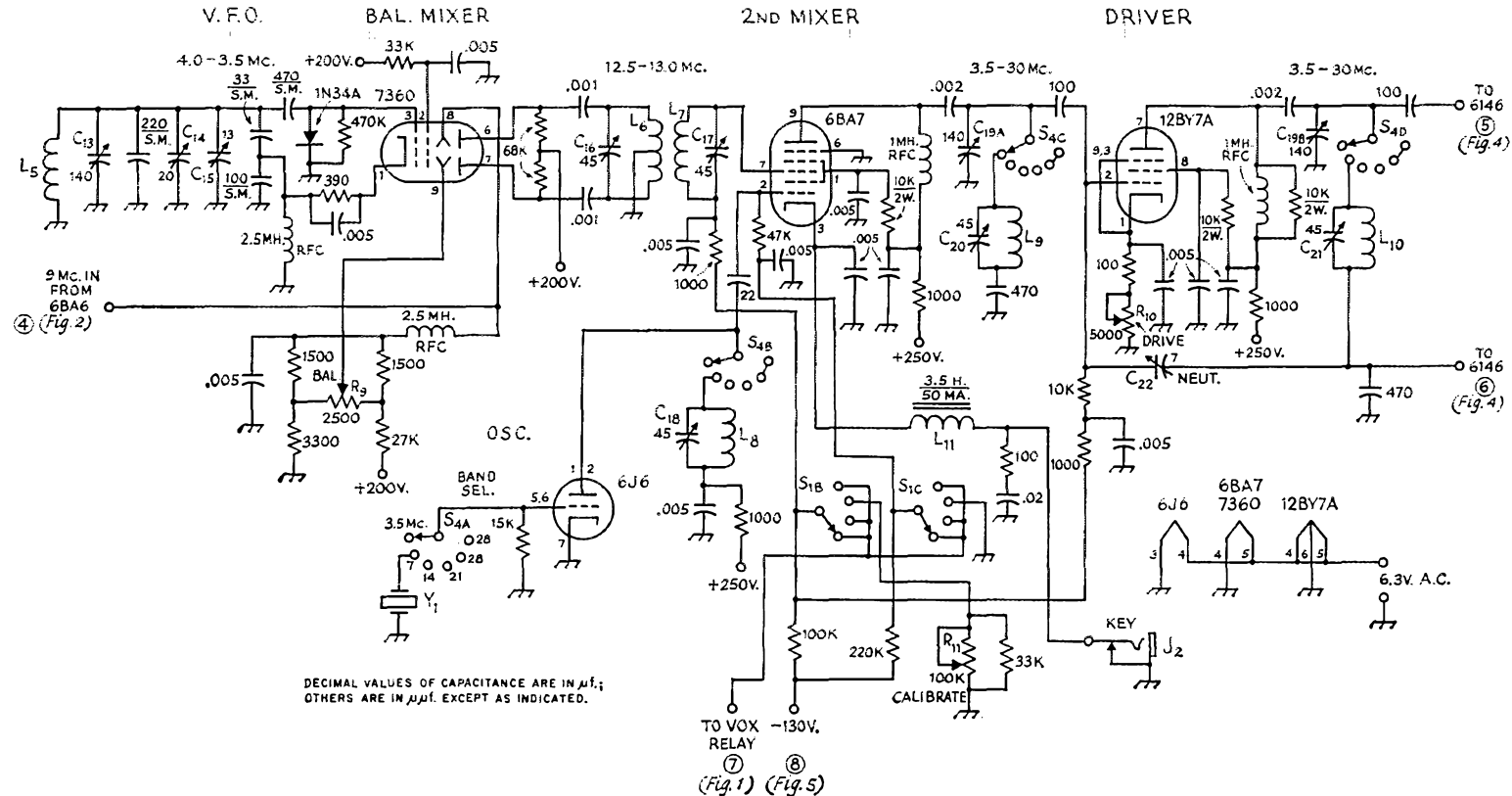


Fig. 3—V.f.o., band-heterodyning and driver circuits. Resistances are in ohms, and fixed resistors used by the author are rated (conservatively in most cases) at 1 watt. Fixed capacitors of less than 0.001  $\mu\text{f}$ . are mica or silver mica (SM); others are disk ceramic. Triode sections of 6J6 are connected in parallel.

C<sub>13</sub>—Midget two-bearing 140- $\mu\text{m}\mu\text{f}$ . air variable.  
 C<sub>14</sub>—N300 5-20- $\mu\text{m}\mu\text{f}$ . ceramic trimmer (Erie TS-D).  
 C<sub>15</sub>—NPO 2.5-13- $\mu\text{m}\mu\text{f}$ . ceramic trimmer (CRL 822-BZ).  
 C<sub>16</sub>, C<sub>17</sub>, C<sub>18</sub>, C<sub>20</sub>, C<sub>21</sub>—7-45- $\mu\text{m}\mu\text{f}$ . ceramic trimmer (CRL 822-BN). In band-switching circuits, a similar capacitor is connected across each coil.  
 C<sub>19</sub>—Dual 140- $\mu\text{m}\mu\text{f}$ . air variable.  
 C<sub>22</sub>—NPO 1.5-7- $\mu\text{m}\mu\text{f}$ . ceramic trimmer (CRL 822-EZ).  
 J<sub>2</sub>—Closed-circuit jack.

L<sub>5</sub>—26 turns No. 22 enam., close-wound on 1/2-inch low-loss bakelite form (National XR-50 form with slug removed).  
 L<sub>6</sub>, L<sub>7</sub>—26 turns No. 26 enam., close-wound on 3/8-inch polystyrene rod, forms mounted as described for L<sub>12</sub>.  
 L<sub>8</sub>, L<sub>9</sub>, L<sub>10</sub>—See coil table.  
 L<sub>11</sub>—Filter choke (Stancor C1080).  
 R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>—Linear control.

S<sub>1</sub>—See Fig. 1.  
 S<sub>4</sub>—4-pole 6-position ceramic rotary switch (CRL P-272 index head, 4 type XD wafers).  
 Y<sub>2</sub>—16.5 Mc. for 2.5-Mc. output.  
 20.0 Mc. for 7-Mc. output.  
 27.0 Mc. for 14-Mc. output.  
 34.0 Mc. for 21-Mc. output.  
 41.0 Mc. for 28-28.5-Mc. output.  
 41.5 Mc. for 28.5-29-Mc. output.

Chart of Harmonic Frequencies

Osc. Freq. (Mc.)	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4
L.F. (Osc. + 9 Mc.)	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.1	13.2	13.3	13.4
3rd Har.	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9	10.2	10.5	10.8	11.1	11.4	11.7	12.0	12.3	12.6	12.9	13.2
4th Har.	8.3	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6
5th Har.	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0

signal consisting of a carrier plus only one sideband produces some distortion in receivers equipped with a diode detector and set for normal a.m. operation.

In this exciter, some of the output of the 9-Mc. crystal oscillator is fed to grid No. 1 of a 6BE6 r.f. amplifier. Audio is fed to grid No. 3. The plate is tuned to 9 Mc. and the output is a standard a.m. signal. Proper adjustment of the cathode resistor and the audio input is necessary to obtain the proper degree of modulation. For a.m. operation, the B+ is removed from the plates of the 7360 and the output of the 6BE6 is fed to the suppressor grid of the 6BA6.

**V.F.O. and Balanced Mixer**

Thanks to W4PFQ<sup>4</sup> and others, the circuit up to this point presented no particular difficulty. We have a 9-Mc. signal at low level — either s.s.b. or a.m. The McCoy people evidently selected 9 Mc. because of the popularity of this frequency in many of the phasing-type exciters. Mixing with a 5-Mc. signal produces output on either 75 meters or 20 meters. Some further conversion is necessary, however, to obtain a signal on the other bands. Because of this, the idea of a 5-Mc. v.f.o. was dropped. A scheme used in one of the commercial exciters appeared to be the most promising. Mix the low-level signal with the v.f.o. signal and convert to a higher frequency. This frequency should be high enough so that the output circuit can be broad-banded to eliminate the need for tuning the mixer plate along with the v.f.o. A chart,

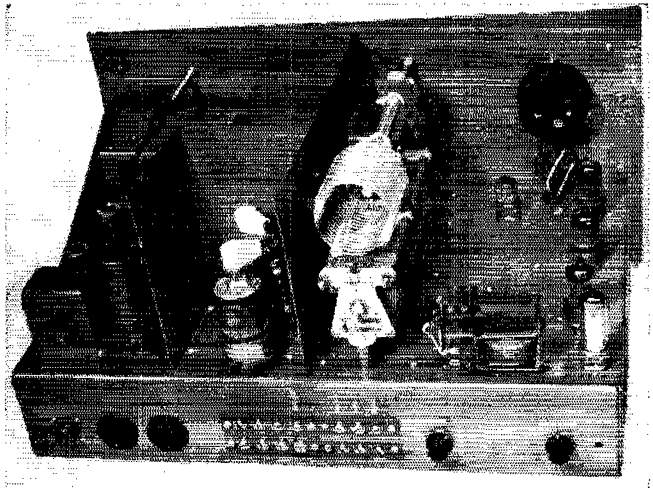
illustrated here, was prepared to determine the best frequency range for the v.f.o., which was to cover a segment 500 kc. wide. Surprisingly enough, the range of 3.5 to 4.0 Mc. appeared to be the best. Just above and below this range, some of the oscillator harmonics fall within the i.f. range. Theoretically, it was not necessary to be quite so careful with oscillator harmonics. As shown in Fig. 3, the first mixer uses a 7360 (which also serves as the v.f.o.). The 9-Mc. signal falls well outside the i.f. passband and no trouble was to be expected from this source. Because of subsequent mixing, the oscillator is on 3.5 Mc. when the exciter output is 4.0 Mc.

**Second Mixer and Amplifier**

After the 9-Mc. signal is converted to the 12.5- to 13.0-Mc. range, it undergoes one more conversion to get to the desired band. Referring again to Fig. 3, mixing is done in a 6BA7, and a 6J6 crystal oscillator is used. In every case, the crystal oscillator is on the high side, so no trouble is experienced from harmonics of this oscillator. All crystals are third-overtone type, and the crystal oscillator includes a tuned plate circuit for each crystal. The output of the 6BA7 is on the desired amateur band and its plate circuit is tuned by a variable capacitor, C<sub>19A</sub>, adjustable from the front panel.

Following the 6BA7 is a 12BY7 which is tuned by a second section (C<sub>19B</sub>) of the same variable capacitor used for the plate of the 6BA7. (The 470-μf. capacitor from L<sub>9</sub> to ground is a tracking corrector.) The 12BY7 is bridge-neutralized and a

This rear view shows the multiband tank assembly more clearly than the plan view. It also shows terminals for the power supply and other external connections. The VOX hold and antitrip controls are to the right.



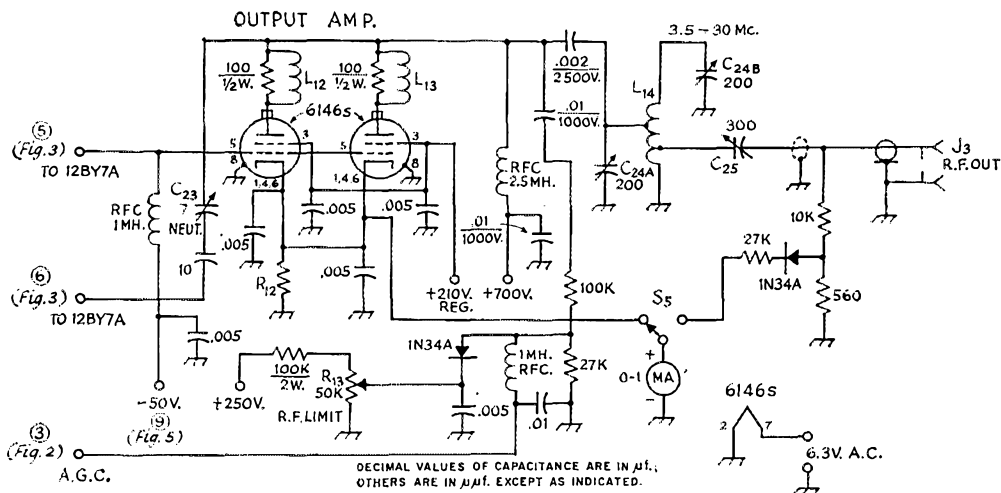


Fig. 4—Circuit of the output amplifiers. Fixed capacitors of less than 0.005  $\mu\text{f}$ . are mica; others are disk ceramic. Resistances are in ohms and resistors are 1 watt unless indicated otherwise.

- C23—Same as C22.  
 C24—Dual 200- $\mu\text{f}$ . 2000-volt variable (Johnson 200FD20/155-505).  
 C25—Midget air variable (Hammarlund MC-325-M).  
 J3—Chassis-mounting coax receptacle.  
 L12, L13—5 turns No. 22 close-wound on associated resistor.

- L14—15 turns No. 14, 2-inch diam., 6 turns per inch, tapped at 3 and 8 turns from ground and (Air Dux 1606T stock).  
 R12—300-times meter shunt.  
 R13—Linear control.  
 S5—S.p.d.t. rotary.

5000-ohm control is connected in the cathode circuit to provide a means of adjusting the excitation to the power amplifier.

### Power Amplifier

Two 6146 tubes are connected in parallel and used as the power amplifier (linear). See Fig. 4. These tubes are also bridge-neutralized. To further stabilize things, a 10,000-ohm resistor is connected across the plate load of the 12BY7. A portion of the r.f. output is rectified by a crystal diode and fed back to the grid of the 6BA6. A control,  $R_{13}$ , is provided so that the crystal will not rectify until some preset level is reached. This operates just like an a.v.c. circuit and minimizes the possibility of over-driving the power amplifiers and any subsequent linear. Another crystal diode is used to rectify a portion of the output so that it can be monitored by a 0-1-ma. meter. A 300-ma. shunt,  $R_{12}$ , is provided in the cathode circuit of the 6146s and this is also connected to the same meter through a selector switch.

The most interesting part of the power amplifier is the tank circuit. It is the multi-band type and uses only one coil and a split-stator capacitor. The circuits used by W6TEU and K4EEU employed a similar tank which had two coils. The design of both types of multiband tank circuits is well covered by W6MUR.<sup>5</sup>

### Power Supply

A total of six d.c. voltages is required for the operation of the exciter. Referring to Fig. 5, a

<sup>5</sup>Johnson, "Multiband Tuning Circuits," *QST*, July 1954.

bridge rectifier is used to provide the high voltage (700 v.). Eight silicon diodes plus one rectifier tube are used. This supply has a choke-input filter with an effective capacitance of 80  $\mu\text{f}$ . The regulated screen voltage for the power amplifier is obtained from the 700-volt supply by using two 0A2 voltage-regulator tubes in series. Two more d.c. supplies are used. Both are directly connected to the 120-volt line. A polarized plug on the line cord takes care of the proper ground connection. One supply uses a single silicon diode and provides -130 volts and -50 volts for the bias circuits. The other supply uses two silicon diodes in a voltage-doubler circuit. It provides +200 volts and +250 volts for all of the exciter except the power amplifier.

### Control Circuits

Under stand-by conditions (see  $S_1$ ), the exciter is producing no output and the receiver is connected to the speaker. The crystal oscillators and the v.f.o. operate continuously. A bias of -130 volts is applied to both the 6BA7 and the 12BY7. Consequently, there is no drive to the 6146s, which are biased with -50 volts on the control grids. A relay is provided in the 700-volt line so that the high voltage can be disconnected from the 6146s.

For transmitting, the -130-volt bias must be removed, and the receiver speaker shorted. This function is performed by the VOX relay. Talking into the microphone will cause the relay to close. It will also be energized if the function switch is placed in the manual position. One set of contacts on the relay closes across the speaker voice coil. A second set grounds the grid returns

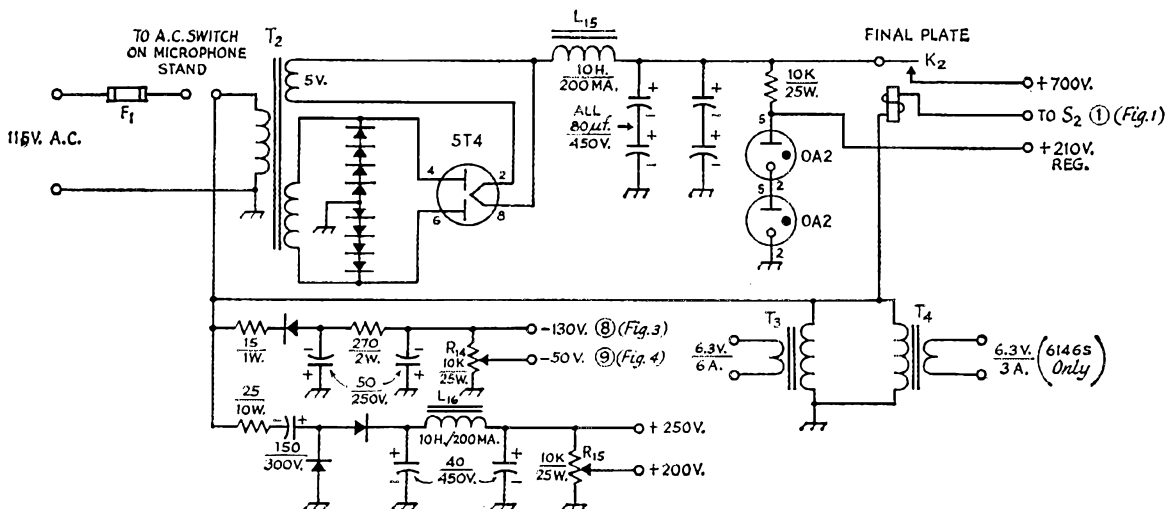


Fig. 5—Power-supply circuits. Capacitances are in  $\mu\text{f}$ . and capacitors are electrolytic. Resistances are in ohms. All solid-state rectifiers are 130-volt a.c., 500-ma. d.c. silicon units (Sarkes-Tarzian M-500). See text regarding use of polarized a.c. line plug.

F<sub>1</sub>—Fuse, 5 amp.

K<sub>2</sub>—S.p.s.t. 115-v. a.c. relay (Potter & Brumfield KT11A or similar).

L<sub>15</sub>, L<sub>16</sub>—Filter choke (Stancor C-2705 or similar).

R<sub>14</sub>, R<sub>15</sub>—With adjustable slider.

T<sub>2</sub>—Power transformer: 800 volts r.m.s., c.t., 400 ma.; 5 volts, 3 amp. (Stancor PC-8412 or similar, 6.3-volt winding not used).

T<sub>3</sub>—6.3-volt 6-amp. filament transformer.

T<sub>4</sub>—6.3-volt 3-amp. filament transformer.

of the 6BA7 and 12BY7 and effectively removes the  $-130$ -volt blocking bias. These tubes then have a normal bias arrangement and so they amplify the signal produced in the low-level section and drive the 6146s.

Provision is included for talking yourself on frequency. Remove the 700 volts from the plates of the 6146s, and then the function switch  $S_1$  is placed in the calibrate position. The VOX relay remains de-energized, but a 100,000-ohm potentiometer,  $R_{11}$ , is connected into the  $-130$ -volt bias circuit. Advancing this control reduces the bias on the 6BA7 and the 12BY7. It is adjusted so that the modulated output of the exciter can be heard in the receiver at about the same level as a regular signal. Talking is continued and the v.f.o. tuned until your voice sounds normal. The exciter is then within a few cycles of the desired frequency. This bias and calibrate circuit is very similar to the one used in the Central Electronics s.s.b. exciters.

### Construction

The mechanical details of the exciter can be seen in the photographs. The original intention was to include the power supply on the same chassis as the exciter. However, it was decided to use components which were on hand, and these were heavy and required a lot of space. Also, RCA warns that magnetic fields will adversely affect the balance of the 7360 tube. Consequently, the power supply was constructed on a separate chassis and cables used to make the necessary connections to the exciter chassis.

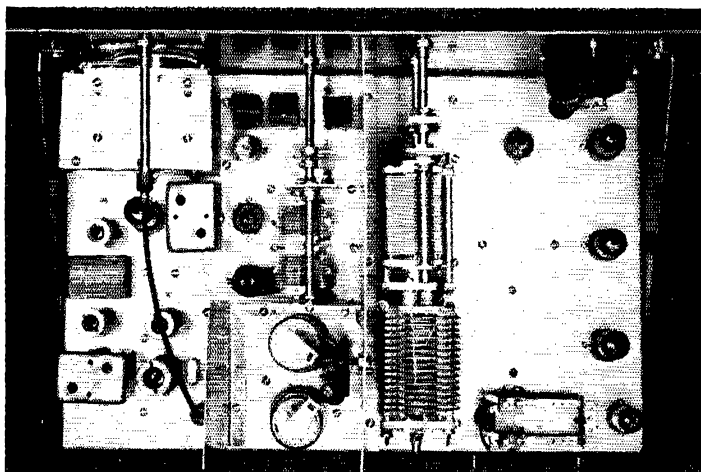
Much time was spent in laying out the main components and arranging the controls so that

the front panel would present a reasonably pleasing appearance. After the holes were cut and the construction started, it became apparent that insufficient room had been allowed for the low-level r.f. portion. The isolation between the input and output of the 9-Mc. filter is good, but the 9-Mc. crystal oscillator is not shielded as it should have been. As a result of this, and because of stray coupling to various leads, the carrier suppression is not as great as expected. Measurements with available test gear show a carrier suppression of about 45 db. Theoretically, the 7360 can produce a suppression of 60 db. and the filter should add about 10 db. more.

The exciter is built on an 11 × 17 × 3-inch chassis. This just fits the LMB W-1D cabinet. This cabinet is 18 inches wide, 11 inches deep and 9 inches high. A pair of Bud MB-458 chassis-mounting brackets is used to brace the panel and chassis. The chassis and the cabinet were purchased unpainted and then all of the holes were cut. After this operation, all metal pieces, including the brackets, were spray-painted with hammertone gray paint from an Aerosol can. It is not difficult to get a good-looking paint job and you don't have to worry about scratching the paint job while you cut and file the holes.

The method of constructing the band-switching coil assemblies is described and shown by W6TEU in his article.<sup>2</sup> This arrangement works out very well and is less expensive than using slug-tuned coil forms.

Two r.f. transformers are specially constructed. One is  $L_1L_2$ . The two coils are wound on  $\frac{3}{8}$ -inch polystyrene rod as are the band-switching coils. The number of turns and the center spacing of



Chassis plan view. The tubes and relay to the right are in the audio and VOX circuits. Just to the right of center are the loading capacitor and components of the final-amplifier multiband tuner. To the left of the center shielding partition is the dual driver tuning capacitor with the six band crystals above it and to the right of the v.f.o. compartment. The 9-Mc. coils  $L_1$  and  $L_2$  are in the shield can at lower right, next to the carrier-oscillator tube and crystals, one of which is hidden by the 6146 shield; the other similar can contains  $L_5$  and  $L_6$ . The black box contains the sideband filter. The long flexible shaft extension operates the carrier balance control mounted below deck.

the coils are given under Fig. 2. The coils are mounted vertically on a piece of Micarta plastic  $\frac{1}{8}$ -inch thick. The shield is made from an old i.f. transformer can which was cut down. The r.f. transformer,  $L_6L_7$ , is constructed in exactly the same manner. The tuning capacitors are mounted external to the cans.

#### Alignment

The initial tune-up of the exciter is no more complicated than the alignment of a multiband receiver. However, no signal generator is needed as this is already built in. No one should consider the construction of an exciter of this type without having at least two pieces of test equipment on hand. The first is a vacuum-tube voltmeter with an r.f. probe attachment. The second is a grid-dip meter with reasonably accurate calibration. A frequency meter such as a BC-221 or LM is also useful to set the final calibration of the v.f.o. However, a receiver can be used for accuracy corresponding to the calibration of the receiver. For s.s.b. operation, accurate calibration is not usually necessary, as it is very convenient to talk yourself on frequency whether this be with a round-table or to a clear spot in the band. Of course, band-edge operation will require some kind of frequency standard.

The first thing to adjust is the balanced modulator. Turn the balance control,  $R_8$ , to either end. Set the differential capacitor,  $C_5$ , to mid-position. Connect the r.f. probe of the v.t.v.m. to the grid of the 6C1. With the 7360 tube operating, adjust the ceramic trimmers  $C_4$  and  $C_6$  for maximum output as indicated on the v.t.v.m. If this occurs with either capacitor at its maximum setting, either  $L_1$  or  $L_2$  needs more turns. Now, alternately adjust  $R_8$  and  $C_5$  so as to produce a minimum output. After this is done, a small readjustment of  $C_6$  will usually result in a slightly lower minimum. More exact adjustments can be made after the whole exciter is operating, and with the signal tuned in on a receiver. In this case, the receiver S meter will serve as the output indicator.

Next, with the selector switch  $S_3$  in the a.m. position, adjust  $C_{10}$  for maximum output with the r.f. probe connected across the 500-ohm a.m. control  $R_7$ . With the r.f. probe connected to Pin 8 of the 7360 balanced mixer, adjust  $C_9$  for maximum output. It is assumed that the slugs of  $L_3$  and  $L_4$  are set so that these maximum adjustments occur within the tuning range of the ceramic capacitors. This completes the adjustment of the low-level section.

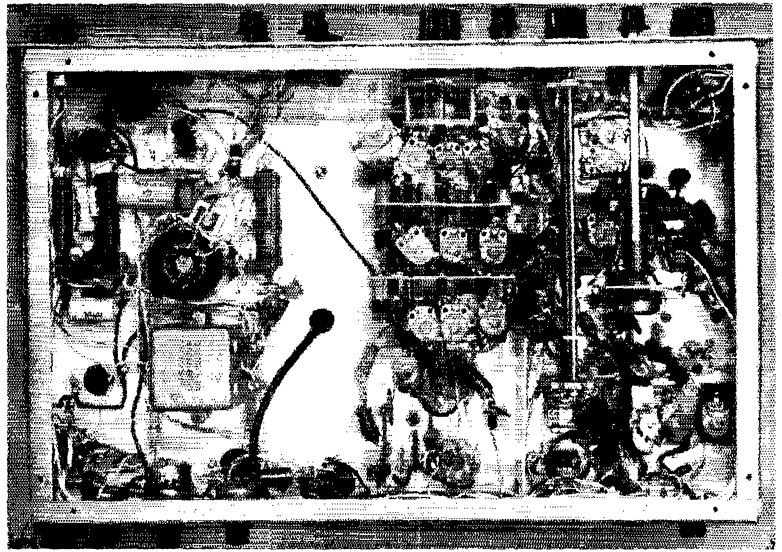
The v.f.o. section of the 7360 balanced mixer is adjusted so that it covers the range of 4.0 to 3.5 Mc. The r.f. probe is connected to Pin 7 of the 6BA7. The v.f.o. is set at 3875 kc. and  $C_{16}$  is adjusted for maximum output. With the v.f.o. set at 3625 kc., the ceramic trimmer  $C_{17}$  is adjusted for maximum output. The capacitance of the r.f. probe will have some effect on the tuning of  $L_7$ , as well as  $L_2$  and  $L_3$ , so these adjustments can be checked again later when the output of the exciter is tuned in on the receiver. The object is to tune  $L_6$  and  $L_7$  so as to produce a passband from 12.5 to 13.0 Mc. The spacing between  $L_6$  and  $L_7$  will affect this also. The spacing of  $\frac{3}{4}$  inch (as stated in the coil list) is not necessarily the best, but seemed to produce acceptable results with the shield used. It will be necessary to adjust the resonant frequencies of  $L_6$  and  $L_7$  experimentally to get the desired results. The output at 12.5 and 13.0 Mc. should be down to about half of the maximum so as to keep the passband reasonably narrow. This variation is easily compensated for by varying the drive control to obtain the required output at any desired frequency.

The crystal oscillator is adjusted next. Connect the r.f. probe to Pin 2 of the 6BA7. Disconnect the B+ from the 7360 balanced mixer and the plate of the 6BA7. Adjust each of the plate-circuit tank coils of the 6J6 so as to obtain maximum output for each band position. If the g.d.o. is first used to insure that each of the tank circuits will tune to the required frequency, no difficulty should be experienced.

Restore the 7360 balanced mixer and the



Bottom view of the W6PZV s.s.b. unit, showing the band-switching assembly.



6BA7 to normal operation. Adjust the a.m. control  $R_7$  to obtain output at Pin 7 of the 6BA7 as was done when  $L_6$  and  $L_7$  were being adjusted. Set the v.f.o. to 3750 kc. Set the band switch to 80 meters. Connect the r.f. probe to Pin 2 of the 12BY7. Set the ceramic trimmer ( $C_{20}$ ) across the  $L_9$  coil so that it is at about half of maximum. Adjust  $C_{19}$  for maximum output. Repeat this procedure for each of the other bands, recording the setting of  $C_{19}$  for each band.

The band-switching circuits of the 12BY7 are adjusted by shifting the probe to the grids of the 6146S, setting  $C_{19}$  to the recorded points in succession, and adjusting the  $C_{21}$  trimmers for maximum readings.

Neutralization of the 12BY7 is performed by disconnecting the B+ from the 12BY7 and adjusting the neutralizing capacitor  $C_{22}$  for minimum indication on the r.f. probe. This should be done on the 10-meter band.

The only remaining adjustment is the neutralizing of the 6146s. Connect a dummy load to the output and resonate the tank circuit to the 10-meter band (using the g.d.o.). Disconnect the B+ from the 6146s and adjust the drive control to obtain an indication on the r.f. probe connected to the tank circuit. Adjust the neutralizing capacitor  $C_{23}$  for minimum indication.

The preceding alignment information is necessarily brief and hits only the high spots. The previously-cited articles give additional information which should be useful. It is assumed that anyone with enough experience to build such an exciter would have no difficulty with its alignment.

#### Afterthoughts

The mechanical and electrical layout of any piece of gear is influenced by the individual tastes and preferences of the constructor. If the author were to build a second exciter of this

type, it would be somewhat different than the first. As mentioned previously, the carrier suppression was not as much as it should have been due to a lack of shielding. Also, insufficient space was allowed for the r.f. section. The author intends to add a frequency-shift circuit to the v.f.o. and an f.s.k. position of the mode switch will be noted on the schematic and the front panel. An additional section on  $S_3$  will be used for this. A two-tone oscillator will be added at a later date. A 9-pin socket has already been installed in the chassis for a 12AX7.

The over-all performance of the exciter has proved to be very satisfactory. Judging from reports, the unwanted sidebands are down at least 40 db. The carrier suppression is apparently adequate as no adverse reports have been received on this score. The a.m. signal has good quality and cannot be distinguished from a standard plate-modulated signal. QST



Those of you who wonder why K7USA is no longer on from the World's Fair — the space for the station was donated by the Alaska exhibit. Now that cooler weather has come, Alaska has moved its information booth indoors, and no room was left for K7USA. All QSLs will be answered. The mail address for K7USA is still P. O. Box 6273, Seattle 88, Washington.

W9HRH and W9PNE (both of whom work at Potter & Brumfield) figured out that one of their new mercury wetted contact relays, which have a life expectancy of something like 10 billion cycles, should last about 20 years when used in a keying circuit. By which time most people would have gone over to sideband.

# Building Fund Progress

## Division Quotas Established

It's well into Autumn — let's go!  
The Building Fund Committee has been content to let the drive move in low gear during the summer months, but now it will increase rapidly in tempo. Quotas have been set for each ARRL division, based generally on current membership but with higher-than-normal objectives for some areas of especially-large electronics industry concentration. The division standings as of the end of September, showing percentage of quota achieved, are as follows:

Central.....	30.0%	Delta.....	14.0%
Roanoke.....	23.1	Great Lakes...	13.7
Southwestern...	22.4	Rocky Mt.....	13.7
Dakota.....	19.4	Canada.....	12.6
West Gulf.....	19.0	Hudson.....	12.4
New England...	18.2	Pacific.....	11.3
Atlantic.....	15.9	Southeastern...	10.7
Northwestern..	15.8	Midwest.....	10.6

## Support Your Division in Its Building Fund Participation!

Here's what you do:

1) Determine that you want to participate in the drive. "Members are Saying" comments in this and previous issues may help in your decision.

2) Establish the amount you wish to contribute. Many amateurs have decided on one year's League membership dues. Quite a number have chosen the rule of thumb of \$1 for each year of holding a license. A surprising number have made substantial contributions well into three figures, in appreciation of what amateur radio has meant to them, and because of their ardent interest in the continuing growth of the League. But use whatever yardstick you choose.

3) Make check or money order payable to the ARRL Building Fund and mail it to League Hq.,

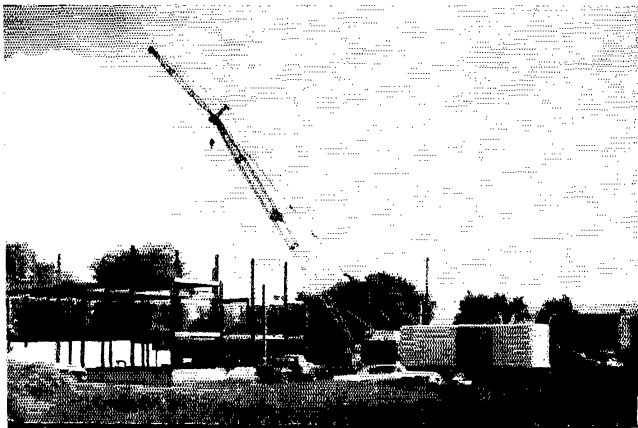
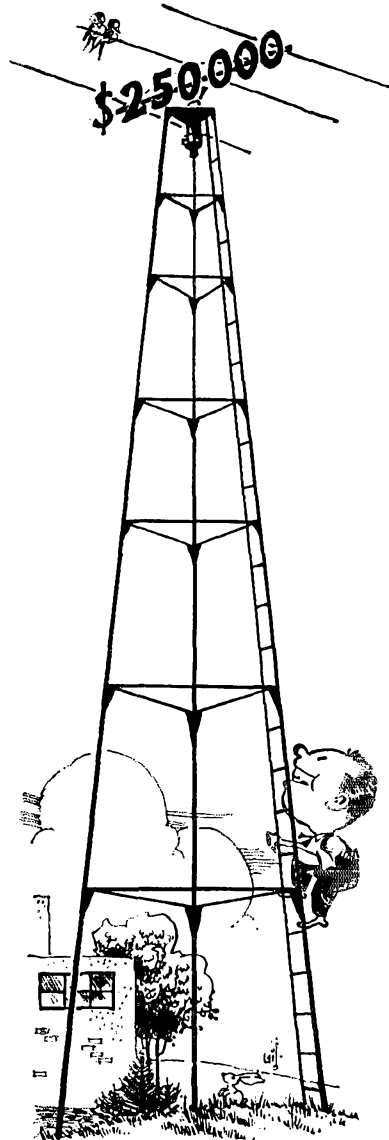
Right after this picture was taken, on September 26, we had two days of driving rain, which held up completion of the steel work until the next week. But all the steel is in place now, and the workmen will begin closing it in. The storm basins are pretty well completed, and the water lines and the power and telephone conduits have been brought in to the foundation.

38 LaSalle Road, West Hartford, Conn. We'll complete a record form for you here.

4) Allow us a couple of weeks to prepare and mail your handsome certificate of participation, signed by our president and the chairman of the building fund.

5) If you wish, make a note that the amount of the contribution is deductible on your U. S. income tax filing next year.

6) Urge other amateurs, through personal contacts and discussion at club meetings and hamfests, to join in the effort. Make your division the first to go over the top of its goal! **QST**



**QST for**

## Members Are Saying . . .

Enclosed is my small contribution to the building fund. Adequate facilities for an expanding operation such as ARRL are a necessity. I am sure it will be money well spent in the years to come. Rather than wait until I remember to look up the notice to accompany this, and forgetting to do it, I will just enclose my check. — *W42NDC*

Enclosed is a contribution from the Dayton Amateur Radio Association and the Dayton HAMVENTION to be applied to the building fund. This is made in grateful appreciation for what the League has done for amateur radio. Its contributions to the cause are so many, so varied and so valuable that it is pointless to try to enumerate them. It is sufficient to say — as expressed at the Executive Board Meeting of the Association 29 June 1962, when this contribution was unanimously authorized — “without the League the Board would not be meeting here tonight, neither would there be any amateur radio.”

Congratulations on this progressive step to provide the necessary physical facilities to enhance the future of amateur radio and for the better functioning of the headquarters. Best wishes for continued progress and success. — *Dayton Amateur Radio Association, Inc.*

Congratulations are in order, now that the League has a new president, Herbert Hoover, jr., a real old timer, dating back to 1915.

What better way can we show our appreciation of his taking time out of his busy life to head the ARRL, than by getting on with the building fund. — *W0KTK*

Having been actively engaged in other building drives, and having had information from professional promoters (who have the whole “bag of tricks and gimmicks”) you can count yourselves fortunate if 60% of those “eligible” make any contribution. With this in mind, there should be no hesitancy in making the strongest appeals. Those who pretend to be offended by pressure are invariably seeking a psychological escape hatch to justify their not giving anything. The free-loaders, like death and taxes, we will always have with us.

I have been a reasonably consistent member of (and sometimes contributor to) the League since before World War I and feel strongly that amateur radio would have long since been eliminated in all countries were it not for the work of the ARRL and its representatives in the U. S. delegations in both official and unofficial status in the international conferences on frequency allocations. — *W6AOI*

Without a united voice, amateur radio would have long since been lost to other interests — and that united voice has been the League. I am proud of my association with the League

and grateful for the benefits it has provided through the years.

Adequate facilities for carrying on the League's business is a necessity and the dignity and pride that a beautiful new home will instill in the staff and membership will enhance the League's fine reputation and amply justify the expenditure. I am a firm believer in a pay-as-you-go policy and in avoiding debt if possible and am in full agreement with the Board's policy of voluntary membership financing. I hope the members will unanimously support the fund and that the little man will soon chin himself on the beam. — *W6FPT*

I had the pleasure of visiting your headquarters office, many years ago, and I surely am in agreement that your needs for a new building should be realized. Your entire staff is to be congratulated on the splendid job they have done for the amateur fraternity, over the years. I feel that having been an active amateur for thirty one years and having enjoyed all the wonderful things your organization has done for me and all other hams that we really owe you something for all your efforts. — *W8FWT*

Attached is the return card relating to my annual dues. Let me suggest that we could easily raise the funds required for building our new headquarters if we members would send in an extra \$5.00 at the time we renew our memberships. This is a painless procedure and a method each of us can participate in. — *W3LL*

Count me in!

One thing that bothers me about the attitude of some hams as to this worthy project: they seem to have the idea that their contributions are going to disappear into nothingness . . .

Did you submit any contest logs or anything of the like to ARRL in the last few years? Think of all the manhours spent checking, recording, and certifying *your* log alone and then think of the standard wage per hour. . . . We owe the ARRL a lot. What we can do toward a more efficient office at headquarters will cut costs and allow an even better ARRL. These contributions mean an even greater hobby for all of us. — *W4G0RS*

Man, let's get that fellow on the tower off the ground! He's still down where the snakes can bite him. Want to see him up where his nose will bleed from the altitude.

I don't believe the gang realizes that if they would just forego a few beers and send in a buck or two apiece how much it will help.

Since you only get out of anything just about what you put in it, it stands to reason if we want you folks to continue doing the wonderful job you have been doing we must provide the place and equipment for your future efforts. — *K8ZFH*

*This article describes a simple and inexpensive method of varying the output voltage of a power supply in the 1000-volt range, although the principle is not confined to this range. With a few additional components, the supply may be made self-regulating.*

# Power-Supply Control and Regulation by Means of Thyratrons

## *Inexpensive Dual-Voltage Supply for Small or Medium-Power Transmitters*

BY C. J. CHRISTMAN,\* WABAFF

THE ability to vary the output voltage of a high-voltage power supply has advantages as attested to by the large number and variety of variable transformers of the "Variac" type currently offered on the market. In an amateur station, the ability to vary the voltage output of a supply permits adjusting the voltage to suit various items of equipment or modes of operation. It is also useful in initial testing of equipment, in measurement work, and for reducing power for short-range work as set forth in government regulations.

However, there is another method of obtaining variable voltage control that is by no means new, but which has not been widely used by amateurs. This method makes use of mercury-vapor grid-controlled or "thyatron"-type rectifiers. By application of a suitable control voltage to the grids of rectifiers of this type, the tubes may be made to conduct over a greater or lesser portion of the positive half of the a.c. cycle, thus varying the average value of the rectified output voltage. Several rectifiers of this type are available on the surplus market at prices lower than the cost of a variable-voltage transformer of comparable power-handling capability. In addition, the voltage regulation of a supply using thyatron control will be better than with transformer control because the resistance introduced in the system is negligible. Thyratrons may also be used in high-power automatic voltage-regulator circuits.

### *A Dual-Voltage Supply*

The circuit of a thyatron-controlled supply built by the author is shown in Fig. 1. The basic circuit is of the bridge type. Since the two rectifiers conducting at any instant are in series, one thyatron on each side of the circuit will provide the desired control. The two remaining rectifiers of the bridge may be standard diode types. Half voltage is made available in this circuit by means of a switch that disconnects the diode rectifiers and grounds the center tap of the transformer,

\*Chrysler Missile Division, Detroit, Mich.

leaving the two thyratrons alone in a conventional full-wave circuit.

Control of voltage is accomplished by feeding line voltage to a voltage divider ( $R_1$  and  $R_2$ ) and the reduced voltage to the grids of the thyratrons through a network by which the phase of the grid voltage in relation to the plate voltage may be varied by means of  $R_3$ .  $R_4$  and  $R_5$  are grid-current limiting resistors. Although there is some variation in amplitude of the control-grid voltage, as well as phase, the effect of the former will be negligible if the control-signal level is sufficiently large.

The thyratrons are type 967, but types 5557 or FG-17 will work equally well. In ratings, all are closely equivalent to 866s. The diodes used are type 83, a full-wave mercury type, with the sections connected in parallel. Although this type is on the "discontinued" list, they are still widely available. Type 816 or type 866 may be substituted; in fact, they should be used if the transformer delivers more than 900 volts, total secondary.

### *Transformer Considerations*

The high-voltage transformer used in the author's supply is a surplus item having a c.e.s. rating of 830 volts, c.t., 300 ma. d.c. A close equivalent is suggested under Fig. 1. With the control set for maximum, the no-load voltages are 1160 and 590. These voltages fall off as load is applied to approximately 900 and 450 at full load. The output voltage is controllable down to about 100 volts.

In general, the power drawn from the transformer should not exceed the product of the r.m.s. voltage across one side of the transformer secondary and the rated d.c. load current, in c.e.s. service. In this case, it would mean that the current should be limited to about 125 ma. at an output voltage of 1000, or 250 ma. at 500 volts. However, in i.e.a.s. service, the product can be increased by about 25 per cent for a.m. phone, or from 50 to 100 per cent for c.w. or s.s.b. service. The substitute transformer listed

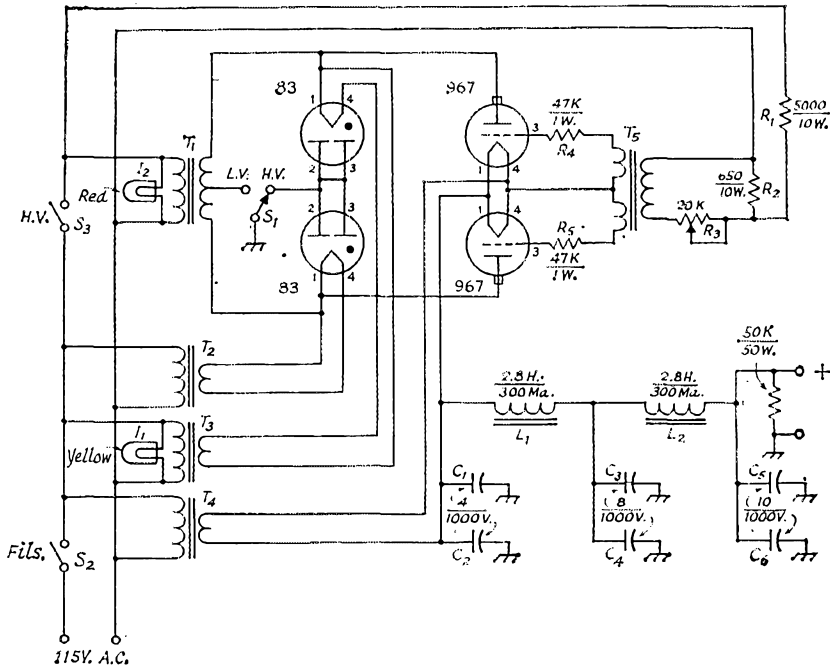


Fig. 1—Circuit of a dual-voltage thyatron-controlled power supply. Capacitances are in  $\mu\text{f}$ . and resistances are in ohms. Capacitors in this case are oil-filled, but suitable series or series-parallel combinations of electrolytics may be substituted. If this is done, the series combinations should have a total voltage rating of not less than 1500 volts.

$C_1$ – $C_6$  inc—See above.

$I_1, I_2$ —115-volt panel ( $I_1$  yellow,  $I_2$  red).

$L_1, L_2$ —Filter choke (Stancor C-2334).

$R_1, R_2, R_4, R_5$ —See text.

$R_3$ —Wire-wound control.

$S_1$ —S.p.d.t. rotary.

$S_2, S_3$ —S.p.s.f. toggle switch.

$T_1$ —Plate transformer: 800 to 850 volts r.m.s., c.t., 300 ma. (Triad R-24A, filament windings not used, or

surplus).

$T_2, T_3$ —5-volt 3-amp. filament transformer for 83s; 2.5-volt 2-amp. for 816s; 2.5-volt 5-amp. for 866s.

$T_4$ —2.5-volt 10-amp. filament transformer.

A single transformer having the required windings may be substituted for  $T_2, T_3$  and  $T_4$ , if available.

$T_5$ —interstage audio transformer (Stancor A62-C or equivalent).

under Fig. 1 has filament windings with a total rating of about 70 watts. If these windings are not used, equivalent additional power may be taken from the high-voltage winding. Taking all of these factors into consideration, it should be possible to draw up to 240 ma. at 1000 volts in a.m. phone service, and at least 300 ma. in c.w. or s.s.b. operation without endangering the transformer, although the output voltage may fall off somewhat at the higher load currents.

With proper phasing, minimum conduction takes place with  $R_3$  shorted out. The correct connections to  $T_5$  may be easily determined by turning the supply on with the load connected and observing the blue glow in the rectifiers. If the glow is bright with  $R_3$  shorted out, reverse connections to either primary or secondary of  $T_5$ .

### Automatic Voltage Regulator

To obtain automatic regulation, it is merely necessary to close the control loop of Fig. 1. This may be done, among other ways, as shown in Fig. 2. One of the complexities demanded for the

feature of automatic regulation is the additional 210-volt d.c. supply for the amplifier tube, which must be connected to the positive source of high voltage. Current requirement is only about 10 ma., but the supply must be insulated for the full d.c. output voltage to ground. This also applies to the heater supply for the 6CB6, control  $R_6$ , and the secondary of  $T_5$ .

Operation of the automatic regulator circuit is simple and may be explained by assuming the phasing control  $R_3$  to be set in its minimum-resistance position which biases the thyratrons completely off. Also assume that the fixed-bias source shown in Fig. 2 is shorted out. Cathode current of the 6CB6 amplifier flows through  $R_7$ , and the drop across  $R_7$  is applied as positive bias to the grids of the thyratrons.  $R_6, R_7$ , and  $R_8$  are in series across the high-voltage output, and a variable portion of the voltage drop is applied as negative bias to the grid of the 6CB6, altering its plate current which, in turn, varies the positive bias on the thyatron grids. The output voltage of the supply may therefore be varied by adjustment of  $R_6$ .

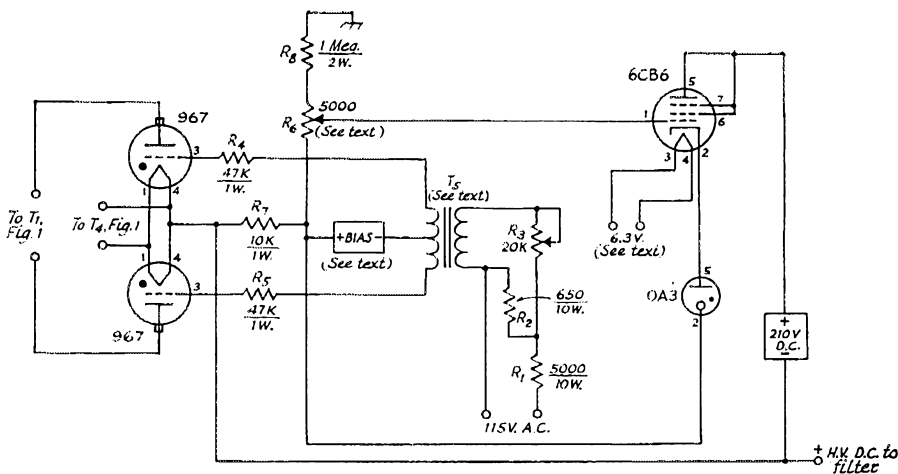


Fig. 2—Automatic regulating circuit. Resistances are in ohms. Components not listed below are the same as in Fig. 1, except see text regarding insulation.

R<sub>6</sub>—Wire-wound control (see text regarding insulation).

R<sub>7</sub>, R<sub>8</sub>—See text.

### Construction

An increase in output voltage of the supply with a fixed setting of R<sub>6</sub> will appear as an increase in the negative bias on the 6CB6 grid. The 6CB6 cathode current will decrease causing the thyatron bias to be less positive and the output voltage will decrease. The reverse takes place with a drop in output voltage.

The low-voltage end of the controlled range may be extended by inserting a well-insulated fixed-bias source (22 volts in the supply described), as shown in Fig. 2. This offsets the small forward bias resulting from the amplifier's plate current near cutoff.

There is nothing critical about the construction of a supply of this type. As with any supply using mercury-vapor tubes, it is well to keep the m.v. tubes reasonably well spaced from the magnetic fields of transformers and filter chokes. Also, as with other m.v. rectifiers, provision, either manual or automatic, should be made for a suitable delay between the applications of filament and high voltages.

If trouble is experienced with "hash" interference from the mercury-vapor tubes, the use of r.f. choke-capacitor filters, as suggested by tube manufacturers, may be helpful.

**QST**

## Strays



More publicity for ham radio. The Warren (Ohio) Amateur Radio Association set up a booth at the Trumbull County Free Fair, and had beaucoup visitors and traffic. Organizing the exhibit were K8ZNB, W8BXA, and K8JLK. L. to r. above are K8CZF, K8ZNB, W8AOG, WN8ANV and W8BXA.

(Warren Tribune photo)

# CQSSCQSSCQSSCQSSCQSSCQSSCQSSCQSS

BY JOHN G. TROSTER,\* W6ISQ

LET'S see now . . . better read these SS rules again this week. Kinda complicated, and just as sure as I'd miss one little thing they'd throw my log out! Can't win a certificate like that.

"Now — 'general call is CQ SS' — then the other fella comes back and sends some stuff — 'exchange info' I guess they call it here — OK — 'use GMT' — sure — OK — 'check carefully the complete rules', it says.

"OK. 'Rules'. Guess I'm eligible. Says 'time spent listening counts as operating time'. Guess I better not listen unless I'm operating. How they expect me to operate unless I listen? But how do I know if the fellas I'm listening to are in the contest or not? This is tough! Waste a lot of time. Suppose by accident I hear a DX station or rag chewer? Maybe I can subtract that time. Yeah, in a big blast like this every second counts. Stop-watch maybe.

"QSO's . . . c.w. to c.w. . . . fone to fone. OK, ok. And that 1.5 'power multiplier' for 150 watts, good. 'Reporting'. Now that reporting — better cut out that 'Explanation of SS Contest Exchanges' like they call it. Gets kinda complicated.

"'Single operator' . . . who else? . . . 'receives no assistance from other pers . . . not have assistance in keeping log . . . spotting stations' . . . ha. Boy, if they knock ya for getting assistance they oughta give ya points for all I gotta put up with around here. Marge ought to be worth a multiplier of about 3, at least, and times 5 for each kid . . . and about times 42 for Marge's mother . . .

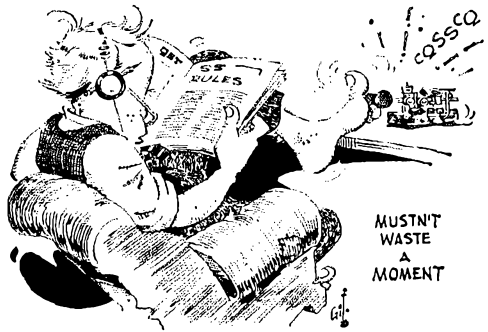
"Now 'Awards' . . . ahhh. Yeah. Now we're into the meat of this thing! Hot dog. 'Certificates' will be awarded to the highest . . . in each ARRL section.' Wonder if any other guys will be in from this section? 'Highest single-op in any club will be awarded a club cert' . . . wow . . . wonder if I could get two certifs? If I only belonged to some club . . . oh well, one at a time. Oh, oh . . . 'Disqualifications' . . . Yi. Don't read that one.

"'Bout time to get going. Wonder if I really should get my 150 watts from the Paralyser bare-foot again this week? Maybe I should just turn down the variac on the old Pulverizer? 150 watts from the four 813's not too efficient, of course . . . might slop over 150 just a little too . . .

"But, oh, oh, what happens when they print my score and picture in the *QST* winner's circle? Four 813's for 150 watts wouldn't look too good! Oh well, I bet at least some of those fellas . . .

"Maybe I'd better read that 'Disqualification' part after all . . . let's see . . . 'failure to comply' . . . whoops . . . back to the Paralyser!'

"Well now, hold it, laddie boy . . . suppose I



pulled three of the 813's . . . take a picture of the shack with the three bottles lying in front of the rig . . . that oughta . . . think anyone would believe?"

"Ahh sure . . . single 813 . . . why not . . . maybe a little over 150 on 80 meters . . . make up for it on 2 meters . . . only run 100 watts there. Up a little on one band, down a little on the other . . . they don't say anything about *averaging* 150 watts. (Guess that would be OK. But better keep those other three bottles handy . . .

"OK — beam east, 5 o'clock. Guess it's under way. Now it says a 'CQ SS' will get me in business. Let's see. Cqsscqcscscqcscscqcscqcsc de W6ISQ W6ISQ cqsscqcscscqcscscqcscqcscqcsc W6ISQ W6ISQ W6ISQ AR AR KKKKK . . . Not a thing but QRM. Try again. Cqsscqcsc de W6ISQ W6ISQ W6ISQ KKK. Still not a thing. I don't think much of their call system. If this one don't get results I'd better pop one of the 813's back in. Cqsscqcsc . . . cqsc de W6ISQ W6IVK (nuts) . . . W6ISQ W6ISQ AR KKKK."

"W6ISQ de W1AW . . . (or was that K-IAW. Oh boy . . . guess that 'CQSS' got results after all. Now let's see. Better check that call) . . . QRZ W1AW or K1AW? de W6ISQ W6ISQ W6ISQ AR KKKK."

"W6ISQ de W — IAW."

"W1AW W1AW de de W6ISQ W6ISQ (where's that 'Explanation of Exchanges' — here it is. OK, here we go) . . . sample . . . dit dit dit dit . . . (ya nut) . . . my nr . . . (let's see, got some fellas last week . . . must be . . .) . . . nr 14 . . . de W61VK . . . (oops, slips) . . . W6ISQ W6ISQ W6ISQ . . . RST RST . . . dit dit dit dit . . . (suppose to say 'ck' . . . he's an old timer two-letter call fella . . . don't hurt his feelings) . . . ck ck 569 569 569 . . . ('your ARRL section' . . . lessee . . . what was that darn thing — oh yeah) . . . Santa calr . . . dit dit dit dit . . . Santa Clara Varr . . . dit dit dit dit . . . (spell it right, ya nut) . . . Santa Clara Valley Santa Clara Valley . . .

\*45 Laurel Street, Atherton, California.

(Continued on page 152)

# Low-Noise Transistor Preamplifier for 50 or 144 Mc.

BY DANIEL MEYER \*

Interior of the 6-meter transistor preamplifier. The input circuit is at the bottom of the picture. Output circuit, top, is double-tuned, with a small amount of capacitive coupling between the hot ends of the two coils.

## High-Performance R.F. Amplification with 0.018-Watt Power Drain

RECENTLY there has been considerable interest in preamplifiers for use on the 6- and 2-meter bands. This has been caused mainly by the availability of inexpensive Nuvistor amplifier tubes which provide low noise figures at these frequencies. A good preamplifier will not only increase gain and improve a receiver's noise

\* Research Engineer, Southwest Research Institute, San Antonio, Texas.

figure, but it may also improve image and i.f. rejection. As good as they are, Nuvistor preamplifiers have one disadvantage common to all vacuum-tube designs: they require filament current and a relatively high B+ voltage.

There is now available a reasonably priced u.h.f. transistor (Philco T-2028 or 2N2308) that has a guaranteed *maximum* noise figure of 4.5 db. at 200 Mc. This makes possible a transistor pre-

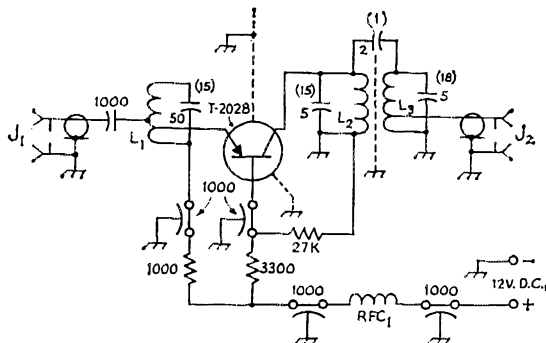


Fig. 1—Schematic diagram and parts information for the transistor preamplifiers for 50 and 144 Mc. Capacitors are ceramic; values given in  $\mu\text{mf}$ . Values in parenthesis are for the 144-Mc. amplifier. Resistors  $\frac{1}{2}$  watt or smaller.

J<sub>1</sub>, J<sub>2</sub>—Coaxial receptacle, SO-239.

L<sub>1</sub>—50 Mc.: 6 turns No. 20 silver-plated,  $\frac{5}{16}$ -inch diam. Emitter tap at 2 turns. Antenna tap  $2\frac{1}{4}$  turns from cold end.

144 Mc.: 4 turns No. 20, silver-plated,  $\frac{1}{4}$ -inch diam. Emitter tap 1 turn, Antenna tap  $1\frac{1}{4}$  turns.

L<sub>2</sub>—50 Mc.: 12 turns No. 26 enam., close-wound on  $\frac{1}{4}$ -

inch iron-slug form (CTC SPC-12-1-41).

144 Mc.: 3 turns No. 18,  $\frac{5}{16}$ -inch diam.

L<sub>3</sub>—50 Mc.:  $15\frac{1}{2}$  turns like L<sub>2</sub>, tapped at 3 turns from cold end.

144 Mc.: 3 turns No. 18,  $\frac{5}{16}$ -inch diam., tapped at  $\frac{5}{8}$  turn. See text.

RFC<sub>1</sub>—Single-layer v.h.f. choke (Ohmite Z-50 or Z-144).



amplifier for 6 or 2 meters that has the low noise figure of Nuvisor and 417-A preamplifiers, but which will operate on only 12 volts and draw only 1.5 ma. of current. The amplifiers described are completely enclosed in  $2\frac{3}{4} \times 2\frac{1}{8} \times 1\frac{5}{8}$ -inch miniature aluminum cases.

**Circuit**

The antenna circuit is single-tuned, with taps on the coil at the proper impedance points for the antenna and the emitter of the transistor. An air-wound coil of silver-plated wire is used to get a high unloaded *Q*, and minimize input losses. The transistor is operated as a common-base amplifier. This type circuit is not suitable for use in some applications, such as TV tuners, due to its large change in input and output characteristics over such a wide frequency range. This is no problem over the four-megacycle bandwidths required in amateur v.h.f. service, however, and the common-base connection does not require neutralization for maximum gain, as does the common-emitter connection. Experiments with both types of circuits proved that the gain and noise figure were approximately the same, but neutralization of the common-emitter circuit was tricky and required a more complicated circuit.

The collector of the transistor feeds a top-capacitively-coupled double-tuned circuit. This gives a flat response over the 4-Mc. band, with faster cutoff on each side than can be obtained with a single-tuned output circuit. The output is tapped to match the 52-ohm receiver input.

**Construction**

Each preamplifier is built on a piece of silver-plated copper laminate board. This material is very easy to drill and is strong enough to use as a chassis for small lightweight projects such as this. The board should be drilled and the shields cut out, using the drawings of Fig. 3 as a guide. The shields are cut from 0.010-inch silver-plated sheet copper stock.<sup>1</sup>

Mount the transistor socket (Elco 3307) on the board. Solder the two shields to the chassis board in the positions indicated. Be sure the transistor socket pins are orientated correctly. The shields should meet in the center of the socket and not touch any of the socket pins. The ground pin on the socket is bent over and soldered to the shield. Wind the input and output coils for the version being built, using the coil-winding data supplied with the schematic.

If the 50-Mc. version is being built, mount the

<sup>1</sup> Silver-plated board, shield stock and input coil wire, along with a socket and two mounting brackets, are available from Irving Electronics, Box 9222, San Antonio 4, Texas, for \$1.50.

Interior of the 2-meter preamplifier, with case and coaxial connectors removed. As in the other picture, the input circuit is at the bottom.

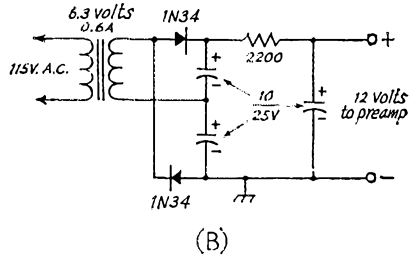
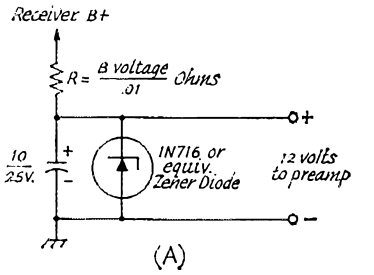
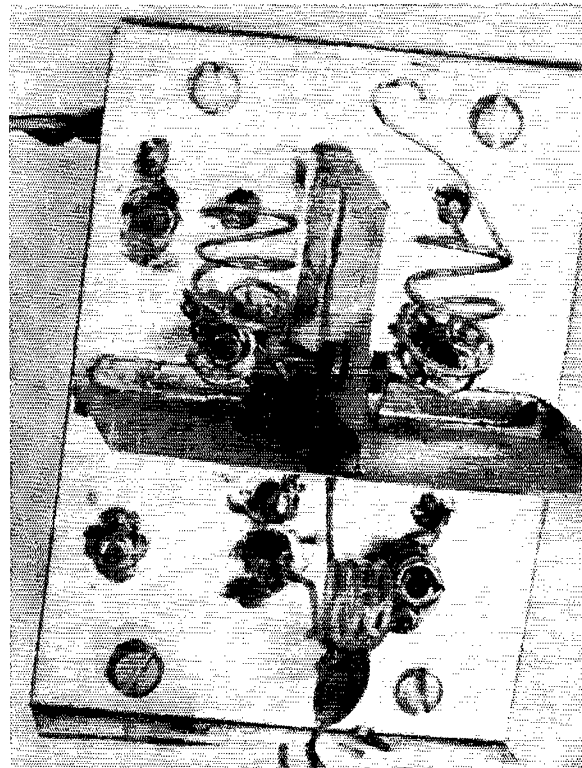


Fig. 2—Power supplies for the transistor preamplifier, if a battery is not used. Circuit A is for utilizing the receiver high-voltage supply, while B is for an a.c. source.

5- $\mu$ f. tuning capacitors on *L*<sub>2</sub> and *L*<sub>3</sub>. The antenna-circuit tuning capacitors on both preamplifiers and the output-circuit tuning capacitors on the 144-Mc. version are zero-temperature-coefficient tubular ceramic capacitors. The longest ends on these capacitors are put in the holes provided on the chassis board and the lead resting on the chassis cut to  $\frac{1}{8}$ -inch length and soldered to the chassis. (See interior photos.) The soldering iron should be applied to the board and solder flowed around the wire lead. Do not push on the capacitor while soldering this lead.



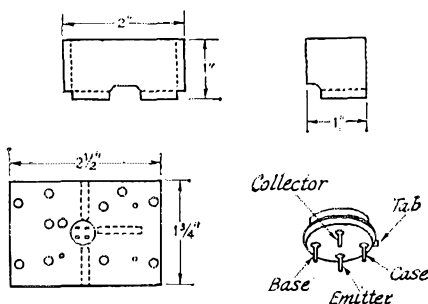
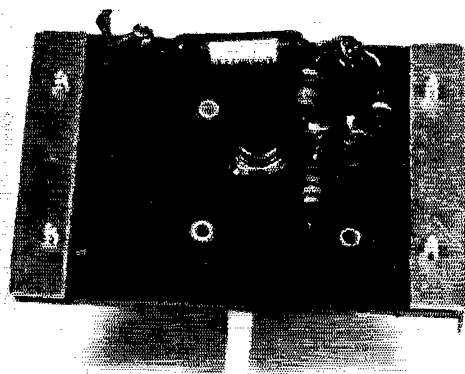


Fig. 3—Principal dimensions of the base plate and shields for the preamplifier. Pin connections for the transistor are shown at the right. Positions of these pins are sketched in the base drawing. Shields should be bent forward on the dashed lines, and then soldered in place as indicated on the plate drawing.

If the solder on the wire around the capacitor is melted while installing the capacitor, any force on the capacitor body will push the capacitor right out of the wire loop. This method of mounting gives the short ground-return path needed at these frequencies, and also provides a handy anchor point for the coils.

Solder the feedthrough capacitors to the board, and cut the leads to about  $\frac{1}{8}$ -inch length on each side. Put the resistors and r.f. choke in place on the top side of the board and solder. The coils are soldered in place next. The coils that connect to the tubular tuning capacitors should be soldered to the capacitors at the point where the upper lead wire is wrapped around the capacitor. Use low heat and work quickly, to avoid burning the silvering on the capacitor. Make connection to the transistor socket with



Bottom views of the two preamplifiers are identical, with only the r.f. choke, the resistors and the transistor showing.

short pieces of bare wire trimmed from the capacitors.

The preamplifier is designed to mount in an aluminum utility box with two brackets, as shown in the photographs. These are held in the box with sheet-metal screws that pass through the

upper holes of the coaxial input and output connectors. Standoffs could be used for mounting the chassis instead if desired. Plug the transistor in, mount the chassis in the box, connect the input and output to the coax connectors, and the preamplifier is ready for adjustment.

### Alignment

For best results, these preamplifiers should be aligned with a sweep generator. Peaking the input circuit in the center of the band with a grid-dip meter and setting the output for a 4-Mc. flat response can be done, but it is tedious at best and not very exact. There should be 52-ohm loads on the input and output in both alignment and use. Bandwidth, passband shape and gain are all affected if proper impedance matching is not observed. If the output must be connected to an impedance other than 52 ohms, the tap on  $L_3$  should be changed to match the new impedance, and alignment carried out with a load resistor equal in value to the impedance the preamplifier will be working into.

If a sweep generator is used, start by expanding or compressing the input coil with an insulated tool, until it is peaked in the center of the band. Now alternately adjust  $L_2$  and  $L_3$  for a flat response 4 Mc. wide. Touch up the input slightly if needed. The input circuit is broad and should give only a tilt to the response curve as it is adjusted to either side of band center. Check the response with the cover on the box, and reset the coils if necessary to give the desired response with the cover in place.

### Use

The preamplifier is connected to the antenna and the receiver or converter input with 52-ohm coax. The power source for the converter may be a battery, a low-voltage a.c. supply, or the receiver B supply. The latter two systems are shown in Fig. 2. Be sure to use a coax relay ahead of the preamplifier and make certain that it is working properly. Appreciable r.f. power from the transmitter reaching the preamplifier transistor would be disastrous. Transistor preamplifiers of the type described here will improve the noise figure and sensitivity of v.h.f. receivers to the same degree as the best tube amplifiers, yet their power drain is so low that they can be operated for long periods of time with small inexpensive batteries.

QST



### STOLEN HAM GEAR

The following equipment was stolen from the car of K2HNS on August 28. A Johnson Viking Mobile, Serial No. 50170; a Johnson Viking Mobile VFO; and a Shure microphone, Model 505C. He offers a \$25 reward for information leading to its recovery. K2HNS, Leroy Schmidt, 10 Oak Lane, Wayne, N.J.

*This article describes an r.f. end — converter with crystal-controlled injection, plus a linear amplifier — that has other applications for 120-150-Mc. work than the TV system that was its primary inspiration. So if you're interested in getting on the 120-Mc. band but not immediately interested in TV, don't overlook it. The camera equipment shown is commercially built, a discontinued model that is being disposed of at much less than the original price as long as the supply lasts.*

## Amateur TV — The Easy Way

*A Complete 432-Mc.- Band Television Transmitter*

BY E. LAIRD CAMPBELL,\* W1CUT

**E**XPERIMENTING with amateur television not only involves working with u.h.f. circuits and techniques, but also demands familiarization with circuits not usually encountered in other phases of amateur radio — video amplifiers, synchronizing circuits, and sweep generators, just to name a few. Maybe all of this is just too big a bite, at least all at once, for the would-be TV enthusiast. Lots of amateur TV'ers got as far as a successful "wired TV" system — that is, one that can give a picture on the shack TV receiver via a cable — or, at the other extreme, a complete u.h.f. transmitter ready to be modulated with some video, but never reach the goal of a complete television transmitting station. But the real reward and final goal is in actually sending a TV picture in a ham band.

\* Technical Assistant, QST.

This article describes an amateur TV system that should appeal to the ham who would like to get a picture on the air without having to struggle with cut-and-try methods, not to mention the mechanical problems of camera construction. This doesn't mean that the undertaking won't be educational — you'll certainly learn something about u.h.f., if that's the area in which you're interested. If your interest is in the video portion, you can dive into that, too, even though this section of the transmitter is commercially built.

The television station described here is made up of two major sections, a manufactured TV camera and control unit and a relatively easy-to-build r.f. unit. The home-built r.f. section does not contain any video or out-of-the-ordinary circuits. The station is not restricted to sending

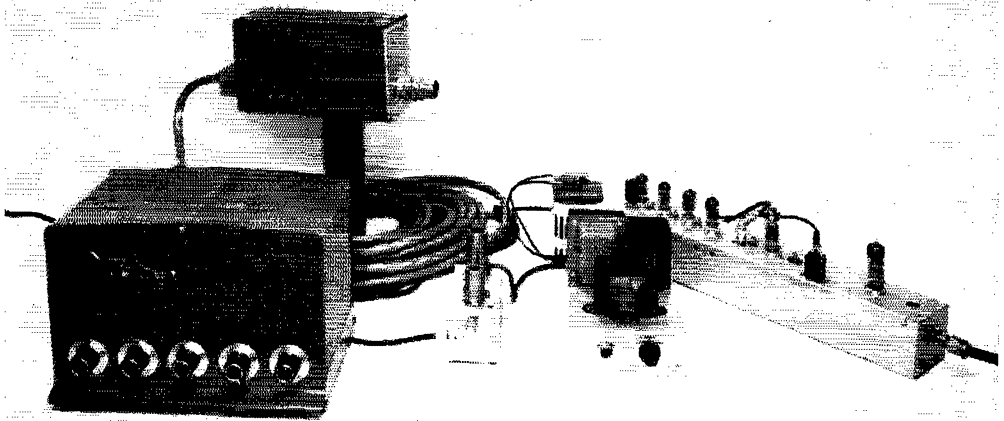


Fig. 1 — View of the television transmitter. The TV Eye control unit is at the left with the camera behind it. The camera support is strictly unconventional and was used only for the photograph. A part of the bulk cable, which connects the camera and control unit, is visible at the base of the camera. A length of coaxial cable connects the control unit with the 55-Mc. amplifier, just to the right of the control unit. Although not visible in the photograph, another coaxial cable is connected between the amplifier and the mixer-amplifier chassis at the right. The 440-Mc. TV signal comes out the BNC connector at the end of the mixer-amplifier chassis. The power supply and bias battery are also visible in the photograph.

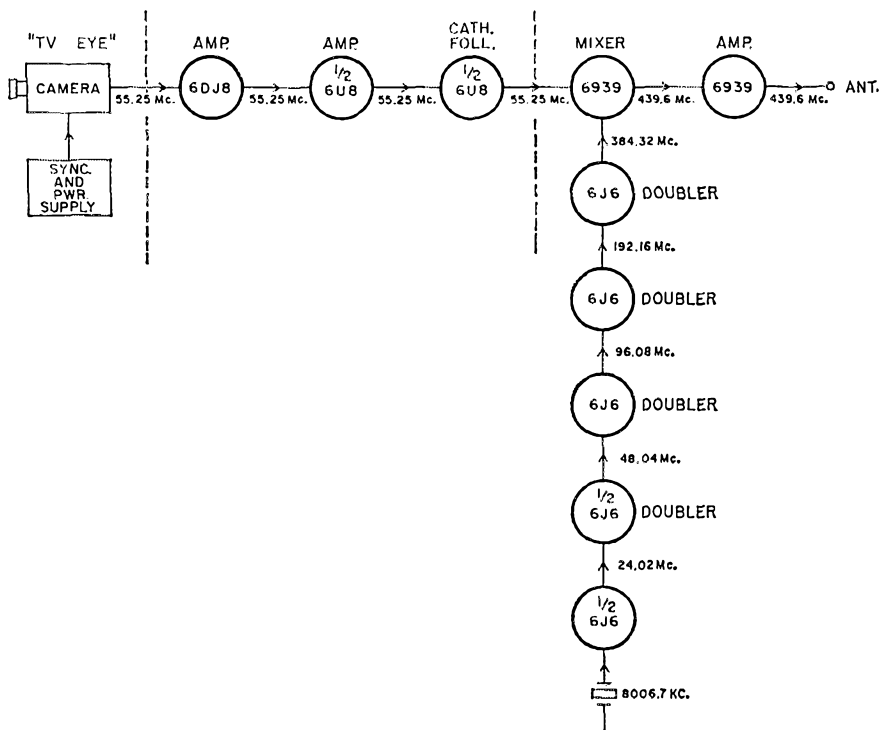


Fig. 2—Block diagram of the TV transmitter, which is composed of three major sections: the TV Eye, the 55-Mc. amplifier, and the mixer and 440-Mc. linear-amplifier section. The TV Eye is a commercial unit available to amateurs.

slides or stills. It is capable of transmitting a moving picture of professional quality.

### System Description

The photograph, Fig. 1, and the block diagram, Fig. 2, show the major components of the TV transmitter. The camera and control units (called "TV Eye") are available to hams and will be discussed in detail later.

As shown in Fig. 2, 55-Mc. TV output from the camera is fed into an amplifier consisting of two broadband stages and a cathode follower. Output from the amplifier goes to an additive mixer, which is part of the u.h.f. mixer and amplifier chassis.

Also applied to the mixer is 385-Mc. energy from a string of frequency multipliers. This and the TV signal are mixed to give a 440-Mc. signal which is then amplified in a linear amplifier. This mixing method does away with the necessity for high-level video modulators. This scheme could probably be used for s.s.b., c.w., and a.m. on the 432-Mc. band, too, simply by substituting a 6-meter s.s.b., c.w. or a.m. rig in place of the TV Eye.

A power supply to furnish all the necessary voltages, except for bias for the linear amplifier, is also necessary. The TV Eye has its own power supply. A dry-cell battery supplies bias for the linear amplifier.

### The TV Eye

The TV Eye package is designed for closed-

circuit television applications and gives a picture signal on any regular TV channel from 2 to 6, inclusive. The only extra that is needed is a lens—a standard 16-mm. movie-camera lens with type "C" mount. One can be picked up second hand at a quite reasonable price at almost any photographic supply house.

Standards for the TV Eye are, for all practical purposes, the same as those used in professional television. Frame frequency is 30 frames per second; vertical sweep frequency is 60 cycles per second; the nominal horizontal sweep frequency is 15.75 kc. Although the horizontal oscillator uses just a simple LC circuit, it gave us no stability problems. One minor departure from commercial practice is that no sync information is present during the vertical retrace interval; the sync is just an exaggerated blanking pulse. However, the TV receiver doesn't mind this and displays a normal picture.

The TV Eye is a discontinued model available to amateurs in a special bargain package which includes the camera unit, a Vidicon camera tube, a control unit with all sync and power supply circuits, cable connectors and 25 feet of cable for connecting the camera to the control unit. (Actually, the two can be separated by as much as 500 feet.) All these components are brand new and the Vidicon carries the usual RCA new tube warranty. The power requirement is 117 volts, a.c. at about 100 watts.

The cigar-box-size camera measures only 5¼ inches high, 4 inches wide and 11 inches deep.

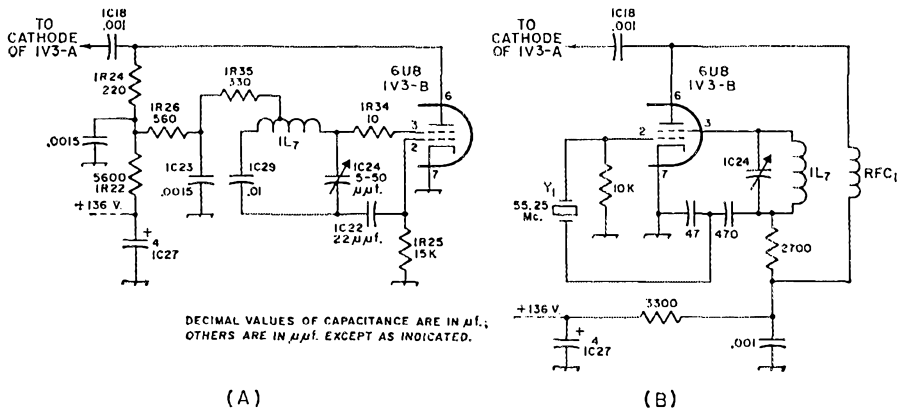


Fig. 3—Modifications to the oscillator in the TV Eye. The original circuit is shown in "A", the modified oscillator in "B". The original tuned circuit components, 1C24 and 1L7, are also used in the modification. Crystal  $Y_1$  has wire leads and does not require a socket.

RFC<sub>1</sub>—8.2 $\mu\text{h.}$  (Millen J300-8.2).

$Y_1$ —Miniature 55.25 Mc. third-overtone crystal (International crystal type F-700).

Since it weighs only 4½ pounds, it can easily be hand-held. Electrically, the camera contains the Vidicon camera tube, a three-stage video amplifier, a video output stage, a 55 to 85-Mc. tunable oscillator, and a modulator stage that combines the r.f., video, and horizontal and vertical sync signals.

The sync signals are fed to the camera through a coaxial cable from the control unit. The control unit contains horizontal and vertical deflection circuits for the Vidicon tube, a protective circuit that prevents damage to the Vidicon in the event of a sweep-circuit failure, a blanking and vertical sync stage, and the power supply.

Output from the camera goes to the control unit through another coaxial cable which terminates at a selector switch. Power leads also connect the camera to the control unit. All of the leads, including the two coaxial cables, are part of the bulk cable furnished with the TV Eye package.

The TV Eye is available in package form from RCA<sup>1</sup> on a cash-only basis with 30 days delivery, f.o.b. Camden, New Jersey. The price: \$195. Quite a bargain when you consider that the Vidicon alone is worth \$200. Not that it should be necessary to justify the price of this equipment, but in case you raised your eyebrows at the tab, just stop and think what some of the so-called blue-chip transmitters and receivers will set you back!

### TV Eye Modifications

Only two simple modifications in the TV Eye are necessary. As mentioned earlier, the output from the camera can be adjusted for any TV channel between and including channels 2 and 6. The r.f. oscillator circuit in the camera is shown

in Fig. 3A. Variable capacitor 1C24, the element used for changing channels, is rather "touchy," in that moving its shaft only a few degrees changed the oscillator frequency many megacycles. Although this oscillator is stable enough for closed-circuit work, it was decided to make it crystal-controlled and leave no doubt as to the exact frequency of the signal. This is important after the mixing process, when the signal is a few hundred megacycles higher.

Fig. 3B is the circuit of the new oscillator with crystal control. A frequency of 55.25 Mc. was chosen because this is the video carrier frequency of channel 2, thus making it convenient for monitoring with a regular TV receiver. The circuit requires only a handful of additional components. The original tuned circuit components, 1C24 and 1L7, are also used in the modification, which is a conventional overtone circuit.

The only other modification in the TV Eye equipment is in the control unit. A length of RG-59/U carries the output from the camera to the control unit where it terminates at a selector switch. This cable should be disconnected from the selector switch and another length of RG-59/U cable spliced to it. A connector can be mounted on the rear of the control unit and the new cable connected to that. The additional cable feeds the output from the camera to the onboard amplifier.

The TV Eye instruction manual has excellent photographs, schematics, operating instructions, alignment data, and maintenance information; there is no need for any discussion along these lines in this article.

### The 55-Mc. Amplifier

The 55-Mc. output from the TV Eye into a 72-ohm load is only about 1 volt peak-to-peak, which isn't enough for proper injection to the u.h.f. mixer. The amplifier shown in Figs. 4 and

<sup>1</sup> Write: Closed Circuit Television Department  
Radio Corporation of America  
Building 15-6  
Camden 2, New Jersey

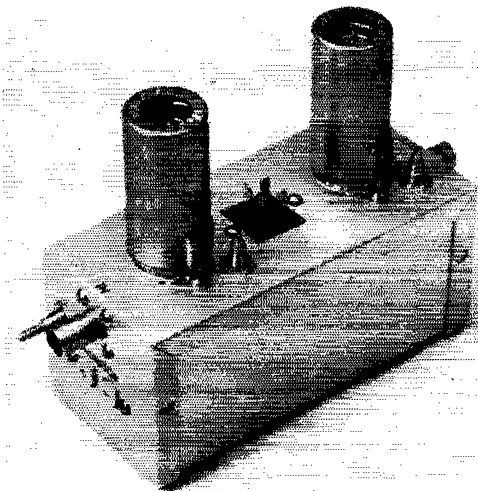


Fig. 4—The 55-Mc. amplifier. The plug located between the tubes is the power-supply connector. Monitor jack  $J_3$ , BNC connector  $J_1$ , and slug-tuned inductance  $L_1$  are visible at the end of the Minibox chassis.

5 is necessary for boosting the camera signals to a usable value. A broad-band cascode r.f. amplifier, such as used in television receiver front ends, drives a second stage, the pentode section of a 6U8. Cathode-follower output using the 6U8 triode section provides a match to the low-impedance input of the u.h.f. mixer.

Fig. 6 shows the circuit of the amplifier. About the only special precaution that needs to be observed in its construction is to place a copper-plate shield between the input and output sections of the 6U8 pentode tube socket. In the development stage, it was found that this amplifier just couldn't be tamed in any other way. Capacitor  $C_1$ , a feed-through type, is mounted on the copper shield (see Fig. 5).

You'll notice in Fig. 6 that the plate inductances,  $L_2$  and  $L_3$ , are shunted with 10,000

ohms. This is necessary, along with the staggering of all the inductances, to get the necessary bandwidth.

A Bud aluminum Minibox (CU-3004A) measuring  $2\frac{1}{4} \times 2\frac{1}{4} \times 5$  inches, houses the amplifier. The jack,  $J_3$ , is a crystal socket used as a connector for attaching a TV monitor receiver. A monitor at this point in the chain is necessary so that the TV Eye control unit and camera can be adjusted properly before the signal is fed into the rest of the system.

Alignment and tune-up of the amplifier has to wait until the mixer and amplifier chassis is complete, since one can't be aligned without the other. Tune-up of the whole system will be covered later.

### Mixer and Amplifier

The mixer and amplifier circuits are shown in Fig. 7. Two type 6939 twin pentodes, especially designed for operation in the 500-Mc. region, are used.

Output from the 55-Mc. amplifier is link-coupled to the 6939 mixer grids, which are connected in push-pull. The link,  $L_4$ , is tightly coupled to  $L_5$  for bandwidth reasons. Injection voltage from the 384-Mc. frequency multiplier is applied to the parallelled cathodes of the mixer across the 270-ohm cathode-bias resistor. Output at 440-Mc. appears in the mixer plate tank circuit, a shorted quarter-wave line.

Because of the rather high input capacitance of the 6939 r.f. amplifier, an open half-wave line is used in the grid circuit. The plate tank is a shorted quarter-wave line which, like the plate circuit of the mixer, is tuned by a variable capacitor. The variable capacitor  $C_5$  is a reactance tuner-outer for the output link.

An r.f. voltmeter connected to the output link is used for a tune-up gimmick and as a relative output indicator. The diode,  $CR_1$ , is tapped down on a resistive voltage divider and terminates at a pin-jack test point. Full output gives about half-scale reading on a 0-1-ma. meter.

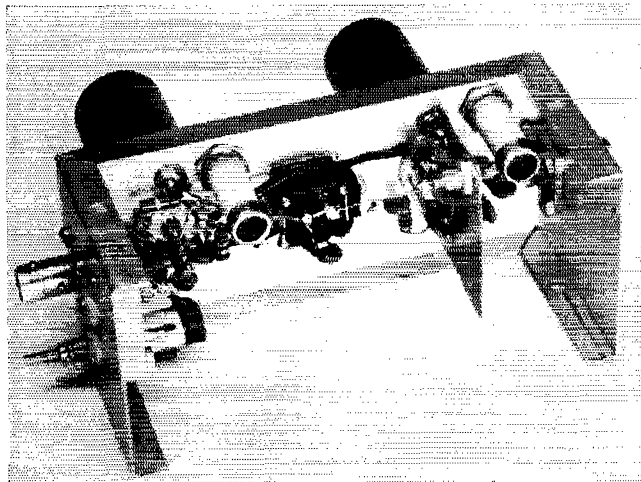


Fig. 5—Bottom view of the 55-Mc. amplifier. A copper shield plate is mounted across the 6U8 tube socket. Feed-through capacitor  $C_1$  is mounted on the top corner of the shield in this view.

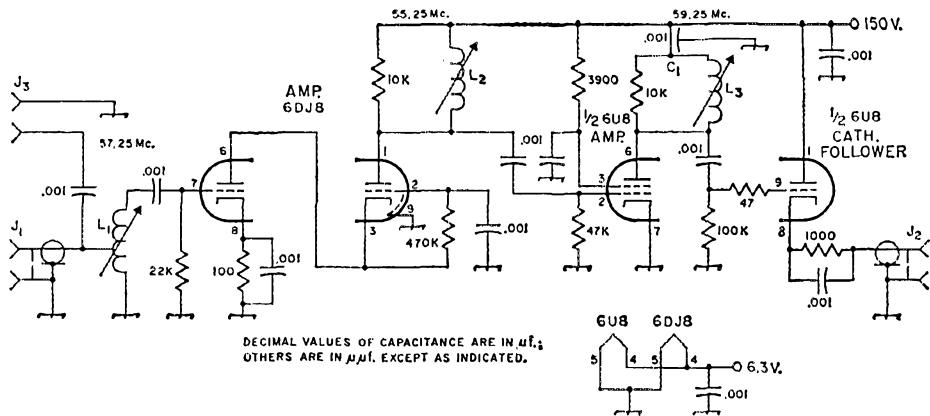


Fig. 6—Circuit of the 55-Mc. amplifier. Resistances are in ohms; resistors are 1/2 watt.

C<sub>1</sub>—Feed-through capacitor (Centralab MFT-1000).  
 J<sub>1</sub>, J<sub>2</sub>—BNC chassis connectors.

J<sub>3</sub>—Crystal socket (Millen 33102).  
 L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>—See coil table.

As shown in Fig. 7, r.f. chokes are used in the heater leads of both 6939 tubes to put the heaters above r.f. ground. This isn't absolutely necessary, but it was found that there was a slight improvement in output when the heaters were connected as shown. There never were any indications of instability in the 6939s, probably because a few tried-and-tested precautions were taken to prevent self-oscillation. The 220-ohm resistor in the ground lead of C<sub>3</sub> in the r.f. amplifier grid

circuit effectively puts some resistance in series with the grid-to-plate circuit to help suppress any parallel-type oscillation that might occur. A copper shield is used at both tube sockets to isolate the grid and plate circuits. This theoretically isn't necessary in the mixer but it was done anyway to prevent 385-Mc. energy from the frequency multipliers (which are on the same chassis as the mixer and amplifier) from getting into the mixer plate and amplifier grid circuits.

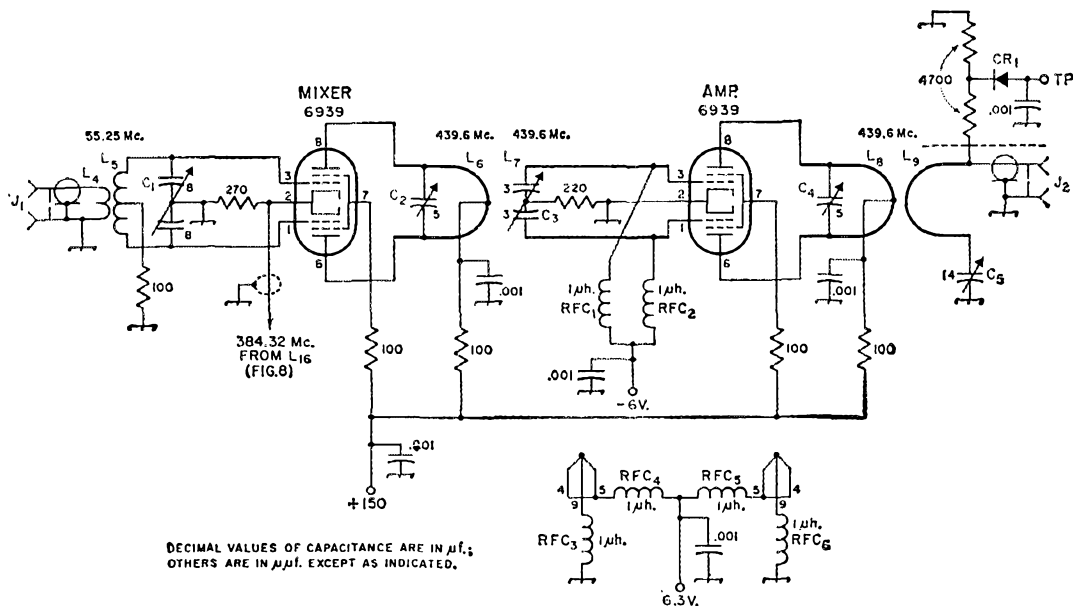


Fig. 7—Mixer and linear-amplifier circuit. Resistances are in ohms; resistors are 1/2 watt.

C<sub>1</sub>—2.2- to 8-μmf. miniature butterfly (Johnson 160-208).  
 C<sub>2</sub>—1.3- to 5.4-μmf. subminiature (Johnson 189-2).  
 C<sub>3</sub>—1.5- to 3.1-μmf. miniature butterfly (Johnson 160-203).  
 C<sub>4</sub>—1.3- to 5.4-μmf. subminiature (Johnson 189-2).

C<sub>5</sub>—2.2- to 14.2-μmf. miniature (Hammarlund MAC-15).  
 CR<sub>1</sub>—1N34A crystal diode.  
 J<sub>1</sub>, J<sub>2</sub>—BNC chassis connectors.  
 L<sub>1</sub>, L<sub>5</sub>, L<sub>6</sub>, L<sub>7</sub>, L<sub>8</sub>, L<sub>9</sub>—See coil table.  
 RFC<sub>1</sub>—RFC<sub>6</sub>, inc.—1 μh. (Miller 4602).

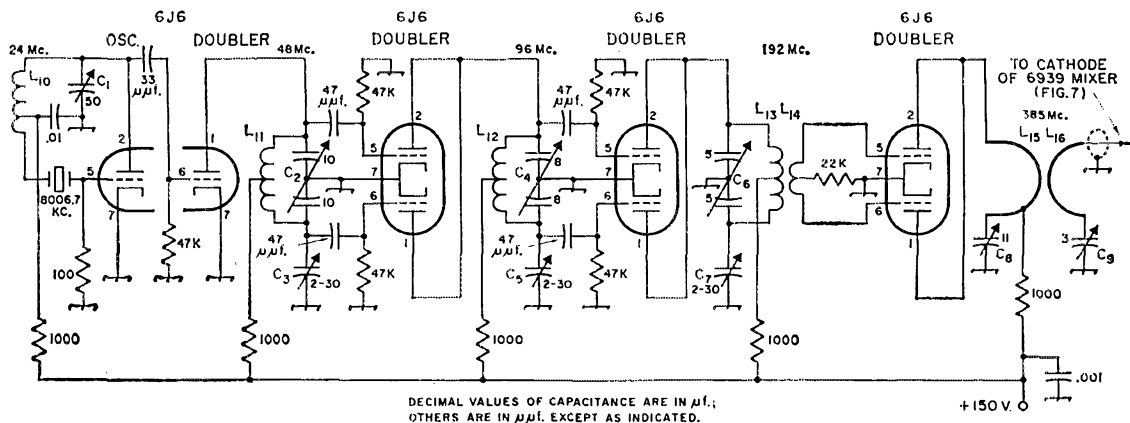


Fig. 8—Circuit of the crystal oscillator and frequency-multiplier section of the TV transmitter. The 1000-ohm resistor connected to  $L_{15}$  must be attached at the spot of lowest r.f. potential. This point is found by sliding the resistor lead up and down the inductance to the place where output from the stage is maximum.

Resistances are in ohms, resistors are  $\frac{1}{2}$  watt.

- $C_1$ —3.2–50- $\mu\text{mf.}$ , miniature (Hammarlund MAPC-50).
- $C_2$ —2.7–10.8  $\mu\text{mf.}$ , miniature butterfly (Johnson 160-211).
- $C_3$ —2–30  $\mu\text{mf.}$ , mica trimmer.
- $C_4$ —2.2–8  $\mu\text{mf.}$ , miniature butterfly (Johnson 160-208).
- $C_5$ —2–30  $\mu\text{mf.}$ , mica trimmer.

- $C_6$ —1.8–5.1  $\mu\text{mf.}$ , miniature butterfly (Johnson 160-205).
- $C_7$ —2–30  $\mu\text{mf.}$ , mica trimmer.
- $C_8$ —1.7–11  $\mu\text{mf.}$ , subminiature (Johnson 189-5).
- $C_9$ —1.2–3.5  $\mu\text{mf.}$ , subminiature (Johnson 189-1).
- $L_{10}$ – $L_{16}$ , inc.—See coil table.

Don't be upset by the lack of bypassing in the 6939 screens. These tubes have built-in neutralization and the tube manufacturer recommends that screens not be bypassed.

The 6939 linear amplifier is operated in the Class A or Class  $AB_1$  region. The book calls for  $3\frac{1}{2}$  volts bias for Class A operation, but it was found that the picture didn't suffer when the bias was raised to six volts, which increased the power output. The output measured in a non-reactive 50-ohm load was slightly over 2 watts.

### Frequency-Multiplier Section

The injection frequency at the cathodes of the 6939 mixer is selected to give the 420–450-Mc. carrier frequency. Consideration should be given to the fact that the bandwidth of the TV signal is several megacycles and also that the band segment 432–436 Mc. should be avoided, since it is usually occupied by stable, narrow-band signals (tripling from the 144-Mc. band) used for long-distance work. We chose an injection frequency of 384 Mc., which gives an output-

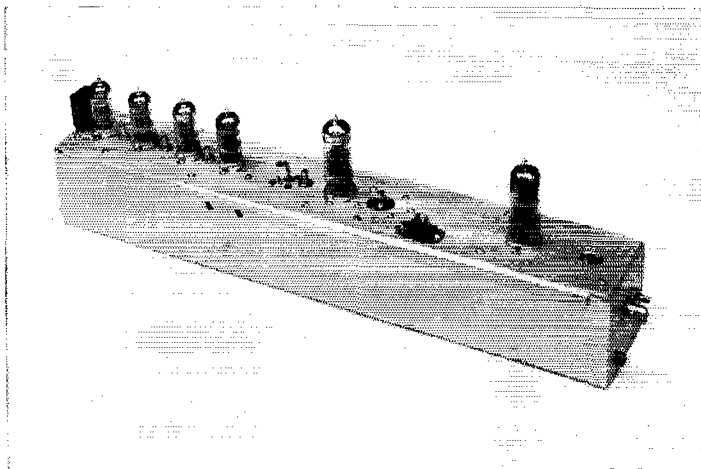


Fig. 9—The mixer amplifier in its slide-cover box. From left to right are the crystal, the oscillator and frequency multipliers (four 6J6s), BNC connector for the 55-Mc. amplifier, mixer grid tuning-capacitor shaft, 6939 mixer tube, linear-amplifier grid tuning-capacitor shaft, power-supply connector, 6939 440-Mc. linear amplifier, and amplifier plate-tuning-capacitor access hole. The two holes on the side of the chassis are for inserting a tuning tool to adjust the 384 Mc. 6J6 doubler plate-tuning capacitor and link-loading capacitor. The BNC output connector, amplifier loading capacitor, and test-point tip jack are on the end of the chassis. Not visible at the other end of the chassis is a hole for adjusting the crystal oscillator. There is also a hole in the bottom of the box for access to the mixer plate-tuning capacitor.



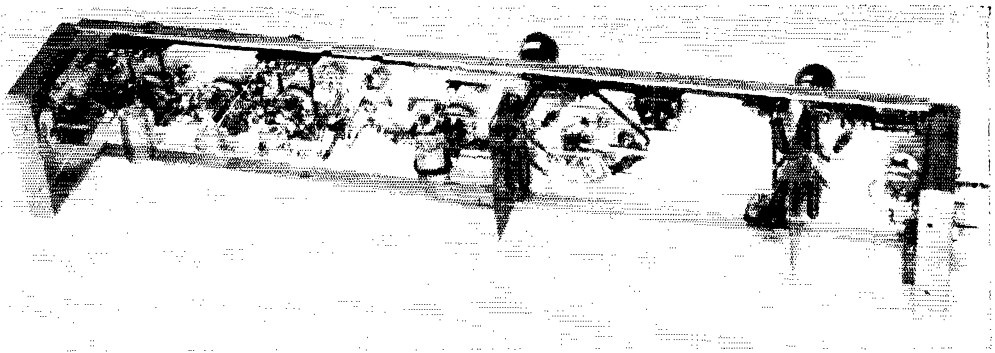


Fig. 10—The slide-on cover has been removed in this bottom view of the mixer-amplifier chassis. The frequency multipliers are grouped at the left. The coil (with link) just to the left of the flat shield at the center of the chassis is the mixer grid circuit. The amplifier grid-tuning capacitor, just to the right of the center shield, is mounted on a Lucite plate to keep it above r.f. ground. The final-amplifier grid chokes are just to the left of the right-hand tube shield. The chokes to the right of both shields are the heater chokes. The r.f. voltmeter components are mounted on the right-hand end. It was found necessary to place a copper shield between these components and the output link; without it, the voltmeter reading did not give a true indication of relative output. The heater and high-voltage leads run along the top edge of the chassis

carrier frequency of 440 Mc. This signal is obtained by multiplying a low-frequency crystal-controlled signal up to the proper frequency. As shown in Fig. 8, the output from a triode overtone crystal oscillator using an 8,0067-Mc. surplus crystal is doubled in a second triode section to 48 Mc. The remaining 6J6 doublers are in push-push/parallel and multiply the signal up to the required 384 Mc.

Trimmer capacitors  $C_3$ ,  $C_5$ , and  $C_7$  maintain circuit balance by duplicating the output capacitance of the preceding stage. They are adjusted for equal drive to the push-push doubler grids. When these trimmers are adjusted they have a tendency to "pull" the tuned circuit so that it is necessary to go back and forth between the trimmer and the tank circuit in tuning. They are adjusted for maximum output in each stage. The 384-Mc. signal is coupled to the mixer cathode by a short piece of coaxial cable.

The frequency multipliers, mixer, and linear amplifier are all built on the same chassis. The one shown in Figs. 9 and 10 is a  $17 \times 3\frac{1}{2} \times 2\frac{5}{8}$ -inch slide-cover box (LMB type 19, available from Newark Electronics, Chicago, Ill.). Fig. 11 gives measurements for the placement of the various holes for some of the mixer and r.f. amplifier components. No specific details are included for the crystal oscillator and frequency

multipliers since there is nothing particularly unusual about their layout. A look at the photographs will aid in laying out the chassis.

### Power Supply

If you have studied all the drawings, you will have noticed that all of the major units in the system require a high voltage of 150 volts (except the TV Eye equipment, which has its own power supply). Total current requirement at 150 volts is about 175 ma. Heater current is pushing 4 amperes at 6.3 volts.

Here is one important note about the power supply: It is a good idea to make provision for turning on the heaters before the high voltage is applied. The 6J6 tubes in the frequency multiplier draw a tremendous slug of plate current as the heaters warm up, if high voltage is applied simultaneously, because the crystal oscillator doesn't start quickly enough to generate bias in the multipliers. This can be handled nicely by using a separate high-voltage on-off switch.

Bias voltage for the 6939 linear amplifier is furnished by a dry-cell battery. There's no current drain on the battery, so it should last as long as your interest in the project!

No construction or circuit data are given here for the power supply since information on this subject is covered quite well in *The Radio*

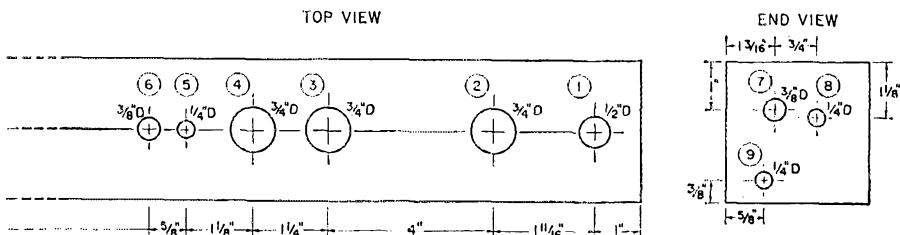


Fig. 11—Dimensions for laying out the mixer and linear-amplifier chassis. The holes are for: (1) final-amplifier plate-tuning capacitor access, (2) 6939 amplifier tube socket, (3) linear-amplifier grid-tuning capacitor, (4) 6939 mixer tube socket, (5) mixer grid-tuning capacitor, and (6) BNC connector. End-view holes are for a BNC connector (7), loading capacitor (8), and the test-point pin jack (9).

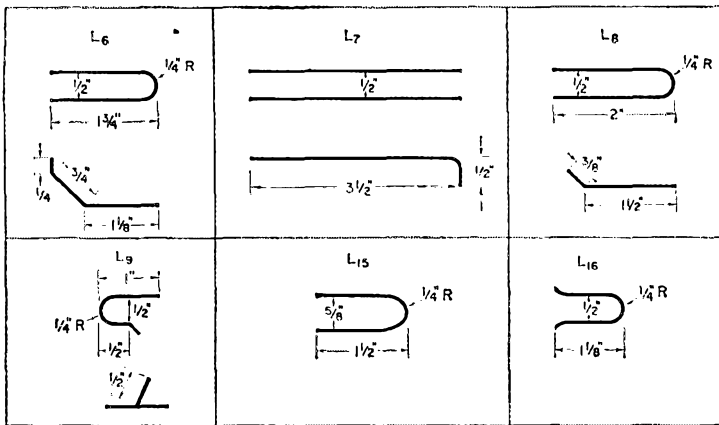


Fig. 12—Inductance data for the TV transmitter. All are made from No. 12 tinned wire. Radii can be generated by bending the wire around a twist drill of the correct size. Dimensions are not absolutely final since some of the inductances may have to be bent somewhat in order to hit the frequency.

*Amateur's Handbook*. One convenient way to get the 150 volts is to use a 117-volt isolation transformer of the proper power rating in a voltage-doubler circuit. Output d.c. voltage will be somewhat higher than 150, so a dropping resistor can be used to adjust the voltage right on the nose. If this scheme is used, a separate 6.3-volt heat transformer will be necessary. Semiconductor diodes will save the need for a tube rectifier heater transformer, as would the use of 6-volt-heater tube rectifiers.

#### Alignment, Testing and Operation

Probably the first step in getting the TV station operational is to check out and become familiar with the TV Eye equipment. After following the instructions in the TV Eye manual as to installation, and after becoming familiar with its theory of operation from the same book, try out the camera and control unit as a closed-circuit transmitter. When the modifications for crystal control have been made, the only adjustment to the oscillator will be to the variable capacitor 1C24, which is adjusted for best oscilla-

tor performance. As with most other overtone oscillators, the optimum setting isn't at maximum oscillator output but at the point where it will start oscillating without any hesitation.

The added length of RG-59/U cable is connected to any standard TV receiver tuned to channel 2. Although this represents a bit of a mismatch, a good picture can usually be obtained. After reading the information in the TV Eye instruction manual, a little experimentation should produce some good pictures.

When it comes to aligning and tuning up the 55-Mc. amplifier, a signal generator, grid-dip meter, and v.t.v.m. with an r.f. probe should be used. It will be necessary to connect the output of the amplifier to the mixer during alignment.

Feed the signal generator output into jack  $J_1$ , Fig. 6. Connect a 180-ohm resistor in series with the generator—this will simulate the same impedance conditions as the camera. Coils  $L_1$ ,  $L_2$ , and  $L_3$  can be set roughly to the frequencies shown in Fig. 6 with a grid-dip meter. Connect the v.t.v.m. r.f. probe between ground and either Pin 1 or 3 of the 6939 mixer.

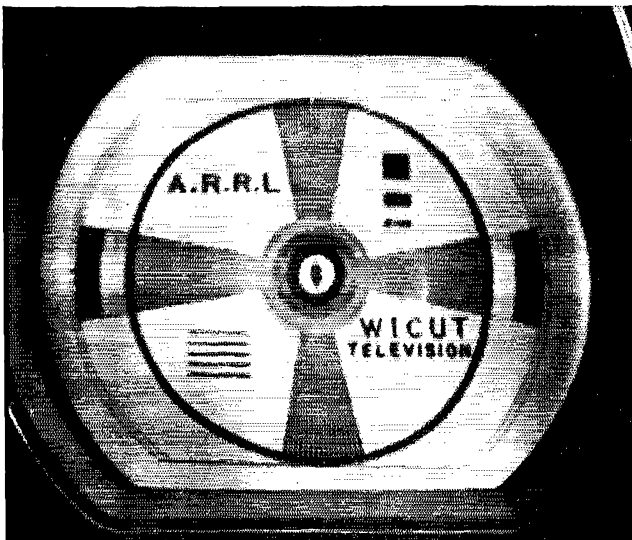


Fig. 13—An actual 440-Mc. TV picture transmitted with the equipment described in this article.

Set the signal generator at 57.25 Mc. and peak up coil  $L_1$ . Then set the signal generator at 55.25 Mc. and peak  $L_2$ . Set the generator at 59.25 and peak  $L_3$ . From here on it's a matter of adjusting  $L_1$ ,  $L_2$ ,  $L_3$ , and the mixer tuned circuit (tuning capacitor  $C_1$  in Fig. 7) until a relatively flat response across the 4 Mc. is achieved. It may be necessary to swap tuned circuits; that is, tune  $L_1$  to 55.25 Mc. and tune  $L_2$  to 57.25 Mc., and so on. Ideally, there should not be more than 3-db. variation in amplitude across the 4-Mc. bandpass. One note of caution when making these checks: Be sure that the high voltage on the circuits remains at 150 volts at all times. If the power supply has poor regulation, different tuning conditions will change the load on the power supply. This changes the voltage, making the measurements meaningless.

When working with the u.h.f. circuits in the mixer, linear amplifier, and frequency multiplier it is just about mandatory to have a u.h.f. grid-dip meter such as the one described in the Measurements chapter in *The Radio Amateur's Handbook*, 39th edition. Coil information in Fig. 12 should get the tuned circuits "in the ballpark" but if you are off a few megacycles the dipper will tell you which way to go.

The first thing to concentrate on in the mixer and amplifier chassis is the crystal oscillator and frequency multipliers, because the 384-Mc. signal furnished by the multipliers is needed to check out the mixer. A v.h.f. grid-dip meter is a useful tool, but can only be used up to the last doubler in the multiplier chain where a wave-meter or u.h.f. grid-dip meter can take over. A one-turn loop connected to a low-power flashlight bulb makes a good output indicator and will light up when coupled to the final doubler's output coil,  $L_{15}$ .

After the doublers are all working and the 384-Mc. signal is available at the cathodes of the mixer, inject some 57-Mc. energy from a grid-dip meter by coupling the dipper to the mixer grid coil,  $L_5$ . This is just a preliminary adjustment which will be done over again later with a TV signal. Leave the high voltage disconnected from the linear amplifier until the mixer is working properly. Tuning the mixer plate to 440 Mc. will give enough signal to light the flashlight-bulb test indicator.

The r.f. output voltmeter can be used as an indicator for tuning up the linear amplifier. The amplifier output should be terminated with a nonreactive load<sup>2</sup> when the amplifier is being tested.

Coupling between the mixer plate and amplifier grid isn't particularly critical, but it may take some pinching and spreading to change the spacing between the two lines before optimum coupling is achieved. The output voltmeter can be used here as a tuning aid.

When everything is working properly, with no spurious oscillations or tendencies toward instability, the TV Eye can be connected and the system checked out with a picture. Connect the

<sup>2</sup> Tilton, "V.H.F. Dummy Loads," *QST*, March, 1960.

### Coil Table

- $L_1$  — 0.5  $\mu$ h. 6 turns No. 22 enam.,  $\frac{3}{8}$ -inch diam., close-wound, tapped at 2 turns from ground end (wound on Miller 4400 coil form).
- $L_2$  — 0.38  $\mu$ h. 5 turns No. 22 enam.,  $\frac{3}{8}$ -inch diam., close-wound (wound on Miller 4400 coil form).
- $L_3$  — 0.55  $\mu$ h. 5 turns No. 22 enam.,  $\frac{3}{8}$ -inch diam., close-wound (wound on Miller 4400 coil form).
- $L_4$  — 3 turns of No. 22 hook-up wire wound tightly over the center of  $L_5$ .
- $L_5$  — 1.04  $\mu$ h. 12 turns No. 20 tinned,  $\frac{1}{2}$ -inch diam., 11/16 inch long, center tapped (B & W No. 3003).
- $L_6$  — See Fig. 12.
- $L_7$  — See Fig. 12.
- $L_8$  — See Fig. 12.
- $L_9$  — See Fig. 12.
- $L_{10}$  — 1.24  $\mu$ h. 14 turns No. 20 tinned,  $\frac{1}{2}$ -inch diam.,  $\frac{3}{8}$  inch long, tapped at  $4\frac{1}{2}$  turns from crystal end (B & W No. 3003).
- $L_{11}$  — 1.5  $\mu$ h. 16 turns No. 20 tinned,  $\frac{1}{2}$ -inch diam., 1 inch long, center tapped (B & W No. 3003).
- $L_{12}$  — 0.32  $\mu$ h. 5 turns No. 20 tinned,  $\frac{1}{2}$ -inch diam.,  $\frac{3}{8}$  inch long, center tapped (B & W No. 3003).
- $L_{13}$  — 0.138  $\mu$ h., 3 turns No. 20 tinned,  $\frac{1}{2}$ -inch diam.,  $\frac{1}{4}$  inch long, center tapped (B & W No. 3003).
- $L_{14}$  — 2-turn link No. 22 enam.,  $\frac{1}{2}$ -inch diam. Leads  $1\frac{1}{2}$  inches long.
- $L_{15}$  — See Fig. 12.
- $L_{16}$  — See Fig. 12.

monitor output from  $J_3$  on the 55-Mc. amplifier to the v.h.f. antenna terminals on the receiver (or converter). The picture coming out of the TV Eye will be seen when the TV receiver or converter is switched to the v.h.f. and the receiver is set on channel 2. If your TV receiver has built-in u.h.f., or has an outboard u.h.f. converter, the on-the-air signal can be picked up for monitoring purposes by switching the TV receiver or converter to u.h.f.; although the TV transmitter is not on any u.h.f. commercial channel, its *image* can sometimes be copied. This is possible because most TV u.h.f. converters, whether or not they are built-in, convert the u.h.f. channel to a v.h.f. channel. There are frequency combinations that, with a strong signal, will give a good picture from a signal in the 432-Mc. band. The 440-Mc. image signal falls somewhere between channel 30 and 35 with most u.h.f. converters when the T.V. receiver is set to channel 6. Sets with built-in converters will have to be experimented with to find the "spurious" signal, although it probably will be found easily using the above combination as a starter. Comparison of the "before" and "after" pictures will show whether any distortion is occurring in the 55-Mc. amplifier, mixer or linear amplifier.

(Continued on page 150)

## • *Beginner and Novice*

# A Simple Three-Band Preselector for 20, 15 and 10

*How To Improve the Performance of Your Receiver*

BY LEWIS G. McCOY,\* WIICP

LOOK through the Ham-Ads in *QST* or through your local radio store will show that there are quite a few used receivers available, many at quite reasonable prices considering what they cost new. A Novice or beginner would be wise to consider such receivers for his first one. Many of these older receivers have excellent tuning mechanisms and provide good bandwidth, and some even have crystal filters to improve selectivity. However, there is one disadvantage in that while these older receivers do a good job on 80 and 40 meters, their performance sometimes suffers on the higher bands, 20 through 10. Usually the sensitivity and image rejection are poor. The lack of sensitivity is due to the poorer performance of older tubes and circuit components as compared with their modern counterparts. The poor image rejection was an inherent trouble with many of these receivers because they used a low intermediate frequency (465 kc.) for a conversion frequency without having enough selectivity in the front end to overcome the image problem.

This article describes the construction of a

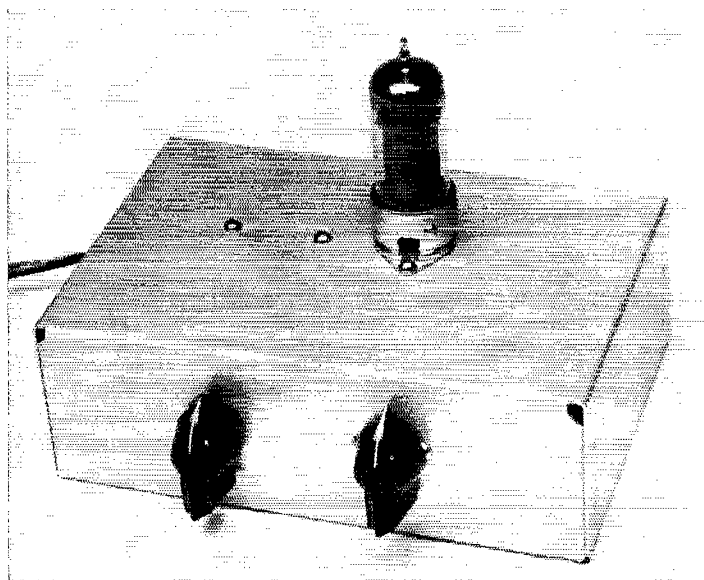
\*Technical Assistant, *QST*.

simple regenerative preamplifier for the 14-30-Mc. range. When the preamplifier is added to one of these older receivers, the receiver performance is improved considerably on the higher bands. The additional gain will enable you to boost up the weaker signals and at the same time will provide a great deal more image rejection.

A preamplifier like the one described here is merely an additional radio-frequency amplification stage which is built on its own chassis. The receiving antenna is connected to the preamplifier and the output of the unit is fed into the antenna-ground terminals on the receiver. Any signals coming in on the antenna are first amplified in the preamplifier before reaching the receiver. The fact that the preamplifier uses a tuned circuit in its input also helps the over-all selectivity, thereby reducing image response.

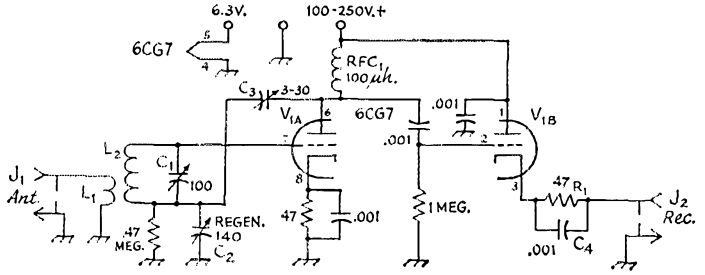
### *Preamplifier Circuit Details*

The circuit for the preamplifier is shown in Fig. 1. In order to keep the cost down, there is no power supply built into the unit, as it is easy to take the power from the receiver; more about that later. However, some amateurs are reluctant



This is a view of the completed preselector. The knob at the left is for  $C_1$  and the one at the right is for  $C_2$ .

Fig. 1—Circuit diagram of the preamplifier. Resistances are in ohms; resistors are 1/2 watt. Fixed capacitors are 0.001- $\mu$ f. disk ceramic.



- C<sub>1</sub>—100- $\mu$ f. variable (Hammarlund APC-100-B).
- C<sub>2</sub>—140- $\mu$ f. variable (Hammarlund APC-140-B).
- C<sub>3</sub>—30- $\mu$ f. mica compression trimmer
- C<sub>4</sub>—0.001- $\mu$ f. disk ceramic.

- J<sub>1</sub>, J<sub>2</sub>—Phono jacks.
- L<sub>1</sub>, L<sub>2</sub>—See Fig. 4.
- R<sub>1</sub>—47 ohms, 1/2 watt.
- RFC<sub>1</sub>—100  $\mu$ h. (National R33, Millen 34300-100).

to make any soldered connection to a receiver, so for those of faint heart we have provided the circuit of a simple power supply that will run the unit.

The r.f. stage of the preamplifier is one half of a dual triode, a 6CG7. L<sub>1</sub>, the input link, is coupled to L<sub>2</sub>, which is tuned by C<sub>1</sub>. The range of the L<sub>2</sub>C<sub>1</sub> combination is from a frequency slightly below the 14-Mc. band to a little higher than 30 Mc.

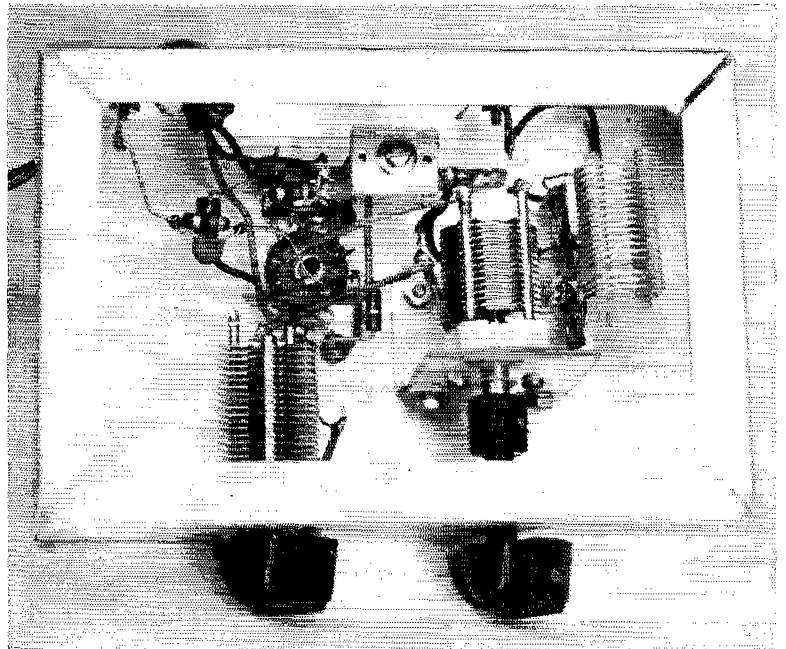
The most gain and selectivity can be achieved when the r.f. stage is operated just below the point of self-oscillation. In this circuit, C<sub>2</sub>C<sub>3</sub> provide the feedback to make the stage regenerative. C<sub>3</sub> is set so that regeneration and oscillation can be controlled by C<sub>2</sub>.

Output from the r.f. amplifier is fed to the second section of the triode, which is operated as a cathode follower. The cathode follower isolates the preamplifier from the receiver. Without it, any adjustment of the front end of the receiver, such as the antenna trimmer, might cause

the preamplifier to break into oscillation. Output from the cathode follower is coupled to the receiver via C<sub>4</sub>.

The power supply (if needed) is a half-wave type. (Fig. 2) The filter consists of C<sub>1</sub>R<sub>1</sub>C<sub>2</sub>. D.c. voltage out of the filter is approximately 130 volts. If you take the voltages from your receiver, the preamplifier can be run on any voltage between 100 and 250 volts d.c. Current requirements are only a few milliamperes. The heater requirements are 6.3 volts at 0.6 ampere. This can easily be taken from any receiver having a power transformer. The reason we say power transformer is that some of the cheaper receivers connected the heaters of five or six tubes in series across the a.c. line. In such a setup it would be impractical to try and get the power from the receiver. Getting the d.c. voltages from such a receiver is also not recommended because it could be dangerous; the power supply of a transformerless receiver is not isolated from the a.c. line.

The coil assembly is mounted alongside C<sub>1</sub>, in the upper right corner in this view. C<sub>1</sub> is mounted on the polystyrene plate and an insulated shaft extender is used to bring the shaft out to the chassis front.



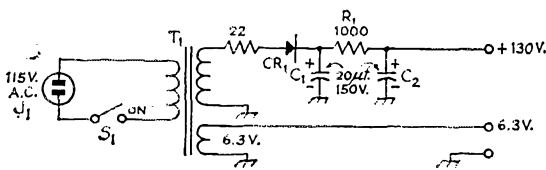


Fig. 2—Diagram of a power supply for the preamplifier. Resistances are in ohms, resistors are 1 watt.

$C_1, C_2$ —20- $\mu$ f., 150-volt electrolytic.

$CR_1$ —Silicon rectifier, 400 volts p.i.v., 200 ma. (International Rectifier 2E4).

$J_1$ —A.c. line plug.

$S_1$ —S.p.s.t. toggle switch.

$T_1$ —Power transformer, 125 volts, 15 ma., 6.3 volts, 0.6 amp. (Stancor PS-8415).

Also, if the unit is used with such a receiver, it is necessary to have a d.c. ground return for the cathode of  $V_{IB}$ . This can be accomplished by installing an r.f. choke, the same type as  $RPC_1$ , between the output side of  $C_1R_1$  and chassis ground.

### Construction Details

The preamplifier is built on a  $2 \times 4 \times 6$ -inch aluminum chassis. All the components are mounted below deck except the tube. The shafts of  $C_1$  and  $C_2$  are brought out to the front of the chassis. The tube socket is mounted  $2\frac{1}{2}$  inches in from the front of the chassis and  $2\frac{1}{2}$  inches in from the side as viewed from the front.  $C_2$  is mounted on the chassis front with its shaft 2 inches in from the chassis side.

$C_1$  must be insulated from the chassis, so it should be mounted on a piece of polystyrene or bakelite sheet. A full-sized template for this sheet is shown in Fig. 3. The sheet is supported by a metal bracket which is mounted to the chassis. The bracket is one inch long with a  $\frac{3}{8}$ -inch lip and is the same width as the sheet (see bottom view).

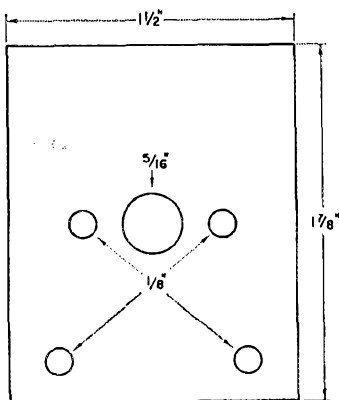


Fig. 3—Template of insulated plate for  $C_1$  mounting.

The neutralizing capacitor, a 3-30- $\mu$ f. trimmer, is mounted on a terminal strip. The coils  $L_1$  and  $L_2$  are made from a single length of Mini-

ductor coil stock, and the assembly is mounted on a terminal strip. Details for making the assembly are given in Fig. 4. This assembly is mounted alongside  $C_1$  near the rear of the chassis. The two phono jacks used for the input and output connections are mounted on the rear of the chassis.

The power-supply leads—three are required—are brought out the rear of the chassis through a rubber grommet. One lead is for the plus B, another is the 6.3-volt heater lead, and the third is a ground lead.

Some receivers have an auxiliary power output and if so, the preamplifier power leads can be connected to it. The voltages available can be determined from the receiver instruction manual. If there is no such outlet, the leads must be connected to points that will provide the necessary voltages. Usually the easiest place to find the plus B line is at the output side of the power-supply filter. You can also check the circuit diagram in the receiver manual for additional help in locating a power take-off point. The 6.3-volt line can easily be identified by checking the pin connections on one of the receiver tubes against the circuit diagram. If you don't have a diagram, you can look up the base connections for any of the receiver tubes in the tube charts in the *ARRL Handbook*.

The ground lead from the preamplifier should be connected to the receiver chassis ground. Be sure the receiver power is off before making any of these connections.

### Adjustment Procedure

Connect an antenna to  $J_1$ , and also connect  $J_2$  to the antenna terminal on the receiver through a length of either RG-58/U or RG-59/U. Don't make the coax line any longer than necessary. Tune your receiver to the 14-Mc. band and turn on the receiver (and converter, if it has its own supply). Next, turn on the b.f.o., and then tune  $C_1$  through its range. Listen for a loud rough signal which indicates the preamplifier is oscillating. If the preamplifier stage doesn't oscillate, slowly decrease the capacitance of  $C_2$  and re-

(Continued on page 134)

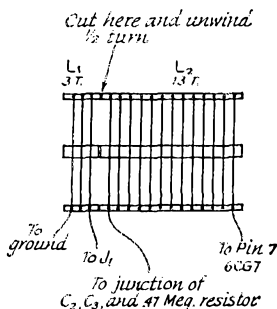


Fig. 4—Drawing of the L-match coil assembly. The assembly is made from a single length of B & W Mini-inductor coil stock type 3007,  $\frac{3}{8}$ -inch diameter, 16 turns per inch, No. 20.

# Logic for Amateurs

"Logic," or "Boolean algebra," is a relatively new science. One of its basic uses is in estimating in advance the nature, sequence and minimum number of steps required to accomplish a desired automatic switching operation. This article is an attempt to provide the amateur with at least a speaking acquaintance with the subject.

## Outline of General Principles

BY WILLIAM SABIN,\* W4YFA

**L**OGIC may be informally defined as a science which attempts to relate a problem to its best possible solution. The processes of logic can be extremely complex and sophisticated when practiced on the human level (and subject to many pitfalls!). However, as electronics becomes more and more wondrous, we find that many of the basic operations of logic, such as remembering, comparing, selecting, rejecting, recognizing, correcting and even learning, can be performed by machines.

A perfect example of these abilities is the electronic mouse which is placed in a labyrinth. After many mistakes and much confusion it finally works its way out. But when it is placed in the second time, it knows its way around like a ham in a surplus store. It remembers all its mistakes and doesn't repeat them.



Fig. 1.

Recently, radar signals were bounced off the sun. Although the echoes were far below the noise level, a computer was able to recognize a barely perceptible pattern to the noise and to extract the desired signal.

Probably the closest thing to a digital computer around the ham shack is the electronic keyer. It "decides" whether a dot or a dash has been "instructed" by the operator and then, without any outside help (or interference), forms the character and the following space perfectly. In this case, the key is the "input" and the relay delivers the "output." The "clock," or timing device (usually a multivibrator), sets the code

\* General Electric Co., Spacecraft Dept., Cincinnati 15, Ohio.

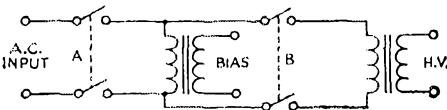


Fig. 2.

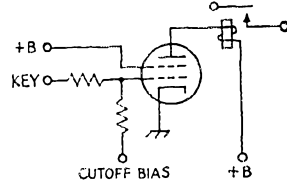


Fig. 3.

speed. The "memory" retains the input instructions until the "control" section carries them out. The "arithmetic" section assures that 1 dash + 1 space = 2 dots + 2 spaces. A most interesting feature of the keyer is the "feedback" from output to operator, by way of the keying monitor. This means that the operator becomes a decision-making part of the system, too. (We must do something about that!)

### Logic Circuits

Other "logical" operations are common in amateur radio work. To help us recognize them, we will examine a few of the logic circuits and discuss their properties.

First, let's consider the AND circuit. Fig. 1 is the symbol. The inputs are fed in at the left. The output leaves at the right. If the inputs A and B and C should happen to be activated all at the same time, an output appears at D. If we designate an activating signal by a 1 and a lack of signal by a 0 (zero), then we describe the AND circuit this way: If A and B and C are 1, then (and only then) the output is 1. Otherwise, the output is 0. An example of AND logic is shown in Fig. 2. If A and B are closed, the high voltage turns on. In Fig. 3, if the v.f.o. is turned on and the key is closed, the keying relay operates.

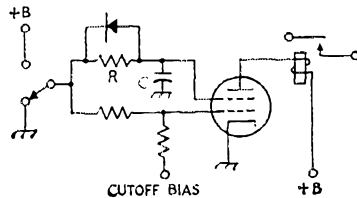


Fig. 4.

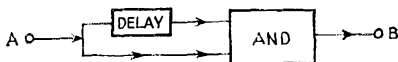


Fig. 5.

A useful tool in the "logic-designer's" bag of tricks is the DELAY circuit. Fig. 4 is an example of DELAY combined with AND. When the switch is closed, the tube builds up current slowly because *C* must charge up through *R*. When the switch is opened, the current stops quickly because of negative bias. The symbol for the logic of Fig. 4 is given in Fig. 5.

Another useful concept is the OR logic, depicted in Fig. 6. Using the 1, 0 idea, we say that if A or B or C (or any combination of the three) is 1, then D is 1. If not, D is 0. Fig. 7 is an example. Note that the larger muting bias does not react on the normal a.v.c. source.

An extension of the OR logic is the EXCLUSIVE-OR, or AND-NOT, shown in Fig. 8. If A is 1, C is 1. If B is 1, C again is 1. But if A and B are 1, C is 0. (C is NOT.) An example of AND-NOT is the "relay-logic" circuit of Fig. 9. If A is closed, signal flows through path X. If B is closed, signal uses path Y. But if A and B are closed, X and Y are both open.

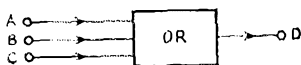


Fig. 6.

Let's look at the NOT-AND or INHIBIT circuit of Fig. 10. Note the hump on the C terminal. If A and B are 1, then D is 1. But if C is also 1, then the circuit is "inhibited" and D is 0. The most famous example of this is the VOX antitrip, in which the receiver audio voltage "inhibits" the voice-operated relay.

The most spectacular feature of the computer is memory. Consider, just as one brief example, Fig. 11. Suppose that if a 1 appears briefly at A, the flip-flop is set in such a state that a 1 is delivered indefinitely at A'. Sometime later we wish to know if a signal has ever appeared at A. We apply a 1 to terminal B, and sure enough, a 1 appears at C. If we like, we can "interrogate" again later and the memory will still remember. Or we can connect the dotted line, and when C shows up 1, the 1 will reset the flip-flop, thus "clearing" the memory. It is best to put a DELAY in the "clear" line, so that the 1 at the output can be detected before it goes to 0.

### The Logic Diagram

Let us consider, as an example of how the logic "elements" may be used to "synthesize" a system which is to perform a specific function, a

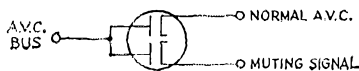


Fig. 7.

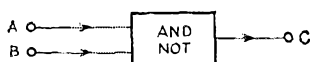


Fig. 8.

hypothetical sequential-keying circuit.

Fig. 12 is the "logic diagram." The rectangles are the important parts of the system. The interconnecting lines and arrows show how the control information "flows." Let us trace out the system, using our 1, 0 terminology.

Closing the key sends a 1 to OR. The output of OR quickly switches the antenna and quiets the receiver to a comfortable monitoring level. The OR output also proceeds to AND-1 and DELAY-1. AND-1 turns on the v.f.o.

The reason for DELAY-1 and AND-1 is this: A simple RC delay circuit will delay a signal fed into it, but will also deliver a signal for a short time after the input is removed. (See, for exam-

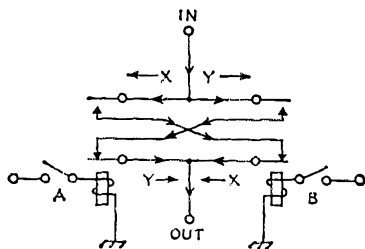


Fig. 9.

ple, Fig. 4.) We want DELAY-1 to hold off the v.f.o. until antenna and receiver switching are completed, but at v.f.o. turn-off time we want fast action. AND-1 assures this.

When the key was closed, HOLD was instructed to deliver a 1 to OR for an adjustable length of time. This keeps the system in "transmit" condition after the key is opened (if we wish).

Also, the key instructs a 1 to AND-2. When the v.f.o. goes into action, a "sample" of the output is rectified and applied to DELAY-2. After the v.f.o. transient is completed, DELAY-2 instructs a 1 to AND-2, and the amplifier turns on. Thereafter, during the HOLD period, the key alone operates the amplifier.

The object of the design, so far, is to go to "transmit" quietly and quickly, without v.f.o. transients appearing in the output.

Let us now proceed to the circuitry associated with the audio system. Assume that our monitoring signal is present at the receiver output. This signal "inhibits" the NOT-AND circuit. The key instructs a 1 to AND-3 and DELAY-3. AND-3 instructs the NOT-AND, but NOT-AND does not turn on the tone generator because it is inhibited.

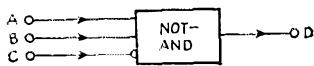


Fig. 10.



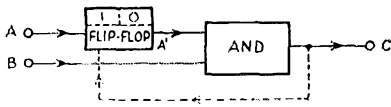


Fig. 11

Thus, we hear *only* our own signal. However, if our monitoring signal is not present, we will have a sidetone to listen to. This is a useful device when you're calling "up-five."

The purpose of DELAY-3 is to insure that if our monitoring signal is present, the tone generator will not turn on prematurely. AND-3 does the same kind of job as AND-1.

Finally, we note that OR can be instructed by the break-in manual switch, for conventional c.w.

### Conclusion

The preceding example is not to be construed as "circuit design" but rather as "logic design," and the logic diagram is to the logic designer what the schematic diagram is to the circuit designer. Once the logic of the system has been defined, the circuit designer has a "road map" to work with.

Imagine, for a moment, that the keying circuit just described is designed with a control panel with a multitude of switches to perform the different operations in the proper sequence and at high speed. A well-trained operator, using his judgment, would be required to see that everything was done just right. Thus, we see that

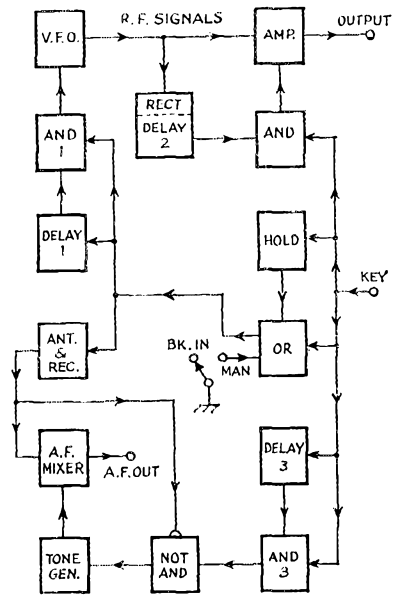
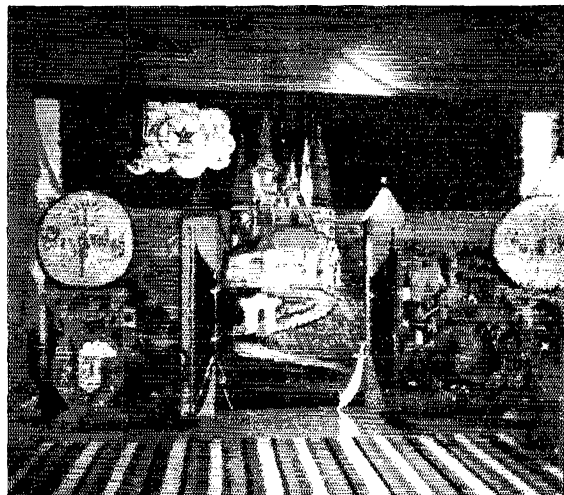


Fig. 12

because the machine has the ability to perform a large number of operations according to a definite plan, or "program," in lieu of a human operator, the machine can, in a sense, "think" for itself. And that's why we call it "logic."

QST

## Strays



An outstanding initiation ceremony for the Royal Order of the Wouff Hong was conducted at the West Gulf Division Convention by Corpus Christi hams under the chairmanship of Comdr. Bartlett, W5IAA. Other hams participating were W5HQR, K5WQF, W5QEM, W5QKF, W5RPH, K5EBK, W5BKG, WN5EDW and WN5DQH. Specially-constructed scenery and lighting effects made the presentation particularly effective.

## CROSS-MODULATION AND TRANSDUCTANCE CURVES

Coordinated Science Lab.  
University of Illinois  
Urbana, Ill.

Technical Editor, *QST*:

A recent article concerning bandpassed front ends for receivers<sup>1</sup> emphasizes the importance of low cross-modulation in the r.f. amplifier tube. Tube types which will operate with low cross-modulation and the maximum desirable grid-voltage variation can be determined in many cases by inspection of tube characteristic curves. Considering the many tube types available, this test should prove useful. In many cases, as will be explained, it is only necessary to consult the tube characteristic plot of transconductance vs. grid voltage, and design to have the grid voltage swing over the *straight-line* portion of this curve.

Cross-modulation occurs because of plate-current variation proportional to greater than the second power of grid-

Andrade, "Recent Trends in Receiver Front-End Design," *QST*, June, 1962.

voltage variation.<sup>2</sup> That is, if the plate current has no component which varies as the third power of the grid voltage, no cross-modulation occurs. While it is also true that a tube whose plate current varies only in direct proportion to the grid voltage, and has no "square-law" component (second harmonic distortion), would have no cross-modulation, this requirement is more strict than necessary. Tube designs approaching this "no-distortion" characteristic are inferior in noise level, dynamic range, and ability to operate with a.g.c.

To select a tube type and determine its maximum permissible grid-voltage swing for low cross-modulation, it is necessary to find a region of the plate-current vs. grid-voltage plot which has only linear and square-law curvature, and this specifies a parabola. A parabolic region can be identified, but only with great difficulty. However, an easier method exists. The plot of the slope of a parabola at each point always gives a straight line. The plot of the *slope* of plate current at each grid voltage is the tube characteristic of transconductance vs. grid voltage. Therefore, the straight-line portion of the transconductance, or  $\mu_m$  vs. grid-voltage curve<sup>3</sup> shows the region of grid-voltage operation where low cross-modulation will occur. Ideally, the peak-to-peak excursion of the sum of all grid-voltage components (peak-to-peak voltage due to all r.f. signals in the passband, plus bias, plus a.g.c. voltage) should not exceed the grid-voltage range defined by the straight-line portion of the transconductance curve.

Curves of transconductance vs. grid voltage published in tube data sheets are directly applicable for choosing tube types and operating conditions if they are on linear scales<sup>4</sup> and if they are applied to circuits where the plate load impedance is small compared to tube plate resistance.<sup>5</sup> This includes, to a good approximation, almost all circuits of pentodes, tetrodes, cascode triodes, and single triodes with low load impedance (as compared to tube plate resistance). The latter is the case of the circuit of Fig. 3, page 19, of Andrade's article.<sup>1</sup> A plot of transconductance vs. grid voltage for the paralleled sections of the 6386 in this circuit is shown in Fig. 1, where the straight-line portion indicates that the total grid-voltage excursion (signals plus total bias) should be held within the bounds of -2 and -6 volts (the straight-line region) to achieve low cross-modulation. The optimum bias is then -4 volts. The usual caution about considering published tube curves as more than the average characteristics of a number of units should be observed, but this is not too much of a disadvantage in such a preliminary inspection test as this.<sup>6</sup>

It is also interesting to note that requirements for low-spurious-frequency mixers for receivers and s.s.b. exciters are similar, since no mixing can occur unless the tube is operated over a nonlinear range. If the tube is operated over a range resulting in greater than square-law curvature, spurious mixer-product frequencies are generated at all possible sum-and-difference combination frequencies of the higher harmonic components of the plate current.

— Jay Gooch, W9YRP

<sup>2</sup> Terman, *Electronic and Radio Engineering*; McGraw-Hill Book Co., Inc.

<sup>3</sup> This curve must be plotted on linear graph paper.

<sup>4</sup> Remote- and semiremote-cutoff tubes appear to be customarily plotted on semilog paper, probably for convenience in fitting the curve on the page, while sharp cutoff tubes are plotted linearly. Curves from published semilog characteristics should be replotted on a linear scale.

<sup>5</sup> For the case of plate load impedance not small compared to the tube internal plate resistance (usually a triode), the plate current varies significantly due to plate-voltage variation as well as grid-voltage variation, and the plate swing must then be considered. In such cases, the tube-data-sheet transconductance curve must be modified before using as described.

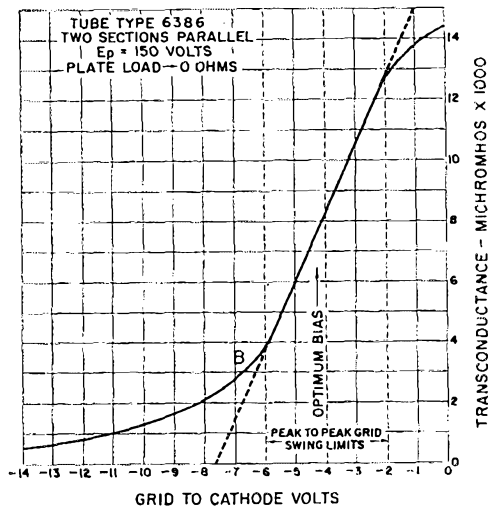
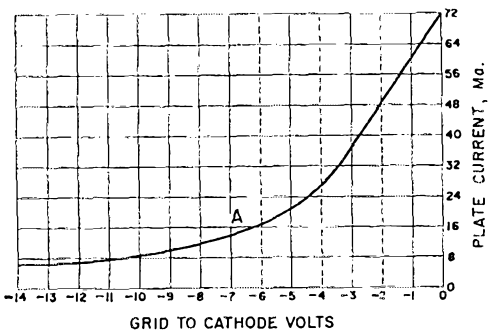


Fig. 1—The plate current (proportional to tube output voltage) which flows in response to grid signals is shown in curve A. The parabolic portion of this curve provides operation free of curvature greater than square law, and therefore operation free of cross-modulation.

This region of grid operation is identified by the straight-line portion of curve B, the plot of transconductance vs. grid voltage, as being between -2 and -6 grid volts.

## TRANSISTORIZED V.X.O.

Box H.G. 145  
Highlands  
Southern Rhodesia

Technical Editor, *QST*:

The variable crystal oscillator provides a very simple

method for obtaining the extreme stability and calibration accuracy normally only obtained with heterodyne oscillators. The VXO can be constructed without the extreme mechanical stability necessary for the v.f.o.; although good construction is important, it would be impossible for the VXO to get off frequency as can a v.f.o. if a trimmer comes loose.

The VXO operates by shifting the series-resonant point of the crystal, as described by Shall,<sup>1</sup> by using a series inductance. The original circuit I used obtained the series inductance by mutual-inductance coupling, Fig. 1, which

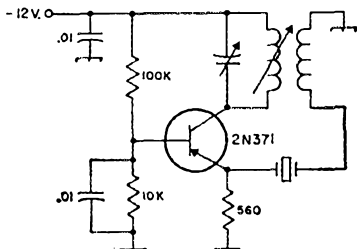


Fig. 1 (Rogers)

also maintained oscillation. Although this circuit worked well and provided up to 2 per cent of the fundamental in shift, it was found to be too critical of the transistor parameters, and large drift occurred if the supply voltage changed.

Further experiments were conducted with a circuit which separated the crystal circuit from the collector circuit, by using a separate series inductance, Fig. 2. This circuit is similar to that used by Galeski<sup>2</sup> and was arrived at after trying to solve some inherent problems in the VXO. The first problem was that of falling output as the oscillator frequency moves farther from the crystal's normal resonant point. To cure this defect, a resonant circuit was placed in the collector lead, and adjustment of  $L_2$  and  $C_1$  maintains a constant output to within 1 db. throughout 80 per cent of the coverage and to within about 3 db. for the complete range of the tuning capacitor  $C_3$ .

Although with this VXO it was found possible to shift the crystal frequency by about 5 per cent of the fundamental, it was actually adjusted to a shift of 200 kc. in 9 Mc., as this was found to be the limit for which a very high standard of stability could be claimed. The oscillator's coverage is governed by the type of crystal, the series inductance  $L_1$ , and the capacitor  $C_2$ . As the series-resonant point of the inductance and the shunt capacitance is approached, the shift increases until the oscillation is no longer controlled by the crystal.  $L_1$  is made large enough to shift the frequency by about half the coverage desired with  $C_2$  set at minimum capacitance, and then  $C_2$  is adjusted to give the exact frequency range.

$L_1$  has to be of v.f.o. quality, and in this 9-Mc. experimental oscillator it was made by winding 80 turns of No. 34 S.W.G. close-spaced on a  $\frac{3}{8}$ -inch form. A core could be used to provide a greater degree of adjustment. The only sensitive part of the circuit is the junction of the crystal and  $L_1$ . This junction should be well secured as small capacitance changes cause frequency drift. The trimmer  $C_2$  should also be well secured. A large tuning capacitor was used to produce a large shift without having to make the series inductance larger, as the larger the inductance the poorer the stability. A slightly smaller capacitance would give an almost constant output over the range. Output is best taken through a link coupled to  $L_2$ .

The frequency stability was checked by beating the oscillator with the markers from a 100-kc. crystal. Intermediate points were checked with a few crystals in my KWM-1 that were within the range of the oscillator. A junction heating drift of about 200 cycles maximum occurs in the first 30 seconds after connecting the supply, after which a further temperature drift of 100 cycles or less occurs in the next five minutes. A 10-per cent change in supply voltage causes less than 100 cycles change in output frequency. The most serious frequency drift is caused by temperature changes. At the low frequency end — that is,

<sup>1</sup> Shall, "VXO — A Variable Crystal Oscillator," *QST*, January, 1958.

<sup>2</sup> Galeski, "The 'Imp TR,'" *QST*, December, 1961.

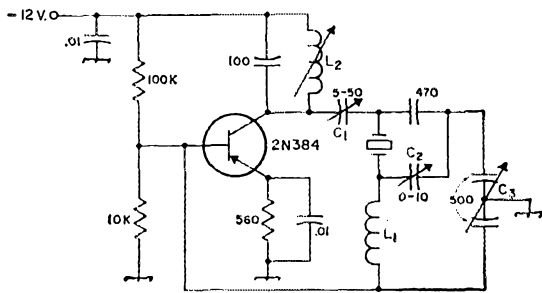


Fig. 2 (Rogers)

furthest away from the crystal's natural frequency — a change of 10 degrees F. causes 1-ke. change, but this improves to an almost negligible change as the crystal frequency is approached. If the oscillator is left in zero beat with a crystal source after having been on for 5 minutes, it will remain at zero beat for several hours under normal conditions, the drift being only a few cycles per hour.

I would like to acknowledge the help and encouragement given by W6BAF, and express my hope that others will try the VXO.

— Alan E. E. Rogers, Z6GJG

## COMMENTS ON THE 1296-MC. PARAMP OF JAN., 1961, *QST*

3111 Forbes Ave.  
Santa Clara, California

Technical Editor, *QST*;

After several hundred letters since the above article<sup>1</sup> appeared in *QST*, the author would like to suggest the following additional points:

1) In every case wherein the paramp was built as described, it has worked as advertised. It has proved so stable that it can be mounted out of sight, so long as the pump (klystron and attenuator) controls are front-paneled.

2) With one exception (a defective thermally-sensitive diode), instability has been traced to either the klystron power supply or a poor attenuator. The klystron itself is extremely sensitive to stray breezes and voltage transients. The attenuator described in the article does require readjustment. The rate of change of attenuation vs. mechanical position is large, and therefore critical in adjustment. Replacement with a surplus or commercial unit is helpful.

3) A definite contribution to stable operation is the addition of a physically small (tantalum or transistor-circuit type) 10- to 20- $\mu$ f. capacitor from the diode bias feed-through capacitor to ground. Shielding of the bias lead is an additional aid. Modulation of this lead by stray noise is perhaps one of the biggest sources of instability in the operation of the paramp. Once this change has been made, the bias adjustment will be smooth.

4) When the amplifier is operated near maximum gain, changes in the antenna impedance, such as are encountered with the antenna looking at nearby buildings, can cause changes in gain, because of the sensitivity of the paramp to changes in input impedance. However, unless your converter is a real noise box, there is no real reason to operate anywhere near maximum gain (20 to 30 db.). A gain value of approximately 15 db. should be sufficient to establish your system noise figure as that of the paramp.

5) When the paramp is used with your crystal converter, some care is required to insure that a reasonable rejection scheme is supplied to prevent local-oscillator energy from getting back to the paramp. This can create some tune-up problems. Since the noise figure of the system is established by the paramp, and there is plenty of gain available, the author recommends careful tuning of the signal tank in the crystal converter, in order to reject as much as possible of the local-oscillator energy, and the addition of perhaps a 3-db. pad in the coax line from the paramp to the crystal converter.

6) The author, in sheer self-defense, no longer reacts to questions that do not include a stamped, self-addressed envelope.

— W. O. Troetschel, K6UQH

<sup>1</sup> Troetschel and Heuer, "A Parametric Amplifier for 1296 Mc.," *QST*, January, 1961.

## SPEAKER DAMPING

International Telephone and  
Telegraph Corporation  
320 Park Ave.  
New York 22, N. Y.

Technical Editor, *QST*:

Fig. 1 is a simplified diagram of audio output stages such as are used in many ham receivers. As will be evident, I am recommending the addition of negative feedback to the output stage.

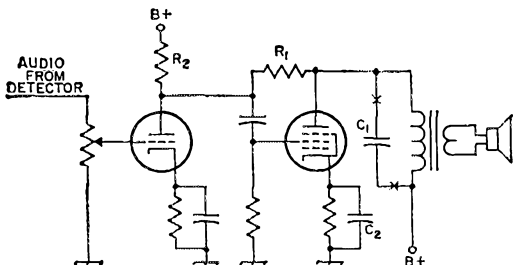


Fig. 1—Negative feedback for reducing loudspeaker transient response.  $R_1$  should be adjusted as described in the text; start with a value approximately equal to the plate load resistance,  $R_2$ , of the preceding stage. Components without circuit designations are those in the original circuit.

The reason is as follows: As is well known, loudspeakers (and headphones) unavoidably have resonances. In addition to the basic resonance of the system, higher modes of resonance also are present. All of these modes can be excited and will be converted to sound waves by shock excitation on the application of an electrical signal of sufficiently short rise or decay time. These are the so-called transients.

But some basic enemies of clear radio communication — noise and sharply keyed signals — contain exactly such transients. They shock-excite loudspeakers and cause them to emit sound as interference in every mode of resonance the transducer may have. This sound does not end immediately with the transient; having been excited into vibration, the transducer will continue to emit sound after the end of the transient. Under noisy receiving conditions, this ringing adds to the general hash that interferes with weak signals.

The transient itself can be treated electrically by clipping and so forth, but transducer ringing can still occur; ideally there should be no ringing to interfere with signals following the transient.

A simple way to damp the transducer sufficiently to stop ringing is by negative feedback. The simplest and most foolproof method for the usual receiver is that shown in the diagram. If capacitor  $C_1$  is present across the primary of the output transformer, it should be removed. If capacitor  $C_2$  is not present, it should be added; the usual value is 25 microfarads at 25 volts. The receiver should then be tuned for a heterodyne (or other source of continuous tone) and the audio-frequency voltage across either the primary or secondary of the output transformer measured. Without touching the receiver volume control, a value for  $R_1$  is then chosen by trial-and-error to decrease the audio-frequency voltage to, say,  $\frac{1}{2}$  or  $\frac{1}{4}$  its value without  $R_1$ . This presumes that, as is usually the case, there is more than ample gain available in the receiver; the loss can be compensated by turning up the volume control.

You will often be surprised if you will tune the receiver to a weak signal in the presence of noise and listen to the results obtained when  $R_1$  is inserted and removed, compensating at the same time for the change in gain by using the volume control. The desired signal appears to stand out from the hash with considerably more clarity on insertion of  $R_1$ .

The circuit is not new. This application of negative feedback has been recommended for years for a.c. d.c. receivers having cheap loudspeakers, when sufficient gain is available to recoup the loss due to insertion of feedback.

— *Jes B. Schlaikjer*

## TRANSISTOR "PREFERRED" TYPES

Hallamore Electronics Div.  
714 North Brookhurst St.  
Anaheim, Calif.

Technical Editor, *QST*:

In comment on "Transistor Types Recommended for Amateur Applications" (March, 1962, *QST*), I feel that to print only transistor types which are in the "entertainment" catalogs would place a severe limitation on the more progressive amateur. There should be a few devices publicized which will enable advanced amateurs to push the state of the art in u.h.f. or higher-power solid-state transmitters.

To qualify my remarks, I should say that our company has been constantly engaged in v.h.f. and h.f. solid-state space communication equipment for more than three years. Our developments have necessitated close liaison with the leading manufacturers of r.f. transistors. Each breakthrough in noise figure, frequency, and power has been followed by rapid application in our lab. So our struggle has always been limited in success by the availability of transistors which are good enough. We have had to stay "on top of" more than thirty companies in order to optimize the watts-megacycles-decibels/dollar.

The accompanying list reflects our experience with transistor r.f. amplifiers, as applicable to the commonly limited budget of the amateur. The low-power devices listed are in the price range 50 cents to three dollars, with the exception of the 1000-Mc. type. The family of medium-power output amplifiers is mostly in the eight-dollar category. It should be noted that distributors list only a representative sample of a company's line, but if the amateur is aware of the fact that carrying a line implies complete stocking of that line, he need only know the type number and manufacturer to determine who stocks the device. Determination of the price and availability of the device requires only a phone call or a post card.

It is probable that many transistors which are the "best devices" for particular amateur applications will always be in the industrial catalogs exclusively. This is natural since the big market is found in industry.

— *James M. Couter, KB6AP, Sr. Electronic Engineer, Advanced Communications Group*

### Today's R.F. Transistors for Amateur Use Receiver or Small Signal

R.F. Amp. or Preamp.	Recommended
to 600 Mc.	2N1742 (Philco)
to 150 Mc.	2N1745 (Philco)
to 8 Mc.	2N1746 (Philco)
to 2 Mc.	2N1785 (Philco)

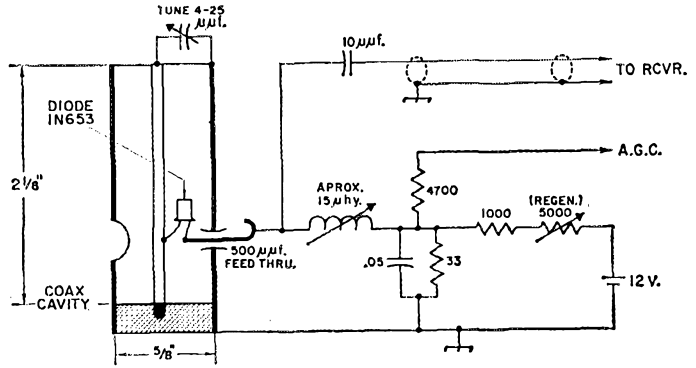
Local Oscillator	Recommended
to 1000 Mc.	2N917 (Fairchild)
to 600 Mc.	2N1742 (Philco)
to 200 Mc.	2N1744 (Philco)
to 10 Mc.	2N1746 (Philco)
to 2 Mc.	2N481 (Raytheon)

Mixer Converter	Recommended
to 600 Mc.	2N1743 (Philco)

### Transmitter Oscillator — low power (see Receiver types)

Output Power Amplifier	Recommended
to 1000 Mc.	2N917 (50 mw.) (Fairchild)
to 230 Mc.	2N743 (300 mw.) (Texas Instruments, Sylvania)
to 150 Mc.	MM511 (500 m.w.) (Motorola)
	2N707 (300 mw.) (Fairchild, Motorola, Texas Instruments)
to 30 Mc.	2N697 (0.6 w.) (Fairchild, Raytheon, Texas Instruments, Hoffman, Sylvania)
to 10 Mc.	2N1907 (80 w.) (Texas Instruments)

Fig. 1—Tunnel-diode super-regenerative receiver for 435 Mc.



### T.D. SUPERREGEN

Seiscor  
Box 1590  
Tulsa, Okla.

Technical Editor, *QST*:

Recently I have been working on an interesting and, I believe, somewhat original receiver. It is derived from earlier similar receivers,<sup>1</sup> and appears to hold a great deal of possibility for u.h.f. ham use.

The basis of the test receiver was a self-quenched tunnel-diode oscillator. It had been noted that even low-cost tunnel-diode units would produce harmonics and amplification up to 800 Mc. and better. Thus it should be very easy to exploit this quality in the form of an oscillator. It is much easier to obtain oscillation from the diode than simple amplification, and wanting to take the simple route, it was decided to give a u.h.f. superregenerative receiver a try.

First a simple cavity for 1250 Mc. was designed for use with a Texas Instruments 1N653 Gallium Arsenide (\$11.70) tunnel diode. It was hoped that the diode would oscillate at this frequency. Second, a relaxation oscillator with a frequency of 1 Mc. was designed to operate with the same diode when located in the cavity. This becomes now a standard superregenerative receiver with a very minimum of parts. Tests, however, indicated that despite the fact that there was some detection at 1250 Mc., it was doubtful that oscillation was occurring. Only very strong signals could be received.

Additional testing indicated that the self-resonant frequency of the 10-18 style diode plus a total of 4 mm. of leads was about 500 Mc. A second receiver was designed with a coaxial tank which resonated at 435 Mc. (Fig. 1). Around this, the self-resonant frequency, the reception characteristics improved markedly. Quite a low level of signal was detectable using only two stages of transistor audio. No tests were made to determine the minimum detectable signal.

A study of the characteristics of the superregen tunnel-diode receiver indicated that it should be possible to add a simple f.m. receiver to the circuit and receive a.m. signals which have been converted to f.m. at the quench frequency. This was tried with the simple setup shown in Fig. 2.

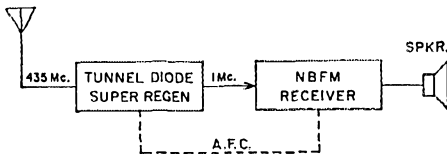


Fig. 2—Using the superregen as an a.m.-to-f.m. converter, for use with f.m. receiver or detector.

Sensitivity was measured at 20 microvolts (30 per cent modulated, 1000 c.p.s. tone) for the minimum detectable signal. No attempt was made to optimize the circuit constants or antenna coupling. Slope detection using a Hallicrafters S-40 as the detector of the quench frequency gave similar results. Narrow-band receivers as detectors appear to be tricky due to the frequency shift of the quench

<sup>1</sup> Skalski and Kabaservice, *Proc. IRE*, vol. 50, pp. 215-6.

frequency. It is expected that a crystal discriminator plus automatic frequency control would give one microvolt sensitivity or better.

The application of this type of receiver to the wide-open spaces of u.h.f. above 1000 Mc. awaits only the introduction of a low-priced u.h.f. tunnel diode package. When that day comes we should see all-solid-state handy talkies at really high frequencies. The diode would, of course, be both transmitter and receiver. Even with today's standard components it should be possible to build simple, but very sensitive, receivers for the 2-, 1 1/4- and 3/4-meter bands.

I would be very interested in hearing from anyone using similar tunnel-diode u.h.f. gear.

— Robert C. Wilson, W5EIM

### NEGATIVE RESISTANCE

35 DeSoto St.  
Providence 9, R. I.

Technical Editor, *QST*:

In reply to a letter in the July "Correspondence from Members" section, may I present the following information:

The field of negative resistance has already been explored by engineers both here and abroad.

The following references may aid Mr. Cascio, KN1TZN, in his search for a powerless amplifier:

- 1) "Network Synthesis with Negative Resistors," *Proc. IRE*, May, 1961, p. 907.
- 2) "Additional Negative Resistance Oscillation Modes," *Proc. IRE*, July, 1961, p. 1225.
- 3) "Optimum Negative Resistance Amplifiers," *Proc. IRE*, June, 1961, p. 1043; Nov., 1961, p. 1687.

I am sure that, since Mr. Cascio's letter appeared in the July and not the April issue, we may take it seriously!

— N. Paul Marin

### TRANSISTOR TESTING

Box 412  
Sedona, Ariz.

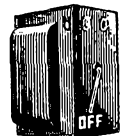
Technical Editor, *QST*:

Re the note by W4UI in June 1962 *QST*, page 59: As has been said many times in many places, including *QST*, ohmmeters can cause excessive current to flow in a transistor, burning it up, or the voltage can be excessive for the transistor type. As an example, a Heath V-7 v.t.v.m. has a short-circuit current of around 140 ma. in the "Ohms X 1" position. Also, many ohmmeters do not have the same polarity as in normal voltage measurement; i.e., the red lead may have negative voltage on it rather than positive.

Perhaps if we must use ohmmeters on transistors we might recommend that a series current-limiting resistor be used in series with the ohmmeter.

— John K. Green, W6MJC/7.

**SWITCH  
TO SAFETY!**



# Announcing the 29th ARRL Sweepstakes

November 10-12 and 17-19

## CONTEST PERIODS

<i>Starts</i>	<i>Ends</i>
Saturday Nov. 10 2300 GMT	Monday Nov. 12 0801 GMT
Saturday Nov. 17 2300 GMT	Monday Nov. 19 08010 GMT

Now's the time to get set for the 29th Annual ARRL Sweepstakes. This popular activity affords you an excellent opportunity to pit your own operating know-how against the best operators in your ARRL section. Every amateur in the League's Field Organization is urged to participate in what some amateurs call the most interesting contest of the year.

Rules are the same as last year. The contest will run over two consecutive week ends with a maximum allowable operating time of 40 hours out of the possible 66 for each entry (phone or c.w.). You may operate both modes, but please file separate logs. A certificate will be awarded to the highest scoring single-op in each ARRL section (plus Yukon-N.W.T.). A certificate also goes to the top Novice, Technician, and multiple-operator entry for those sections with sufficient entries; see the rules for award details. Within a club, single operator entries can compete for the club certificate given to top c.w. and phone scorers with an engraved cocobolo gavel going to the club with the highest aggregate score. Please be sure to mark your logs accordingly if you're participating for your club award.

Newcomer? Well, it won't take you long to follow the SS procedure. Listen a while to "catch on", call CQ SS or answer such a call, exchange preambles as shown in the form and keep your log properly.

For this contest Yukon-N.W.T. (VE8) counts as a separate multiplier while Newfoundland and Labrador (VO) count as Maritime.

Please read and follow the rules carefully. We guarantee you'll be risking duplicate QSOs after the first few dozen contacts, so we do suggest use of ARRL *Operating Aid No. 6*, a check list of stations worked. This and log forms are yours for the asking. Please request them today from the ARRL Communications Dept., 38 La Salle Rd., West Hartford 7, Conn. Logs must be postmarked by Dec. 19, 1962, to be eligible for score listing and awards.

## 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 72 sections. Yukon-N.W.T. (VE8) counts as a separate section. 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) *QSO:* 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 (see p. 6) worked during the contest is the "section 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(s) 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"  $\times$  the "sections multiplier"  $\times$  the "power multiplier."

5) *Reporting:* Follow the sample shown in reporting contest results. 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 periods. 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 19, 1962, to insure eligibility for *QST* listing and awards.

6) *Awards:* Certificates will be awarded to the highest 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 licensees 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 licensees submit phone logs. A certificate also will be awarded to the highest scoring Novice and Technician from sections of less than three entries . . . that in the opinion of the Awards Committee

## HOW TO SCORE

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 used.

For final score: Multiply totaled points by the number of *different* ARRL sections worked; that is, the number in which at least one bona fide SS point has been made. Multiply c.w. scores by 1.25 and phone scores by 1.5 if you used 150-watts-or-less transmitter input at all times during the contest.

## EXPLANATION OF "SS" CONTEST EXCHANGES

<i>Send Like a Standard Msg. Preamble, the.....NR</i>	<i>Call</i>	<i>CK</i>	<i>Place</i>	<i>Time</i>	<i>Date</i>
<i>Exchanges:</i> Contest serial numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (RST report of station worked)	Your ARRL section	Send GMT time of transmitting	Send date of QSO
<i>Sample</i>	NR 1	W1AW	589	CONN	2301 NOV 10

displayed exceptional effort. Only single-operator stations are eligible for certificate awards. Multiple-operator scores will receive separate QST listing 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. Segregate 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 disqualifications. In all cases or question, the decisions of the ARRL Contest Committee are final. QST

### SUMMARY OF EXCHANGES ARRL SWEEPSTAKES CONTEST

STATION.....**W1AW**..... CW or PHONE?.....**C.W.**..... SECTION.....**CONN**.....

B A N D	Time on or off Air	S E N T (1 point)						R E C E I V E D (1 point)						Nr. diff Secs as wkd	P O I N T S
		NR	STN	CK RST	Sec- tion	TIME	DATE (Nov)	NR	STN	CK RST	Section	TIME	DATE (Nov)		
3.5	2300	1	W1AW	589	CONN	2301	10	2	W3ALB	589	E PA	2302	10	1	2
		2		589		2303		5	W4JAT	589	VA	2304		2	2
		3		579		2305		5	W1EZD	579	W MASS	2305		3	2
		4		359		2315			W3NOH						1
	2325	5		579		2321	▼	2	K100V	599	W MASS	2322	▼		2
14	1900	6		569		1903	11	189	KH6VD	579	HAWAII	1905	11	4	2
	1915	7		589		1906		201	W0PHR	599	S DAK	1907		5	2
3.5	2105	8		599		2107		98	W1AZW	599	W MASS	2108			2
						2120		57	W3NOH	589	E PA	2120			1
	2140	9	▼	569	▼	2128	▼	307	W2AYJ	579	N LI	2130	▼	6	2

**Summary:** (Enter below on last sheet used)

Bands used. **3.5, 14**.....; Nr. diff. stns. wkd...**9**.....; Nr. diff. sections wkd...**6**...  
 Total Hours operation..**1:15**..; Input power.....watts; Type transmitter (tube line-up  
 if home-built).....; Receiver.....  
 Antennas.....  
 Assisting person(s) name(s) or call(s) etc.:.....

**SCORING:** ..**18**... points X **.6**.. Sections X **1.25** Pwr Mult.\* = **135**... CLAIMED SCORE  
 \*Power multiplier: C.W. -- 1.25 for 150 watts or less input at all times. Phone -- 1.5  
 for 150 watts or less at all times. Otherwise the multiplier is 1.0.

Participating 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 Address

# • Recent Equipment —

## The Electrocom FSC-250

### Frequency Shift Converter



A FAVORITE slogan of the RTTY gang is that "RTTYers build." This may, however, have been born of necessity, for in the past there has not been a great deal of commercial apparatus available to the would-be RTTY operator. This picture is changing. Because of the continuing availability of RTTY machines, either through military surplus or through such sources as W6AEE and W9GRW, more and better RTTY terminal equipment of commercial manufacture is appearing on the market.

#### The Electrocom Model FSC-250

This frequency shift converter operates on the audio signal from any receiver, converting the frequency shift signals to the necessary "marks" and "spaces" which will key the RTTY machine. The block diagram of Fig. 1 shows the tube and circuit line-up, and the photographs show the mechanical arrangement. Briefly, the tone input is amplified and then saturates a limiter so that the limiter output contains only frequency variations, not amplitude variations. A cathode-follower matches the impedance of this limiter to the space and mark filters which follow. (The standard filters supplied are for an 850-cycle shift, but other frequencies are available on special order.) The signals then go through space and mark amplifiers and detectors, through a pulse shaper, and then into the keyer which feeds the RTTY machine. All of this is, of course, standard practice in most any RTTY terminal unit. This unit, however, has several interesting features which add to its versatility and reliability (and its cost!).

Provision is included for some optional plug-in input filters, to provide additional selectivity

ahead of the limiter. The better the selectivity of your receiver, the less the need for one of these optional filters.

An autostart control is included by using half of a 12AT7 as a detector and cathode follower to pick up a signal from the mark rectifier. This signal is fed to the other half of the 12AT7, which acts as a relay control tube. When one second of mark signal is received, the relay closes, and the relay contacts may be used to turn on the RTTY machine.

There are three power supplies in this unit. One, using a silicon rectifier, supplies loop current for the RTTY machine. Another supply using a 6X4 supplies all positive voltages for the converter, while the third supply, also using a 6X4, supplies all the necessary negative voltages for the converter.

A two-inch monitor scope takes tone voltages from the output of the mark and space amplifiers and allows a visual indication of proper receiver tuning. In addition, the scope tube and the tuned filters permit the converter to be used in adjusting transmitter shift. It is simply necessary to tune in the transmitter between mark and space, and adjust the transmitter shift control for maximum crossmark on the monitor scope.

Output terminals on the back of the unit provide connections to the loop power supply and vacuum tube keyer circuits for quite flexible operation of the unit. Duplex, retransmission, and keyboard operation are available.

Across the front panel are four knobs and the monitor scope. There is a bias adjustment to provide more reliable copy if an incoming signal contains bias distortion. A channel selector permits the converter to copy the mark channel

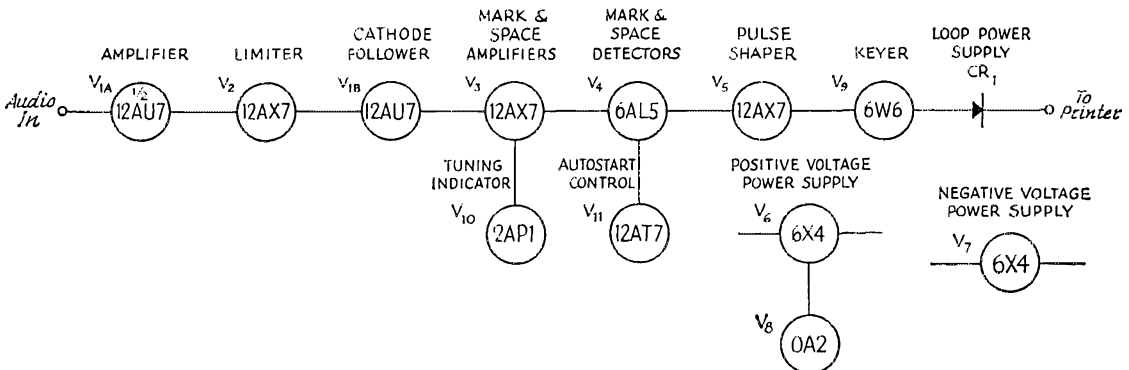


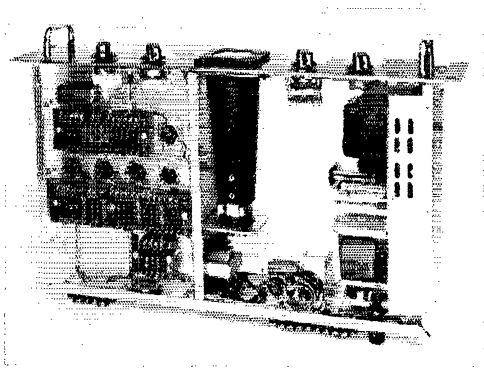
Fig. 1 — Block diagram of the Electrocom Model FSC-250 Frequency Shift Converter.



only, both channels in polar operation, or the space channel only. When there is interference on either the mark or space channels, the channel selector is set to receive from the clear channel and the bias control is adjusted for best printed copy. One-channel operation may also be used for receiving c.w. signals for keying recorders. The third control is the keying control, which selects the keying mode of the d.c. loop supply. Local position allows the loop supply to be used for local keyboard operation of the RTTY machine, disabling the scope and preventing the converter from keying the d.c. loop. The normal position is used for regular operation, while the reverse position allows a signal shifted in reverse to be copied without retuning the receiver. The mark position allows the RTTY machine to be locked in a marking condition during no signal or c.w. identification periods. The converter is keyed in a normal manner after receiving approximately one second of mark signal. It continues to operate normally until approximately one second of continuous space signal is received, at which time the machine locks in a marking condition. The auto position allows automatic starting of the RTTY machine. Upon reception of one second of mark signal, the autostart relay closes and turns on the printer motor. The last front panel control is the on-off power switch.

Along the back edge of the chassis are controls for adjusting the loop current, channel balance, and scope trace.

The instruction book supplied with this converter is clear and concise. It contains the usual master schematic and list of parts, and also provides diagrams for the several modes of operation and connection to the RTTY machine. Also included are the schematics for an external keyer which will permit extended flexibility of use, and a frequency shift keyer circuit for use with the transmitter oscillator. The photographs clearly identify the various components, and the



Underneath view of the RTTY converter. The section to the left contains the limiter, space and mark detectors and filters. In the center is the monitor scope, while the power supplies and keyer tube are at the right. All components are clearly identified both in the schematic and on the chassis by part number, so that tracing out the circuits is very simple (and quite a change from some of the gear we've seen!). Across the back edge of the chassis are terminal strips for audio and teleprinter connections, and controls for adjustment of the scope monitor.

terminal strips on which the resistors and capacitors are mounted (see photograph) identify each part by schematic circuit number.

— R.L.B.

### Electrocom FSC-250 Frequency Shift Converter

Height: 3½ inches.

Width: 17 inches behind the panel.

Depth: 11 inches.

Weight: 14 pounds.

Price Class: \$325.00.

Manufacturer: Electrocom Industries,  
1105 N. Ironwood Drive, South Bend,  
Indiana.

## Knight Model P-2 S.W.R. Meter

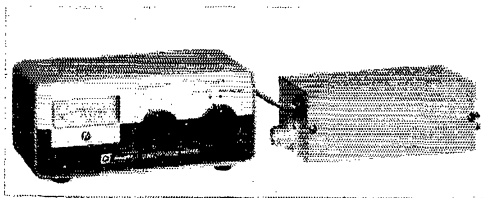
AN s.w.r. bridge is a valuable accessory for any amateur station for antenna matching, making s.w.r. measurements, and indicating relative power output. The Knight model P-2 s.w.r. meter will do all of these and is in a price class that makes it a difficult item to duplicate with store-bought parts.

The bridge consists of two units connected by a 4-foot cable. An indicator box houses a 100- $\mu$ a. meter which is calibrated in s.w.r. (1:1 to 20:1) and relative power (0 to 10). Also mounted on the indicator box are a SENSITIVITY control and a two-position (FORWARD and REFLECTED) rotary switch.

The second unit contains the coupling circuit which is quite similar to the one used in Monimatch, Mark II.<sup>1</sup> One innovation is a simplifica-

tion of the original design: instead of two strips to form the outer-conductor "trough," the assembly is mounted low in the box so that one side of the box replaces one strip.

Knight gives the frequency coverage of the s.w.r. meter as 1.8 to 432 Mc. However, it appears



The Knight-Kit s.w.r. bridge. The indicator box is to the left and the coaxial line section box is at the right. A 4-foot length of cable connects the two boxes.

<sup>1</sup> McCoy, "Monimatch, Mark II" *QST*, February, 1957.

to perform well throughout the entire 420-450-Mc. band. We tried the bridge at 440 Mc. and, after some minor adjustment of the position of the diodes on the pick-up wires, a good null was obtained. We also checked the bridge in a transmission line at 440 Mc. and found it put a negligible impedance "bump" in the line.

A few more specifications: It takes about 45 watts at 160 meters for full-scale meter deflection. The sensitivity increases more or less in proportion to frequency, and it requires only about  $\frac{1}{2}$  watt on the  $\frac{3}{4}$ -meter band for full-scale meter deflection. The maximum power rating is one kilowatt. Resistors are furnished for using the bridge in both 50- and 72-ohm unbalanced lines.

Included with the bridge kit is an assembly manual which contains information on alignment, service hints and a trouble-shooting chart.

— E. L. C.

### Knight P-2 S.W.R. Meter

	Indicator	Coupler
Height:	2 $\frac{3}{4}$ inches	2 inches
Width:	6 $\frac{1}{2}$ inches	5 inches
Depth:	3 inches	2 $\frac{1}{2}$ inches
Weight:	About 2 pounds	

Price class: \$15

Manufacturer: Allied Radio Corp., 100 North Western Ave., Chicago 80, Illinois.

## Strays

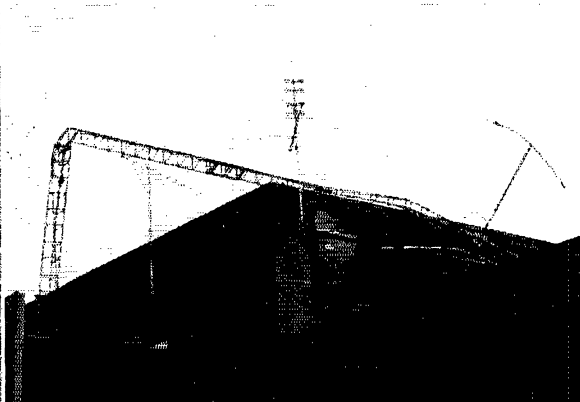
Another tragic accident occurred near Montreal in July — VE2DR, ARRL SCM, has sent us the details. A young man erroneously identified by the newspapers as a ham (he was *not* a ham) requested the help of his father and several neighbors to raise a 40-foot steel tower which had a 15-foot whip on top. A 7.2-kv. power line ran overhead, and the distance to it was apparently misjudged. The young man was on the roof, hoisting by means of a rope, while six others were lifting the tower at ground level. The whip struck the power line, and three of the men on the ground probably died instantly. All of the others, including the man on the roof, were badly burned and required hospital treatment. One of the men received additional injuries when the tower fell back to the ground and struck him. This is another example of the hazards in raising antennas in the vicinity of high-tension lines.

W0GML received a plaque from the CO of the Naval Reserve Training Center in Wichita for having been the first ham to make contact with a U. S. submarine at sea.

Any twins who are hams? Contact K0IKC (1605 So. First Ave., Sioux Falls, So. Dak.)

WA2PDU, now 16, started in radio three years ago. He has received the following licenses: Amateur Extra, First Class Radiotelephone, Second Class Radiotelegraph.

A 53.525-Mc. FM Directory is available (25¢ each, four for a dollar, plus 3¢ postage each) from Jack Cunkelman, W3JKE, Tri-State College ARC, Angola, Ind. This lists all known f.m. activity on 52.525 Mc. Some 600 stations are listed with call, name, QTH, and phone number.



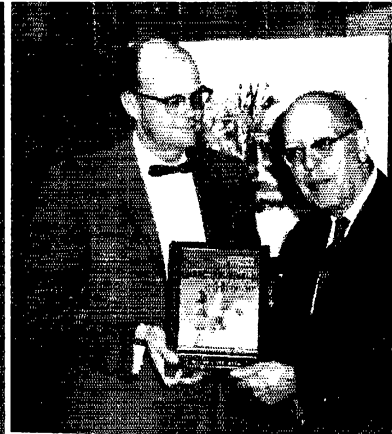
"For want of a nail . . ." A Connecticut station, which shall remain nameless, had this beautiful 50-foot tower installation until a gust of wind came along this summer. It was unguyed, and it buckled just above the first section. Result—a total loss. One set of guys would probably have saved it. (Photos by W1VW, whose tower it was not!)



Above, Director W8UPB presents cover plaque awards to QST authors W8FKC and W8CWL for their article in the May issue of QST on tracking Oscar.

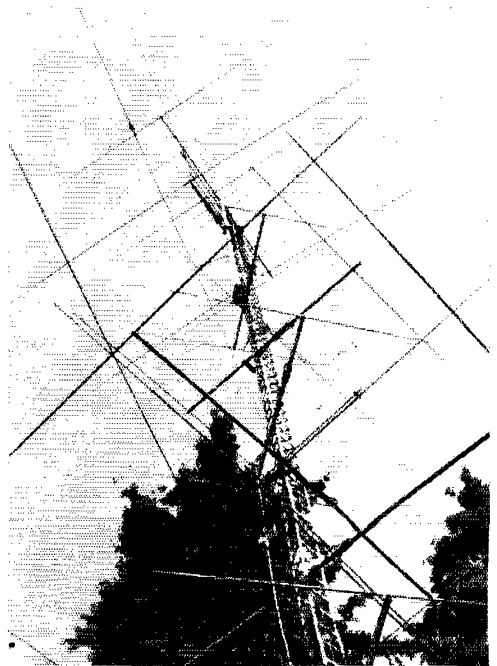


At the right ARRL Director W6HC presents the ARRL Merit Award to K6LFH and W6EJU, who accepted it on behalf of project Oscar.



Above left, W3YDF and son helped to provide communications for the Pennsylvania junior rifle championship matches sponsored by the Pennsylvania Rifle and Pistol Association. Others taking part included W3HKV, W3LQT, W3GVR, W3LPO, and K3GCH. The matches were held at four different sites around the state, with the hams providing the necessary communications to coordinate the event . . . Here's W6HC again, awarding cover plaques to W6VKP and W6SAI for their articles in the February and March issues of QST.

This maze of antennas is the mighty impressive set-up at W7ESK. Atop the 105-foot tower are four rotary beams—3 elements on 20, 3 elements on 15, 3 elements on 10, and 2 elements on 40. In addition, fixed on the tower itself are six more beams, two each for 20, 15 and 10 meters. Rush, W7ESK, was national high scorer on phone in the 1961 SS, and he didn't have these beams then, so watch out for him this year!  
(Photo by K7IQI)





# Hints and Kinks

## For the Experimenter



### MINIATURE 6-METER TRANSMITTER

The diagram in Fig. 1 is a miniature transmitter of the "wrist-radio" variety which developed from a circuit used in a transmitter for tracking small animals. The transmitter was attached to the animal and tracked with direction finders. A modulator is included for listening to the sounds or calls of the animals themselves and to their breathing and heartbeats. Although the equipment was designed for use with animals, the circuit should be of interest to those who like to experiment with miniature transmitters. The one shown in Fig. 1 was constructed so that the transmitter and batteries occupied a volume less than one cubic inch! The total weight was about 2 ounces. Now, can someone come up with a matching one-cubic-inch receiver?

The entire transmitter is operated from a single 2.5-volt mercury battery. Since the manufacturers of hearing aids have built very satisfactory small audio amplifiers and it would be unnecessary to duplicate their efforts, a used

hearing aid was purchased to provide the modulator. The circuit shown in Fig. 1 includes the diagram of the Dahlberg Magic-Ear hearing-aid modulator.

— Edward C. Pienkowski, W8BEB

*Editor's Note:* Similar equipment has been developed by Philon's Western Development Laboratories for use in tracking grizzly bears in Yellowstone National Park, operating with a power output of some 100 milliwatts on 32 Mc.

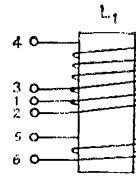


Fig. 2— $L_1$  is wound on a CTC form, LS12-6D.

Pin 6 to Pin 5,  $2\frac{1}{8}$  turns No. 30 enam.

Pin 2 to Pin 1,  $\frac{1}{8}$  turn No. 30 enam.

Pin 3 to Pin 4,  $3\frac{3}{8}$  turns No. 30 enam.

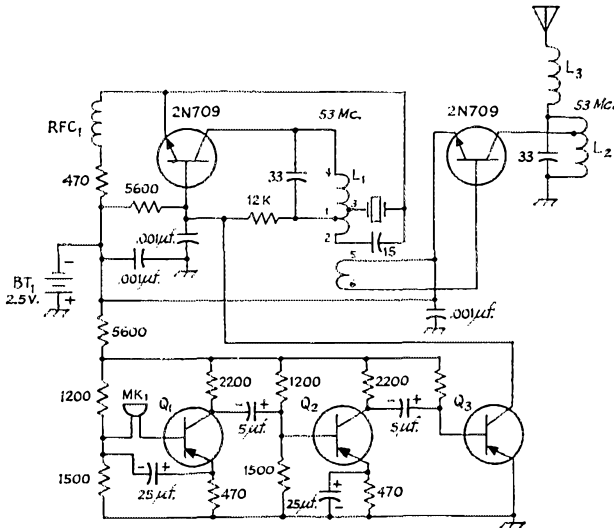


Fig. 1—W8BEB's miniature 6-meter transmitter. The modulator section is a transistorized hearing aid. Capacitor values are in  $\mu\text{f}$ , unless marked, resistors are  $\frac{1}{2}$  watt. The 0.08-inch diameter coil form for  $L_2$  can be a length of insulated rod or tube. The crystal is a 53-Mc overtone type.

BT<sub>1</sub>—2.5-volt battery (Mallory RM1RT2).

$L_1$ —See Fig. 2.

$L_2$ —22 turns No. 30 enam. on 0.08-inch-diam. form,  $\frac{3}{8}$  inch long, tapped 15 turns from bottom.

$L_3$ —The antenna consists of 8 inches of No. 22 7-strand hookup wire. Coil  $L_3$  is made by cutting a 2-inch slit lengthwise in the wire insulation at the center of the antenna and removing the conductors from this 2-inch portion of wire. It is important not to damage the insulation when removing the wire because this insulation is used as the coil form.

The insulation from which the conductors have been removed is now wrapped with close-spaced No. 36 enameled wire for the full 2 inches. The ends of the No. 36 enameled wire are soldered to the ends of the two remaining 3-inch pieces of No. 22 wire. A length of polyethylene tubing is slid over the coil for protection.

MK<sub>1</sub>—Miniature hearing-aid microphone.

Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub>—Small signal audio transistors.

RFC<sub>1</sub>—30 turns of No. 36 enameled on 0.08-inch-diam. form.

## MORE ON FINGER KEYING

THE photograph in Fig. 3 shows the keys which I use with an electronic keyer. Since I am a piano player, I replaced the paddles and knobs on the straight keys with paddles that have the same dimensions as the keys of a piano,  $\frac{7}{8}$  inch wide with about  $\frac{1}{8}$  inch between keys. The tops of the paddles should be no more than  $\frac{1}{4}$  inch above the table to allow a relaxed position for the hand.

As far as a feather-touch being an advantage in keys of this sort, I believe than an actuating pressure of about 4 ounces is about right. This has been the "standard" for pianos for 200 years and tradition alone will not explain the persistence of the keyboard design! Furthermore, most of the actuating motion, according to the opinion of most piano teachers, should come from the wrist and not from a single finger, so that the entire hand furnishes pressure. Both piano keys and telegraph keys of the usual type should be "pushed" and not tapped.

I also recommend that right-handers use the left hand for all types of keys. This gives the advantage of leaving the right hand for writing while the left hand is ready to send. Don't judge your own ability until after a few hours of practice. You probably will be surprised at how easy it is to master.

— Ben H. Sullivan, K4DKD

— ... —

SOME operators have found that the changeover from a semiautomatic "bug" key to an actuator for electronic keyers ruins their sending on the bug because of the new response required when sending dashes. What is needed is some different muscular approach so that keying habits on the bug could remain unaltered.

My solution is shown in the photograph in Fig. 4. Two surplus straight keys are mounted at a slight angle to one another and are provided

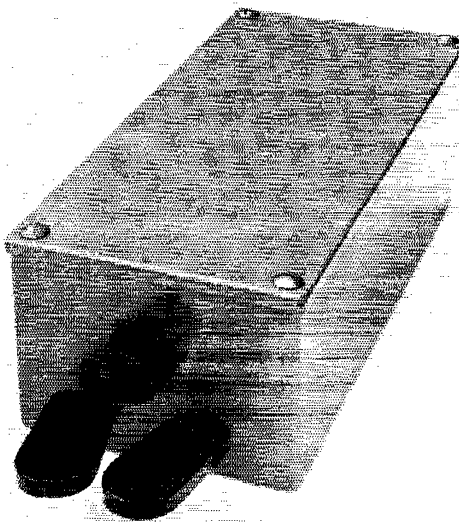


Fig. 4—G2QB's finger keyer.

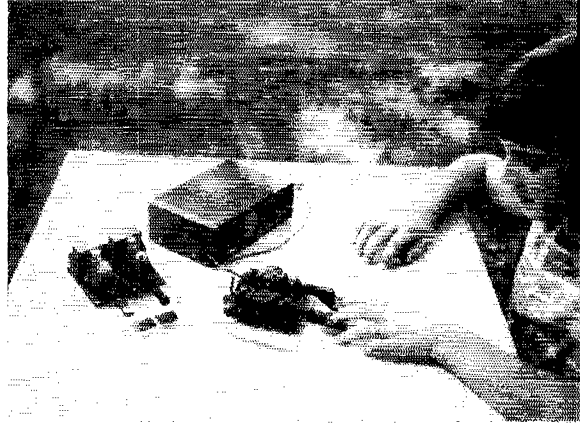


Fig. 3—K4DKD's "piano" key.

with extensions. The left-hand key is connected to the electronic keyer dot contact and the right-hand key to the dash contact. The extensions are manipulated with two fingers, exactly as in piano playing. Some practice is needed; but quite quickly, the mental and muscular reactions drop into place. Since the action is different from that used with the bug, no difficulty is experienced when changing over from one type of key to the other.

The actuator and electronic keyer can be built into a single box as in Fig. 4, making the whole unit self-contained.

— R. W. Bailey, G2QB

## NO-SCRATCH EQUIPMENT FEET

A PROBLEM often encountered in home-built equipment is that of finding suitable legs or feet to prevent the scratching of desk tops or other equipment. The drawing in Fig. 5 shows a solution to this particular problem. Plastic furniture leg tips have recently been placed on the market in a variety of sizes and colors. A convenient size for ham use is the  $\frac{1}{4}$ -inch white tip.

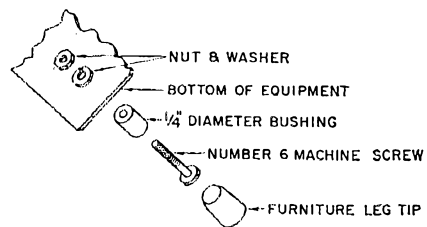


Fig. 5—K6QXQ's no-scratch equipment feet.

To use these tips, cut four  $\frac{1}{4}$ -inch-diameter bushings  $\frac{3}{16}$  of an inch long. The inside diameter of the bushing should be large enough to accept a No. 6 machine screw or self-tapping sheet-metal screw. Appropriate holes should be drilled in the proper locations on the bottom of the equipment. A machine screw and nut or a self-tapping sheet-metal screw secures each bushing to the equipment. After the bushings are in place, simply slip the tips over the bushings.

— Lowell E. Robertson, K6QXQ

# Happenings of the Month

## Election Results

### FCC Reorganization

#### ELECTION RESULTS

In the current elections for director and vice director taking place in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions, three incumbent directors and six present vice directors were declared re-elected by the Executive Committee, being the only candidates found lawfully nominated and eligible for their positions.

Hudson Division Director **Morton B. Kahn, W2KR**, was declared reelected for his third two-year term. **P. Lanier Anderson, W4MWH**, director of the Roanoke Division for the past decade, will continue in that post. The West Gulf Division will again be led by **Dr. Roemer O. Best, W5QKF**, now rounding out his first term as director.

In the Central Division, **Philip E. Haller, W9HPG**, will begin his third term as vice director. **Harry J. Dannels, W2TUK**, vice director of the Hudson Division for the past two years, was re-elected. Another vice director entering his second term is **Bigelow Green, W1EAE**, of New England. **Joseph F. Abernethy, W4AKC**, was re-elected as vice director of the Roanoke Division, the post he has held since 1959. In the Rocky Mountain Division **John H. Sampson, jr., W7OCX**, will start his third term as vice director. The vice director of the West Gulf Division

for the past two years, **Ray K. Bryan, W5UYQ**, also was re-elected.

The Executive Committee found that the three candidates for vice director of the Northwestern Division all were ineligible, two for lack of the required membership continuity, and one by reason of his commercial radio occupation. Thus, there was no contest for this position, under the terms of By-Law 6, the present incumbent continues in office.

All other offices involved in the current elections are contested. Ballots have been sent to all Full Members of the Central, New England, Northwestern, Rocky Mountain and Southwestern Divisions; the votes, to be effective, must be received at headquarters before noon November 20. The full text of the Executive Committee minutes for September 29, 1962, can be found at the end of this department.

#### FCC REORGANIZATION

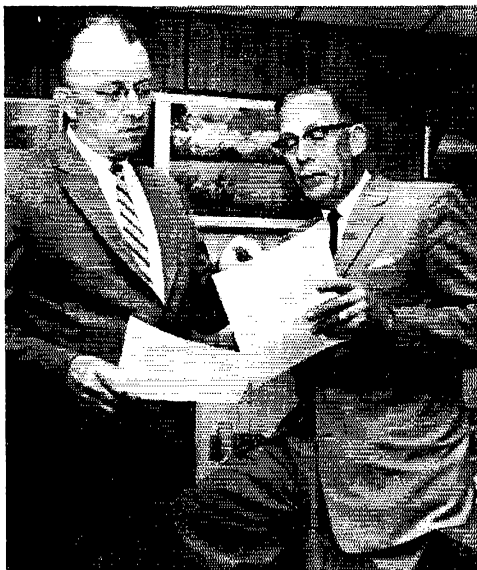
As one of several steps recommended by the research firm of Booz, Allen, and Hamilton, the Federal Communications Commission has shifted responsibility for the amateur service from the Public Safety and Amateur Division<sup>1</sup> to the newly-created Amateur and Citizens Radio Division,<sup>2</sup> both units of the Safety and Special Services Bureau.

With the change, two old friends and fellow amateurs return to an official interest in the amateur service. **Ivan H. Loueks, W3GD**, is chief of the new Division. A native of Harrison Valley, Pennsylvania, OM Loueks was educated at Mansfield (Pa.) Teachers College, Rochester Institute of Technology, Bucknell University, and the University of Florida, from which he obtained a B.S. degree in electrical engineering in 1931, along with membership in Sigma Tau and Phi Kappa Phi honor societies. He had also done post-graduate work in mathematics and radio physics at the University of Pennsylvania. His military experience covers 31 years, culminating with the rank of Captain, USNR, from which he retired in 1961.

Mr. Loueks started with the old Federal Radio Commission in 1931 as a radio inspector, serving at various times in the Atlanta, Georgia, Grand Island, Nebraska, Philadelphia, and Washington offices. From 1939 to 1952 (with time out for active Naval duty in Washington and in the Pacific Theatre) he was a radio engi-

<sup>1</sup> Now retitled the Public Safety Division.

<sup>2</sup> Citizens Radio Service matters were formerly administered by the Land Transportation Division, whose other functions have been transferred to the Industrial Radio Division.



Our New FCC Bosses—W4GF and W3GD

neer for FCC in Washington, including duties as chief of the amateur branch after the war. Mr. Loucks served as assistant division chief of the Industry and Commerce Division from 1952 to 1958, and of the Land Transportation Division from 1958 to 1960, at which time he became chief of the latter division. He is a member of the IRE, AFCEA, VWOA, QCWA, and, of course, ARRL; his League membership stretches back to 1924, incidentally. Along the way, OM Loucks has held quite a batch of calls: SABC, SCTS, 4GD, W4GD, W4PAX, W9ON, W9ZZAK, W3GYW, and now W3GD.

William S. Grenfell, W4GF, who followed Mr. Loucks as chief of the Amateur Branch from 1952 to 1961, is Chief, Rules and Standards Branch, in the new division. A 1935 graduate of Oregon State University, with a B.S. degree in electrical engineering, OM Grenfell was a radio technician for the Oregon State Highway and Police Department Radio System before joining the Radio Intelligence Division of FCC in 1940. In 1941 he moved to the Portland Field Office as a radio inspector. Entering the Navy in 1943, he became a radar officer, and reached the rank of Lt. Commander USNR in 1952. Released from active duty in 1946, Mr. Grenfell returned to the FCC as a radio engineer in the Frequency Allocation and Treaty Division, remaining in that capacity until becoming chief of the amateur branch in 1952.

"Bill" Grenfell was first licensed as W7GE in 1930 and now works the bands from 3.5 to 144 Mc., a.m., e.w., and s.s.b. with 160 meters a-building. He is the author of "A Noise Limiter for Everyone," *CQ*, July-August, 1952 and "The Match Tone," *QST*, January, 1958.

### AMATEUR WEEK HONORS K9EAB

When Cliff Corne, K9EAB, received the Arne Trossman High Honor Plaque the occasion was used as a "handle" for Amateur Radio Week in Illinois, August 4-11th. The plaque was awarded to K9EAB by the Peoria Area Amateur Radio Club on August 4 at the Corne residence with about 35 club members and guests present.

The text of the Governor's proclamation follows:

STATE OF ILLINOIS  
EXECUTIVE DEPARTMENT  
PROCLAMATION

WHEREAS, The safety of our citizens and that of our whole land has become dependent upon the speed with which we can communicate with one another, and

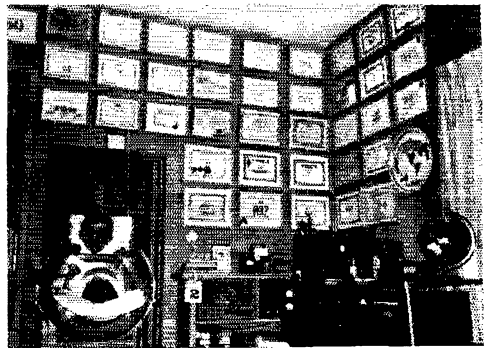
WHEREAS, Every-day communications, being susceptible to nature's foibles and those of man, are therefore oftentimes inoperative, and

WHEREAS, We have come to recognize the importance of amateur radio operators who have filled the breach often when the need for communications was vital to the safety of our citizens in time of an emergency, and

WHEREAS, The date August 4th through August 11th coincides with the presentation of the Arne Trossman Amateur Radio Operators High Honor Plaque:

Now, THEREFORE, I, Otto Kerner, Governor of the State of Illinois, do hereby proclaim the week of August 4-11, 1962, as Radio Amateur Week in Illinois, requesting citizens of our state to observe this time appropriately.

OTTO KERNER  
Governor.



K9EAB and some of his awards.

K9EAB is confined to an iron lung. One of his favorite sides of the hobby is the seeking of certificates and awards for operating achievements; we understand that he has received nearly 300 pieces of "wallpaper"!

The club used the occasion to call amateur radio to the attention of the public; all local TV stations and newspapers gave extensive coverage to the presentation, and proclamation.

### Minutes of Executive Committee Meeting

No. 288

September 1, 1962

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met in the Multnomah Hotel, Portland, Oregon, at 9:07 A.M., September 1, 1962. Present: President Herbert Hoover, jr., in the Chair; First Vice President W. M. Groves; Directors Robert W. Denniston, John G. Doyle and Morton B. Kahn; General Manager John Huntoon and Vice President F. E. Handy. Also present were General Counsel Robert M. Booth, jr.; Directors Harry Engwicht, Carl Smith and Ray E. Meyers; and Assistant Director Donald G. Eberlein.

The Committee examined a proposal to make group life insurance available as an optional League membership feature, at additional cost, but did not feel that it was appropriate at this time.

On motion of Mr. Denniston, unanimously VOTED to grant approval for the holding of an Oklahoma State Convention at Lake Texoma on October 27-28, 1962, and a Rocky Mt. Division Convention at Albuquerque, New Mexico, on July 6-7, 1963.

On motion of Mr. Doyle, unanimously VOTED that the League casts its vote in favor of IARU proposal No. 103, relating to the admission into membership of the Radio Sports Federation of the U.S.S.R.

The Committee examined a request from the Hudson Amateur Radio Council seeking the expulsion from League membership of Maxwell Meyers, W2B1B, and REFERRED the matter to the General Council.

On motion of Mr. Kahn, unanimously VOTED that the League accept the responsibility of the chairmanship of the amateur radio committee of the National Industry Advisory Committee.

The Committee then discussed at length the progress of the Building Fund and informally approved plans of the Building Fund Committee to set up quotas for each division.

On motion of Mr. Groves, affiliation was unanimously GRANTED to the following societies:

- The Babcock & Wilcox Amateur Radio Club, Barberton, Ohio
- Bayou City VHF Radio Club, Houston, Texas
- Brownwood Amateur Radio Club, Brownwood, Texas
- Crawford County Amateur Radio Club, Robinson, Illinois
- Electron Benders Amateur Radio Club, Inc., Tulsa, Oklahoma
- Explorer Post #552 Radio Communications Sqdn., Floral Park, New York

Irving Amateur Radio Club, Irving, Texas  
 Lenape Amateur Radio Club (IIS), Medford, New Jersey  
 Los Altos High School Amateur Radio Club, Los Altos, California  
 McGuire Amateur Radio Club, McGuire AFB, N. J.  
 Oakland County Amateur Radio Society, Pontiac, Michigan  
 Osltomo Amateur Radio Club, Osltomo, Michigan  
 Piedmont Amateur Radio Club, Inc., Salisbury, N. C.  
 The Saint James High School Amateur Radio Club, Chester, Pennsylvania  
 The Sky Wire Radio Club, Marion, Indiana  
 The South Bend Amateur Radio Club, South Bend, Indiana  
 Upper Arlington Radio Club (IIS), Columbus, Ohio  
 Beta Cube, Bakersfield, California  
 San Benito County High School Radio Club, Hollister, California

Ben Employee Amateur Radio Society of Wisconsin, Milwaukee, Wisconsin  
 Skokie Six Meter Indians, Skokie, Illinois

The Committee recessed at 11:12 A.M., reconvening at 9:40 A.M. on September 2 with all persons hereinbefore mentioned in attendance except Messrs. Eberlein, Engwielit and Handy.

The Committee examined a proposal of the Public Relations Committee for a new booklet on amateur radio for distribution at fairs, hobby shows, etc., and engaged in extended discussion thereon. On motion of Mr. Denniston, unanimously VOTED to express appreciation to the Public Relations Committee for initiation of this project, and to refer it to the Headquarters staff for further evaluation.

There being no further business, the Committee adjourned, at 11:40 A.M.

JOHN HUNTOON  
 Secretary

## NEW BOOKS

**Basic Radio**, by Marvin Tepper. Published by John F. Rider, Publisher, Inc., 116 West 14th St., New York, N. Y. Six volumes: Vol. 1 — DC Electricity (No. 197-1), price, \$2.70, 144 pages; Vol. 2 — AC Electricity (No. 197-2), 144 pages, price, \$2.70; Vol. 3 — Electron Tube Circuits (No. 197-3), 144 pages, price, \$2.70; Vol. 4 — AM and FM Receivers (No. 197-4), 128 pages, price, \$2.50; Vol. 5 — Transistors (No. 197-5), 72 pages, price, \$1.90; Vol. 6 — AM and FM Transmitters (No. 197-6), 144 pages, price, \$2.70. Set of six, \$13.85. All 6 by 9 inches. All six volumes are also available in one book. 776 pages for six-volume set. 6 by 9 inches, cloth cover. Price, \$14.85.

A "pictured text" course covering the complete subject of radio communications fundamentals. Divided into six volumes, the coverage includes a.m. and f.m. receiver and transmitter circuits. Volume 1, D.C. Electricity, covers electrons and protons, electrostatics, current, voltage, resistance, Ohm's law, power, d.c. circuits, magnetism, electro-magnetism and d.c. meters. Volume 2, A.C. Electricity, goes into vectors, a.c., inductance, reactance, impedance, transformers, capacitance, time constant, a.c. circuits and a.c. meters. Electron Tube Circuits, Volume 3, contains information on electron tubes, load lines, power supplies, voltage regulation, voltage amplifiers, power amplifiers, feedback, loudspeakers, oscillators and demodulators. The A.M. and F.M. Receivers volume deals with the TRF receiver, the superheterodyne, converters, i.f. amplifiers, a.v.c., limiters, f.m. discriminators, ratio detectors and a.f.c. Transistors is the subject in volume 5. It contains a discussion of electrons and holes, N and P type material, junction diodes, point contact diodes, p-n-p and n-p-n transistors, transistor circuits, amplifiers, oscillators and push-pull circuits. The last volume, Transmitters, has information on transmitting tubes, power supplies, crystals, crystal oscillators, frequency multipliers, r.f. power amplifiers, amplitude modulation, frequency modulation, antennas, transmission lines, radiation and protective devices. An excellent course for the student, technician, or radio amateur who wants to update or improve his knowledge in any one of the areas of communications covered by the course.

**Hints and Kinks for TV, Radio and Audio.** Edited by Martin Clifford. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. Cat. No. 103. 128 pages, 5½ by 8½, paper cover. Price, \$2.35.

This book is not to be confused with *Hints & Kinks For The Radio Amateur*, published by the ARRL. This Gernsback Library version is a collection of ideas, shortcuts,

timesavers and gadgets from *Radio-Electronics* magazine on the general subjects of TV, radio and audio.

**Transistor Circuit Manual**, by Allan Lytel. Published by Howard W. Sams & Co., Inc., 1720 East 38th St., Indianapolis 6, Indiana. Cat. No. TCM-1. 256 pages, 5½ by 8½, paper cover. Price, \$4.95.

This manual is full of practical transistor circuits for just about any application. The diagrams are accompanied by parts values, and the text fully describes the functions and characteristics of each circuit. Although most of the manual is devoted to three element transistor circuits, there are numerous circuits utilizing special PNP devices, tunnel diodes and other specialized semiconductor devices. Starting off with an introductory text section on the use of transistorized devices in all types of electronic circuitry, the manual contains 16 sections arranged by semiconductor applications. Each section contains a general introduction which discusses that specific class of circuits.

**RCA Receiving Tube Manual, RC-21.** Published by Electron Tube Division, Radio Corporation of America, Harrison, New Jersey. 8½ by 5¾ inches, 480 pages, paper cover. Price, \$1.00.

This latest edition of the tube manual contains over 900 receiving tubes, including the nuvistor and novar, and data on 100 types of black and white and color picture tubes. The circuits section of the manual has been expanded to 26 circuits, including a 2 meter receiver and a 10 meter nuvistor preamplifier. Also, a new receiving-tube chart has been added to aid in the selection of tube types for specific applications.

**101 More Ways To Use Your VOM and VTVM**, by Robert G. Middleton, Published by Howard W. Sams & Co., Inc., 1720 East 38th St., Indianapolis 6, Indiana. Cat. No. TEM-8. 128 pages, 5½ by 8½, paper cover. Price, \$2.50.

The title of this book just about covers its contents. All of the uses fall into one of six categories: testing household devices, special uses, test-equipment checks, circuit tests, component tests and miscellaneous tests.

**1962 Tube-Caddy-Tube Substitution Guidebook**, by H. A. Middleton. Published by John F. Rider Publisher, Inc., 116 W. 14th St., New York 11, N. Y. 64 pages, 4 by 6 inches, paper cover. Price, \$0.90.

Four thousand direct substitutions for commonly used tubes.





CONDUCTED BY ROD NEWKIRK,\* W9BRD

**When:**

Marconi had his hands full conquering terrestrial DX obstacles, as we noted last month. It took him a quarter of a century to extend his record from a mile or so to the antipodes. But, though carrying on from basic work by Hertz, Faraday, Maxwell and other earlier giants, he did it almost alone. Marconi was a dreamer, and in those days unconventional theorists usually were relegated to academic obscurity before they could arouse active interest in their ideas.

How the pendulum has swung! Now the dreamers are in the driver's seat riding high, wide and handsome. Vast sums are eagerly expended by governments for the development of almost anything an outspoken scientist cares to recommend. The only trouble a Marconi would encounter today would be the preservation of his identity, for the corporate committee image has superseded that of the scientific individualist. This situation, while it endures, is of special interest to followers of the communications art. And the accent, as in the heyday of Marconi, is still on DX.

For example, Jet Propulsion Lab's S.W. Golomb, writing in *Astronautics*, makes these observations concerning space communications:

... Over the past fifteen years the sensitivity of radar-astronomy installations has increased at an average rate of 5 db. per year. It is not unreasonable to predict by extrapolation that this increase in sensitivity will continue at approximately the same exponential rate over the next several decades. Since another 250 db. beyond present capabilities will enable us to attempt radar contact with other solar systems, it is likely that in about 50 years we will be ready to attempt a radar contact with the planetary systems (if any) of Alpha Centauri, Sirius, Procyon, etc. With Alpha Centauri there will be a nine-year wait for signal return; with Sirius and Procyon about 20 years; and with Arcturus some 66 years. This is by no means the extreme, even among the bright stars — round trip to Rigel exceeds 1000 years.

Note that a Venus-sized planet at the distance of Arcturus is only about 35 db. harder to detect than one at the distance of Alpha Centauri — that is, about seven years more advanced in terms of our technology. Yet the propagation delay is an extra 55 years! The conclusion is inescapably clear. While it may be reasonable to wait until the entire system is ready before establishing radar contact with the planets of Alpha Centauri, we have no time to lose if we want to see those of Arcturus at the time we are technically capable of it. We must turn the transmitter on Arcturus as soon as possible. Then we will have 66 years to learn how to build receivers sensitive enough to detect the reflection. But we must act now, lest there be no signal for our grandchildren to detect 66 years hence! . . . The program we must follow is clear. Every day we pick a different star and beam our radar at it. Then we sit back and wait. I propose to call this Project Winkle, in honor of Irving's hero, R. V. Winkle.

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

Well, *there's* an advantage Marconi didn't have. With no propagation delay he had to have his transmitter and receiver functioning simultaneously. For star-eebo work you can pour your resources into a superkilowatt, send the message, then sell the thing and get to work on a receiver. Seems to us there are a few lids on our ham bands already using such techniques — big voices and no ears.

**What:**

Good old autumn once more comes through in fine DX style, cranning the "How's" mailbag with long-haul reports from 10 through 160 meters. Things are getting fringy and shallow at the higher end of the range, to be sure, but we can't have everything all the time. And, as one might expect at this stage of the game,

**160 c.w.** and phone DX prospects haven't been so promising in many a year. K4KSY hears that HR3HU will have a modified HT-37 on the band with a full-sized quarter-wave vertical, and Hal reports the U.S. west coast breaking through into Honduras around 2 Mc. in late summer. . . . W2EQS relays word from H8XAG on a 1.8-Mc. theme: "The Dominican Republic will be on 1825-ke. c.w.; this winter. Since neither of my transmitters covers 160 I will have to build another rig. In running through my junk box I find I will need a crystal and final coil to complete the job. When finished it will run slightly over 50 watts. Receiver here is an HRO and the antenna will be a 275-ft. wire about thirty feet high." W2EQS expects a bumper 160-meter DX season with signals from CO EL HC HL HI KH6 SU VK XE YN ZL and other regions. The OH QV and OX bids have filed for 1.8-Mc. transmitting privileges but the outcome is in doubt. There is heavy marine usage of 160-meter frequencies in Europe. — KP4AXU commenced 80-to-160 c.w. and s.s.b. contacts, crossband style, with W2FYT, Ks 2PIIF and 8IIBR 'way back in August. . . . We expect to hear from WIBB & Co. with details on the coming season's scheduled Transatlantic & DX Tests at any time. Ws 2FYT and 350 worked VK3AKR on 160 c.w. in September!

**80 c.w.** already finds Ws 4SHJ 7DJU, WA2KSD and VE1ZZ catching up with stuff like CEs 2BM 4EC, CT2BO, DM3s RBM ZCG, E1DJ, HAs 1KSA 5AF, H13PC, JA8LN, LUs 1DIB 9FCU, PY4AXN, SPs 3AMZ 5AHL





ZC4PB/p, Famagusta team of Cyprus Amateur Radio Society, journeyed to an 1800-ft. promontory for this year's RSGB National Field Day. In the group photo, front (left to right), are unidentified ZC4SS staffers; the middle row comprises ZC4s CK and PB; and in the rear are ZC4s WD CT FB OS and CS. The lower action shot shows ZC4s CS WS and CT, plus a logger, racking up some of the endeavor's 114 QSOs. Cyprus amateurs now use their new 5B4 prefix.

5AIB 9AMA, T2CMI, UA2DM, UC2KAB, UI8AP, VK5ZC, VPs 5XG 8GQ, VR2DK and sixteen ZLs, plus a hatful of more commonplace European types, mostly hugging the low edge below W1AW's 3555-ke. hangout.

**40 c.w.**, lively all through the summer, really turns on the DX steam when the frost jumps on the pumpkins. Ws 2TKG 7DJU 9NN, Ks ILOM 2JUA 3CINN 4MYO 5YFU 7RVI 8NMG 9JLQ 9SRR 9UKM 6JPL, WAs 2HLH 2KSD 2PXI 2UXZ 6HRS 6PIB 6TZN 6VAT 9AUM, VE7BBB and listener W. Cox write in about CE1AD, CP5-EZ, CX2BT, DM3s KBI RB, HA5KFR, HC1DC, HIs 2FC (7003 ke.) 10 hours (GMT, 8CHU 8XAG (12) 6, HKs 3LX (28) 6, 5CR (20) 10, 7XI, HZ1AB, JAs 1BTG 1CXW 1GBC 1ERC 1HSL 1HX 2AEA 6AKW 7OD 8LN, some KUs, KV4AA, KX6s AJ (28) 11-12, AZ, LUs 6MI 7JL, LZs 1FO 1KPZ 2KSU, OX3BZ, PJ5MB, numerous PNs, SL6BH (17) 2 of Sweden, SPs 3UH 6FZ, TI2LA, UO5PK, a flock of Vks, VPs 3VN 5MJ 5XG 6LJ 9AK/p (25) 7, VR30 (4) 5-8, Ws 4WQQ, VP9 6ZDF/KM6, XEs 1CCG (15) 16, 2LA (1) 1, many YVs and YUs, ZK1BY (15) 10 and a large helping of ZLs. . . . KN1VWL comes up with KP4AYM and YV3DE in midband.

**40 phone** is a complex project but the cool heads who monitor way down around 7100 ke, can come up with some interesting DX items, K1KSY, WAs 2KSD 2PXI and 6ORS warmed up on HH2P, HR3HH, HZ1AB KH61VG, KP4AXU and VP7CT.

**20 c.w.** becomes more of a daytime proposition with feverish DX doings at dusk and dawn. Ws 1OPR (159/143 countries worked/confirmed), 2TKG 6JQB 7DJU 7LZ 7POU 8CQN (161/68), 8YGR, Ks 1JFF ILOM 1PJT 2JUA 2YFE 3CNN (103/59), 3SMIN 3MNIJ 5RCO 5YFU 6TZN (83/70), 7RVI 8NAIG 9BHR 9SRR 9UKM 6JPL 6RKN, WAs 2HLH (82/37), 2KSD (163/122), 2K1HW (51), 2MJF 2UXZ 6HRS 6VVD 6KHK 6MIN (22), 6ORS 6TZN 6VAT 9DKM, IIER, KW6s DF/0 DG/0, VE7BBB and Mr. Cox report 14-Mc. code action by CQs 3BU 23, 3NR 6AII 13, 81H 14, CPs 3CN 5EZ, CTs 1AU 1CB 1TT 3AB, DM2s ATL 21, AZN, DU, IAs 1OR 6IV, EAs 8CI (57) 23, 9AP (29) 22, FA8RI (4) 22, FG7s NJ (39) 21, NK XQ, F08s AA FN (85) 21, FY7TF (42) 1, GB2LS 23, GD3FXN (35) 21, plenty of IAs, H7ECE, H18XAG (53) 12, HZ1AB (68) 23, IS1ZUI (68) 22, scads of JA brethren, KAs 2HO 2HT 2MB 7SL, K6CBK (4) 5, KGs 1RM 1FR 4AM (28) 0, 6AKR 6AOC, KM6s BI CE CI, LXs 2XG 3DX 3QX, MP4s BAF (20) 1, QBB 19, OA2C

(26) 3, OH2BZ/OH0 (57) 17, OX3BZ, OYs 1R (5) 21, 7ALL (20) 21, PJ2ME, PZ1AH (23) 2, SL5AB 15, SU1IM (30) 1, SV0WI, TF2WGN (53) 2, TG9AD (4) 4, TT8s, AJ AL (47) 20, UAs 2KAA (52) 23, 2KAW (53) 21, 9DT (33) 2, 9FO (61) 3, 9VB (83) 0, 9WJ (67) 2, 0KFG 0LR (49), UB5s ES EY PP NP KST, UC2s AR (58) 22, AW (19) 17, CS (18) 16, UF6AU, UH8KHH (37) 3, UM8KAA (31) 2, UN1KAJ, UO5IT, UP2s AN AY (51) 18, NM (83) 17, TK (26) 23, UO2s FF KAB (10) 19, UT5s AA 19, EU 21-4, UWs 3AY 0IH (36) 5, VEs 8CC 8CW 0MC, VPs 2KJ 2MIV (24) 9, 2TK (44) 23, 3ER (39) 1, 4VP 6LN 12, 8GU 8XZ 9AK, VOs 4DW 4HE 21, 5IU (11) 22, VRs 2AB (71) 16, 2BZ VRI 2DK 3L 30 (4) 4-5, 3S (35), 100 4-6, 5AA (99) 7, VSs 1AJ (72), 4RS (7) 14, 9ARJ, Ws 4LCY/KM6 (59) 7, 4WQQ/VP9 5VWU/KJ6 (39) 7, 6ZDF/KM6 (93) 4, 0ANJ/KP6, WA6JSA/KM6, XE3s AQ (80) 5, MB (20) 14, YN3KM, many YOs, ZB1CR 21, ZK1s AR (75), BS BY (65) 2, ZPs 5AY 5LS (75), 5OG 9AY, 4X4s IIS KK MJ (41) 22, MZ, 5As 1TW (70) 23, 1BX 3CR, 5B4s BP (3) 23, TC WS, 5N2LKZ (18) 17, 6O1ND (4) 21, 6W8BL (39) 23, 9G1DT (18) 21, 9M2UF and 9Q5AA (20) 19.

**20 phone**, now more erratic than ever as the nights grow longer up our way, enabled Ws 1APA 4PC, Ks 1JFF 1PJT 2TDI, WAs 2MJF 2PXI 6MIN, KW6s DF/0 DG/0, VE7BBB and tuner WV2IPC to collect r.f. from CN8s AJ FU, CR6CA (29) 20, CTs 1EY (300) 23, 3AV (320) 23, DU6IV, EA1GZ, ELs 1A 5A GC2HFD/a (348) 22, GDs 3ENK 6IA (313) 21, HC1LE, HH2PB\*, HKs 1XB (333) 3, 3LX, HP3DA (290) 17, HV1CN (340) 20, HZ1AB, IS1RIF (292) 23, JA1s BLC\* CWP\*, KA2s H0\* MB\*, KGs 1BB (27) 23, 1BX 1CC 1FN 19 6AKR\*, KX6CG, LX1TJ (330) 15, lots of OAs and OEs, OAs 5P (280) 23, 0HV (328) 5, PJ3AR\*, SVs 1AI 0WT (322) 19, TF2WID, TG9AD, VO1FC\*, VPs 7NB\* 8XZ (316) 14, VR5AR (295) 4, Ws 1UHK VO1\* 9ANJ/KP6\*, YN1SV, YU1I, YV1AJ, ZK1BS\*, ZS3E, a batch of ZLs, 4X4KK 5A1TB (280) 21, 9Q5s AF and US. The asterisks represent a.m. customers and all others are single-sidebanders.

**15 c.w.**'s openings are brief and fewer between but Ws 7POU 8YGR, Ks 1JFF 1PJT 2YFE 3CNN 4OGV 5YFU 8NMG 9BHR 9SRR, WAs 2JIS 2KSD 6KHK 6TZN and VE7BBB do all right with CPs 3CN 5EZ, CR7Z, HK1QQ (1) 23, OAHEX (100) 20, ZK1AR, ZL3Is, ZP5JP, ZS6s BFD JK, 9U5BB/9U5 and some more ordinary European/South American fellows. Europeans on 15 aren't quite so ordinary, anymore though, because the north Atlantic path's m.a.f. sags lower and lower.

**15** phone, thanks to some encouragement from decreasing congestion, does plenty of business. WIBPM, Ks 1PJT 2YFE 3SMN 4OGV 5YFU 8NMG 9BHR 9SR.R 9UKM 0R.NK, Was 2PXI 6ORS and KW6DF/0 made the grade with CEs 2IQ 2JS 3CV 3XG (260) 23, CO8RA, CR6JA, CX9BA, F3PZ, GM5FT, G1JIM (160), HC5EJ\*, HB9ZS\*, HIBABO (270) 21, HKs 3AFB 3QA 6NX 6VX, HR3EB, ITIZDA, many LUs, OA4GB, PJ2CR, a helping of PYs, PZICE, TGs 7BS 9PE (280) 1, TIs 2RO 6CAL (260) 21, VPs 2KJ (240) 23, 2MC 5FM 7CT 9FE, VR3L, XEs 10E IQM 2LN, YNs 1BE 6AH 9CIL, YVs galore, ZE1AE, ZLs 1CA 2AN 2BE, ZP9AY, ZSs 1AB 1BV 1MW 1VM 2GF 3MH 2PT, 4X4s BL HS, 5As 1TW 5TW, 5N2NFS, 9G1DU and 9U5JH. We almost overlooked our own boys — K6BZ\* (434) 3, KG4s BC BII BI, KH6EJV, KP4s AYP BHR BIE BKR UII, KX6AS, KZ5s MA and MN. In this case the asterisks go for s.s.b. entries, very rare on 15 for some reason.

**15** Novice DX men persist in the face of worsening 21-Mc. conditions. WNs 4ELB 0ATT, KNIs TZQ (39/27) and VWL will be displaying impressive QSLs from DJ50L, F8KJ, FA8RJ, G3MCQ, HH2CE, HK3LX, K8FOQ/KS6, KH6DKI, KP4BBN, OH2BC, PYs 3AFE 5ASN, VP7BN, XE1CGG, WN8DBG/KP4, WP4s BIS BJD BJJ, YV5BOA, ZS6BBW, 5B4RF and 6OIND. Stay with it, lads! Which brings us to the remains of

**10** phone, where W2ELW and K2YFE fooled the critics by QSOing HK1ZU (520) 18, LU2DED (465) 23-0, VO1EI (500) 0 and YV1AJ (405) 21. Ah, check November, 1960, "How's" and see how green was our 28-Mc. DX valley then, a short two years ago.

### Where:

**Africa** — Unfavorable inmailbag commentary keeps showing up on the subject of high-pressure solicitation to cover DXpeditionary expenses. This moves us to say that when somebody goes a-roving "to give the gang a new one" the word "give" means just that. Solicitation to defray expenses is perfectly okay but this approach obviously should be entirely divorced from QSL exchange or the promptness thereof. Appropriate International Reply Coupons or mint stamps of the country concerned, plus self-addressed envelopes, adequately defray expenses of QSL shipment. Insistence on cash is not only unnecessary but ethically questionable. Unless its intention be to *sell* the gang a new one — and here there will be trouble — we urge each DXpeditioner to *QSL first*, and then, if you feel you must, pass the hat around. . . . 5N2RSB wants his QSLs only via K3MNJ with self-addressed stamped envelopes, or IRC-plus-s.a.e., not via bureau in any case. . . . W4ECI has W4BPD's logs up through his VQ9A, VQ9C and VQ9A/8C operations but the QSLing task is formidable. Patience, please, plus s.a.s.e. . . . "Those who did not receive QSLs for W6MLY's" T8-TL8-TN8-TT8-TZ8-TY2-5V4 QSOs from KV4AA now may send direct to W6MLY," reports VERON's *D Xpress*.

**Asia** — "I'm now active from Cyprus," pens ex-5A4TC-VQ1SC-VQ4GQ. "My new call is 5B4TC and I'm looking forward to joining the fray once again. I'm handling my own cards this time, but all logs for my 5A4TC activity have been sent to W2CTN. I have 5A4TC QSLs on hand here, too, should anyone have been missed." . . . K4WIS continues QSL efforts in behalf of TA4RZ although Mustafa's log transcripts are hard to handle and probably incomplete. PA9WWP received complete TA2AR logs for QSOs into August but his hospitalization delayed QSL dissemination. As usual, QSL requests accompanied by self-

Lion's Head Radio Club recently visited with Yank hams aboard USS *Glacier* when the ship docked at Cape Town. Front (left to right) are ZS1s TP BQ, K1GYE, ZS1V; second row, ZS1s TZ WW OA, Mrs. OA, WA4DZL; rear, ZS1s RZ ACD and BW. (Photo by ZS1VW)



Ex-EP2BK, center, visits the hamshack of G2FUU, right, with guests G3ERN, left, and G2ARN, standing. G3ERN, who worked EP2BK on 80 and 160 last season, is well known to the North American 1.8-Mc. crowd.

addressed envelopes and International Reply Coupons will be answered direct, others via bureau routes. . . . K4TJL, assisting MP4QBB (W5LAK) with confirmatory matters, may be the fellow to see regarding John's current MP4MAO doings. . . . W3MVK writes, "I've been operating HL9KN but please note that I am handling QSLs only for contacts I had. I cannot confirm those of other operators as I do not have the necessary log duplications. I still have several hundred cards all filled out, one for every QSO, and ready to go. But I have yet to receive QSLs from the fellows I instructed to QSL via W3MVK. Most of these are for Europeans; if they want their confirmations they should send me their cards direct or via bureau. S.a.s.e. would help ease the work load and financial burden. I'll hold all cards for another three months, then forward them via bureau." . . . WGDXC understands that W3KVQ awaits 1962 logs from V9SAAC, now active as G3MOJ, and also needs records for some 1961 contest contacts before he can wind up those Aden QSL matters. W3KVQ can still confirm 9K2AM QSOs scored by visiting W3RYX between December 4, 1961, and the 15th of May this year.

**Oceania** — Ex-KW6s DF and DG have settled down at the Colorado address in the list to follow. Layne writes, "We have all logs and plenty of QSLs left and will still QSL 100 per cent for all claimed contacts that check with our logs. We made an aggregate total of more than 20,000 QSOs. Calls used included K0SLD/KH6, K0SLD/KW6, KW6DG/5, K0TFF/KH6, K0TFF/KW6 and KW6DF/5. We now operate as KW6DF/0 and KW6DG/0 while awaiting reassignment of our K0 calls. Let me say that we enjoyed those two years of hamming on that small island. It sure helped pass the time!" . . . KJ6BZ, presumably operated by K3GAD, tells European amateurs to QSL via G5VT who still awaits logs at this writing.

**Europe** — Chasing down QSLs is almost as much sport as chasing QSOs. K9YRA writes, "In December, 1961, I

Conway Valley Amateur Radio Club of North Wales, founded in 1959, numbers avid c.w. and sideband DX men among its membership. From left to right are GW3CW, s.w.l. G. Williams, GW3s MDK YR HGL JI and LCD.



worked TF2WGD. The only QTH I could copy was 'Jerri Arnold . . . U. S. Detachment.' Sent a card to Iceland's IRA society with no luck, then sent IRA a letter in English and Danish (knew no one who knew Icelandic) with an Iceland stamp from W2SAW plus s.a.s.e. asking if they knew his QTH, but no luck. At your suggestion I checked with other TF2s listed in QST, enclosing TF stamps and s.a.s.e. or s.a.s.e. One reply said to try MARS, Keflavik Airport. Sent them a letter with s.a.s.e. but they couldn't help. Then I wrote the Icelandic Consulate in Chicago for the QTH of Iceland's equivalent to our FCC. Wrote that agency in English and Danish with TF postage and s.a.s.e. but still no luck. Then I heard from K6BX who suggested trying K9JOK. Wrote K9JOK but Jerri had moved to Colorado. My mail was forwarded, however, and today I received the pasteboard!" Now K9YRA's CQs probably will be answered by several TFs with instant QSLs. . . . "Please mention that I will act as QSL manager for SM5CBC/9Q5," requests SM7ACB, a detail hereby attended to.

**South America** — W6OGI/1 of ARRL Hq. provides this address for the VP1 QSL bureau: Rudolfo Lopez, VP1RL, P.O. Box 487, No. 1 Market Square, Belize, British Honduras. . . . PJ2ME of Sint Maarten writes, "Would appreciate having it mentioned that W2CTN is my QSL manager and that it's no use QSLing me direct. I have neither QSLs nor the time to fill them out." Three cheers for guys like W2CTN!

**Hereabouts** — A toast in Old Haywire to this month's 'QSLers of the Month' — CN8EU, F08AA, G3PFN, HL9KJ, HZ1AB, K5FOQ/KS8, LU9DAH, OZ7BQ, PY7AKW, PZ1CE, VP2MO, W6ZDF/KM6, ZS2MH, 4X4MZ, 5As 1TW 5TW and 5B4RF — as nominated by Ws 1BPM 8CQN, Ks 3CNN 6TZX 8SQK, WAs 4DAA 6OKS and KN1TZQ. Do you have any candidates for kudos in recognition of prompt QSL response for recent QSOs? . . . K1UAA, WAs 2AUC and 4DAA put themselves on "How's" record as offering to assist worthy overseas DX stations in need of QSL managers. WA4DAA would prefer a West Indies, Central American or South American applicant. . . . W1RAN, planning an even bigger St. Pierre show next February, is getting lots of s.a.s.e. repeat requests for FP8HX QSLs already forwarded via bureaus. Ned stands by with spare pasteboards just in case. . . . K2UYG recommends registered mail for shipments to certain rare spots around this globe. "I have had two letters opened, IRCs removed, and sent back to me as 'unclaimed' although I know the addresses were valid."

K5JVF would like a QSL lead on the 7-Mc. LU1ZC he worked in September, 1959. . . . TG9AZ, president of Guatemala's CRAG, declares TG1CC and TG3TD spurious. "Many QSLs for these pirates have been received. They will be returned upon request." . . . "If the boys in the States will send one IRC each, I will QSL the moment I get their cards," assures H18XAG via W2EQS. "Every U. S. QSL I receive eventually will be answered but it may take time. The European boys have been sending two IRCs and airmail envelopes but it takes four IRCs to send one QSL from here to Europe by air." Bert now wants cards sent to him via the address in the listing to follow. . . . "I had that self-addressed envelopes and IRCs really bring home the DX bacon," testifies WV2IPC, a 21-Mc. long-haul man. . . . We receive occasional inquiries concerning "How's" policy reference repeating addresses in our monthly QTH lists. Unless there is substantial change in a station's listing we normally do

not repeat it within a six-month period. After half a year, if it has not appeared in the *Call Book*, and if evidence is at hand that the address is still valid, we usually give it another whirl. . . . And so on to the juice directory:

AP2IJ (via KH6IJ)  
 CO8CO, J. Negreira, P.O. Box 20, Delicias, Ote., Cuba  
 CP5EZ (via W2CTN)  
 CT2BO (via W6NJU)  
 DJ1ZG/M1 (to DL9PP)  
 DL4DC, J. Stager, Ludwig Thoma Strasse 32, Bad Toelz, Germany  
 DL5KM (via W0UUC)  
 EA9AZ (s.s.b. only) c/o K1QAJ/6, 381 Cottonwood, Vacaville, Calif.  
 FG7XJ (via W2CTN)  
 FG7XQ, Box 521, Pointe-a-Pitre, Guadeloupe  
 FP8CC (to W2HLL)  
 FP8CD (to K2UTN)  
 FY7YE (via W5JLU)  
 FY7YF (via W2CTN)  
 GC2HFD/a (via G3EIL)  
 HC1LE (via W2MUM)  
 ex-HC5HA (5N2HA, via 5N2JKO)  
 H18XAG, MAAG, c/o U. S. Embassy, Santo Domingo, D. R.  
 HK4YL, S. Llano, Box 2311, Medellin, Colombia  
 HL9KH (via W9VZP)  
 HL9TB, Lt. G. Anzic (K8BVD), 17th Trans Bn., APO 7, San Francisco, Calif.  
 HP1IE (via W2CTN)  
 I1HM, M. Cipriani, Box 511, Florence, Italy  
 K9EOH/mm, J. Baughn, CE Divn., USS *Pocono* (AGC-16), FPO, New York, N. Y.  
 KC6PE (via W9SFR)  
 KG6AJR, F. Lee, KH6EWH, 1230 Lono St., Kailua, Oahu, Hawaii  
 KG6IC, USCG, APO 815, San Francisco, Calif.  
 ex-KP6AL (to KC6BD)  
 KS6AX, C. Browne (KL7CIK), Communications Office, Pago Pago, U. S. Samoa  
 KW6CS, R. Figueroa, KH6AZM, 1502 Wilhelmina Rise, Honolulu 16, Hawaii  
 ex-KW6S DF & DG, Bob & Layne La Baume, 520 Iris Dr., Security, Colorado  
 LU1CP, c/o U. S. Embassy, Buenos Aires, Argentina  
 LX3DX, Box 331, Antwerp, Belgium  
 LX3JE, Box 1313, Koblenz, Germany  
 MP4BDR (via K1AQI)  
 OA4IK (via RCP)  
 OA4ON, Box 1737, Lima, Peru  
 OA4IV, USAF Mission, c/o U. S. Embassy, Lima, Peru  
 OY7MI, M. Haasen, Bogota 4, Torstavn, Faeroe Islands  
 PJ2ME (via W2CTN)  
 PX1FO (to F2CO or via W2CTN)  
 PY4AXN (via K3JIG)  
 PY0NC, Box 58, Rio de Janeiro, Brazil  
 SM5CBC/9Q5 (via SM7ACB)  
 SV1AB (via W4HUE)  
 ex-TF2WGD A/2c J. Arnold, K9JOK/0, Box 08255, 3428th School Sqdn., Lowry AFB, Colo.  
 T12CMF (via W2CTN)  
 TL8AB (via F2FF)  
 UP2NV, Box 310, Kaunas, Lithuanian S.S.R., U.S.S.R.  
 ex-VK9RO (via VE5RX)  
 ex-VP1OLY, Oly Hopun, 3730 Lindell, St. Louis 8, Mo.  
 VP2KR, J. Stratfull (G3JJS), Audit Dept., St. Kitts, Leeward Islands, W. I.  
 VP2MV (via W2CTN)  
 VP5BL (via W3AYD)  
 VP9OC, A. Jones, Rocky Ridge, Smith's Parish, Bermuda  
 VQ5IG (via W2CTN)  
 VORC (via W4ECL)  
 VR2AB (via VR2AS)  
 VR3T (via W6AFL)  
 VR5AR (via W9EXE)  
 VR6TC (via W4TAJ)  
 W3BOA/mm, L. Sander, USS *Rankin* (AKA-103), FPO, New York, N. Y.  
 W6ZDF/KM6 (to W6ZDF)  
 WA6GMK/KG6, J. Hug, 1562 Gardenia C. H., Anderson AFB, Guam  
 WA6UNJ/KB6, J. Cushing, 1st Mob. Comm. Gp., APO 73, San Francisco, Calif.  
 ZE8JJ (via K5ADQ)  
 ZL1ABZ, Kermadecs (via ZL2GX)  
 ex-ZL4JF, Caupubells (via ZL2GX)  
 ex-5A4TC-VQ1SC-VQ4GO (to 5B4TC)  
 5B4TC, S. Crabtree, Hq. FBS, BFPO 53, Nicosia, Cyprus  
 ex-5N2JJS-VP2LO-VQ3EX (to VP2KR)  
 5U7AD, Niamey Airport, Niger  
 ex-9G1AA-ST2DB-ZD4CL, H. Best, c/o International Aeradio Ltd., 40 Park St., London W. 1, England  
 9G1CY (via K1EJO)  
 9G1DT (via W4HUE)  
 9G1GN (via VE1AM)  
 9M2AF (to W8DPP)  
 9M2GV (via W7EMU)  
 9Q5AAA (via W2IMJ)



ST2AR, long ardent in the DX field, expects to be signing a new Sudan prefix at any time. Eric communicates for Sudan Airways when not ferreting out DX on the ham bands, 14- and 21-Mc. c.w. preferred. (Photo via W8KX)

905PW (via HB9GX)

9U5JL, Box 5, Ruhengeri, Ruanda

9U5PE, Box 142, Shangqu, Ruanda (or via UBA)

These were squeezed out of grapevine berries offered by Ws IOPB 8CQN 8KX 9NN 9W NV, Ks 2TDI 2UYG 2YFE 3CINN 6TZX 9YRA 8JPL, WA2JLH, WV2IPC, KH6ARL and the following club group entities: American SWL Club *Official Bulletin* (J. Howard, 6201 E. 109th Terr., Kansas City, Mo.), DARC's *DX-MB* (DLs 3RK 9PF), International Short Wave League's *Monitor* (B. Brown, 196 Abbey St., Derby, England), Japan DX Radio Club's *Bulletin* (JAIDM), Long Island DX Association (W2MES), North Eastern DX Association's *DX Bulletin* (W2DGW), Newark News Radio Club's *Official Bulletin* (L. Waite, 39 Hannum St., Bullston Spa, N. Y.), QRP Amateur Radio Club's *Newsletter* (KGJSS, W6CIS), VERON's *DXpress* (PA6s FX LOU VDV WWP) and West Gulf DX Club's *DX Bulletin* (K5ADQ). Thank you kindly — come again!

## Whence:

Asia — Ex-9G1AA departs Kuwait for United Kingdom leave with this sober observation: "No licenses have been issued in 9K2-land to foreign nationals for about two years, and prospects for the future look very poor. The few stations still active here apparently are on the air only because the authorities have not yet decided what to do with them. I will soon proceed to Abu Dhabi in the Trucial Oman States and will be active on single-sideband. I'll have to get wised up on all the new country prefixes that have come along since I went QRT in Ghana more than two years ago." Dick also signed ST2DB and ZD4CL in days of yore . . . . . 5B4TC (ex-5A4TC) writes from Cyprus, "I have a nice radio QTH here and hope to get back on 40 and 80 soon. I'm looking into possibilities of a DX trip to TA territory, too." . . . . . More Korea notes: K8BV1 fired up on the 38th parallel as HL9TB on 7 and 14 Mc. W9WNV opened a two-year tour as HL9KH at Osan, and brought much of his Chicago antenna farm with him. Don will use all permissible DX bands, c.w. and sideband, and intends to investigate chances of DXursions to various rare Asian objectives. W9VZP handles HL9KH's Stateside liaison . . . . . QSLs for ten JA2 contacts among at least four prefectures since 1956 can earn a certification from the JARL Sky Wireless Club, c/o M. Yasuda, P.O. Box 6, Hisai Miken, Japan. Ws 5AWT 6JNX 6KG 6RCV 6UNP 6YC 7UVC 8JIN, K6s BWX CJF EJE JEP, WA6s HRS and IVM lost no time salting this one away . . . . . Asian notes via the clubs route: TA4RZ anticipates another year in Turkey before settling down in Virginia. . . . KA2JL and friends plan a five-day Marcus Island spurgle around this time. . . . MP4QBB-MP4MAO (W5LAK) is interested in a new neutral zone out Persian Gulf way, so be alert. . . . RAF DXers still point toward the Kuria Murias. . . . W0FWA/3W8 is a 14-Mc. sideband possibility. . . . After MP4TA01's departure to Germany, MP4TAM keeps Trucial Oman represented on 20-Mc. a.m.

Africa — ST2AR's nearest "local" QRM is still 500 miles away, notes W8KX. Walt opines, "My hat is off to Eric for making his Lazy-H load up on 10, 15 and 20 meters, especially without an s.w.r. bridge. But I'm sure an ST2 with a few watts and a piece of wire would do quite well in the DX world." . . . . . W8KX comments further, "VQ9A (W4BPD) proved that signals can get through from the equatorial zone at most hours of the clock if someone is interested enough to be on the air listening." But K2UWG is apprehensive: "Poor conditions certainly cut into W4BPD's Chagos stay. He was there for a week but most of us had only one good day to get a crack at him. This sort of thing will be an important consideration for future DXpeditions. No longer can they count on 24-hours-per-day results on 14 and 21 Mc. for a fast few thousand QSOs. The stays will have to be longer and the bands more carefully selected. Several locals gave up 14 Mc. in desperation, then hit VQ9A/8C paydirt later on 7 Mc." . . . . . W2TCL reminds us of LREM's W-CR7-A certification, a sheepskin available to W/K/V/E/VOs who collect QSLs for QSOs with fifteen CR7 stations since January, 1949. . . . . 5N2JIS (G3JJS) closed down in favor of VP2KR status in late summer. John, who formerly signed VP2LO and VQ3EX, also hopes to fire up from time to time in the British Virgins. K3MNP reports 5N2RSB back from U. K. leave and ready for pile-ups once again. . . . . Club organs add African ordinals: W4BPD, after 2.75 kilQSOs as VQ9A/8C and a Rodriguez stop, is inclined toward Marion, Gough, Bouvet and some 9U5 shenanigans. . . . 9U5s JH and PE like 21-Mc. phone but 9U58A year for 14-Mc. s.s.b. . . . Ex-TT8AG should begin a year's FB8ZZ assignment this month, then move on to Madagascar. . . . TU2AL, health improved, returns Stateside for further orders, possibly a stint in France.

Oceania — "I'll be on Midway for another year," cheers W6ZDF/KM6. "The station is a KVM-2 and folded dipole, with most activity on 40 c.w. at 0600-1200 GMT. I switch bands and modes as my inclination and conditions dictate. Recently snagged 75-meter sideband contacts with a WA6 and a VE7, and worked three Novices on 80. It's nice being on the DX end even if I'm not especially rare. I look forward

## LICENSES IN ISRAEL

Editor, QST:

Hams visiting Israel will find it useful to know that a foreign visitor, even a ham, may not speak on an Israeli phone (or c.w.) station without special permission, even though the licensed Israeli owner is operating it. However, permission to operate a licensed Israeli station is easily obtained on presenting the original operator's license from the United States. The Radio Licensing Office is located at 37 Yehuda Hayamit Street, Jaffe — Tel Aviv. This is the largest city in Israel, ½-hour ride from Lod Airport, where planes from the U. S. land.

There are about 300 hams here, licensed alphabetically, beginning with 4X4AA and currently up to 4X4P-. The examination is held twice a year at Tel Aviv. There are 3 classes of licenses.

The novice license begins with 4X4N- and is renewable indefinitely without re-examination. The power limit is 10 watts, c.w. only, 40 meters only, crystal controlled. It requires 6 w.p.m. and a Q and A exam.

The Class B license requires 12 w.p.m. and an oral technical examination. Phone is allowed on all bands, 25 watts, a.m. or s.s.b.

A Class A license also has a comprehensive oral exam, a test of 16 w.p.m. and 250 watts permitted input.

Frequencies (in Mc.) allowed are: 3.5-3.8 (part phone), 7-7.1 phone or c.w., 14.0-14.1 c.w., 14.1-14.35 phone or c.w., 21.1-21.450 phone (21-21.1 c.w.) or c.w., 28-29.7 phone or c.w., (28-28.1 c.w.) 144-146, 1215-1300, 2300-2450 and 5650-5850. Six meters is not permitted.

A diagram of the transmitter and any future modifications thereafter must be sent to the licensing agency, which is a division of the Post Office system.

A popular 50-page electronics magazine, published monthly in Hebrew (translation: *Electronics World*) carries 4 pages of amateur officers, DX worked, and club news contributed by members.

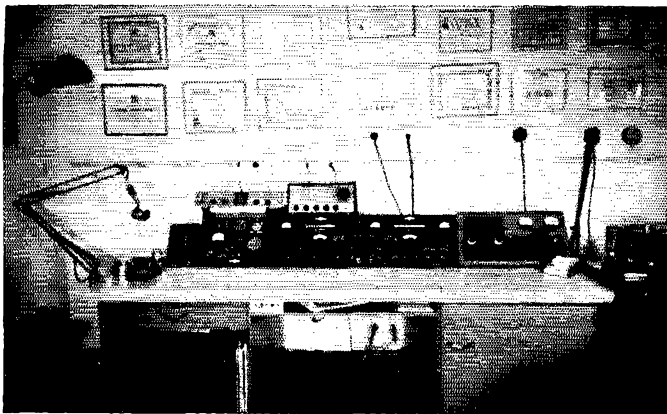
The import duty is high for both parts and equipment, most modern tubes for transmitters cannot be bought locally. Such tubes as the 6146, 811A, 5R4, 866, for example, are very expensive when available, particularly for an Israeli income. A 5R4G costs 19 Israeli pounds and a 12AX7 is 8 pounds, (3 Israeli pounds = 1 U. S. dollar). A 6BQ5, like all newer TV-type tubes, is not available. There is no TV station in Israel at present.

There are active radio clubs in Tel Aviv and Haifa which can be reached through the QSL Bureau, P.O. Box 4099, Tel Aviv.

This information comes as the result of a visit to the shack of Abe I. Nazel, 4X4IX, who has lived here 10 years.

— Morris Saled, M.D., W2NXXS

to 3.5-Mc. work with the U. S. east coast this winter and I'll be happy to arrange skeys with Novices or others who need KM6 QSLs. Amateur radiograms will reach me okay as I check into the Hawaii Poi NTS net every night, traffic handling being my first operating love." . . . . "I was amazed at the number of U. S. hams operating from rare VR8 and K8U islands as evidenced in 'How's QTH' listings for August and September," remarks W8KX. "Only ones I worked were KP6s around 0400 GMT. My 60-hour work week is cutting into DX-doin' here, and DX conditions have been poor in Michigan between 0500 and 1200." By the way, we'll have to wait for the DX dust to clear before we can be sure just exactly where some of those Pacific portables were located. Some of them switched prefixes or used ambiguous call signs at random and at will. . . . . W4ANE comments the DXpeditionary approach of VK3AHO as XJIRI and PWSBH. "Not only is Bill a splendid operator, but he makes friends for amateur radio wherever he goes. I wish other DXpeditions always had fellows like him." . . . . ARRL Hawaii SCM KH6DYC, an astute DXer, now attends Virginia Polytechnic Institute while KH6ARL takes up his paperwork slack. . . . Two or three club Oceania shippings: W9EXE's 14-Mc. VR5AR appearance was a bristling briefie. . . . KIAZA expected a



TG9AD's impressive 20-meter signal starts out from this business-like installation in Guatemala City. Bob's KWS-1 feeds a hungry three-element beam outside. (Photo via W8KX)

two-month Palmyra encore beginning last month or sooner. . . . CR8AB may make it back to Timor next month with an eager HT-37.

**Europe** — Top U. S. A. scorers by call area in the '61 Scandinavian Activity Contest were Ws 1KQF 2WZ 3DBX 5WZQ 7ESN 8IBX 9SZR and 0NCS (no Fours or Sixes applied). K9ECE led the five Yank phone entries, while VEs 2AFC and 3BWW paced Canada on c.w. and phone, respectively. UB5FJ and DJ5CU turned in the highest totals outside Scandinavia on c.w. and phone, respectively. The Scandinavian winners were OH1TN, c.w., and OH5SM, phone. SM3VE did an outstanding job, too, coming in No. 2 on both modes. . . . OY7ML writes from Torshavn, "Received my TA-33 beam from K9ECE and friends but, due to change of QTH, it will be some time before I get it going. I'll be QRT for a while before starting up again with an improved signal. I have applied to our Danish 'FCC' for permission to make tests on 160 meters but I'm afraid this will not be granted." . . . "Permission is being sought for maritime-mobile work in the Mediterranean aboard USS *Pocono*," states K9EOH/mm. G'luck, Jim . . . Don't forget the closing session of RSGB's 7-Mc. DX Contest on the 3rd and 4th of this month, details in the October column.

**Hereabouts** — Ex-VP1EK forwards comment from ex-VP1OLY who now resides in St. Louis (see "Where"): "VP1AM is very active in Belize with VP1ML's Elmac rig. VPs WS and RT are on occasionally. VP1GC bought my father's rig and is very active but VP1BS has been QRT for some time. VP1AB is still on the air but I don't know about VPs DL EE and MC." Oly is anxious to meet ham friends in the St. Louis area. . . . VP9 DC of Radio Society of Bermuda reports W2YTH and W0AIIH/VE3 the highest Stateside scorers in the Bermuda Amateur Radio Contest held in May. Other U. S. call-area leaders were



TT8AJ often is found around 14,055 kc. between 1800 and 2100 GMT, also 0600. Yves sometimes works 15, 40 and 80 meters with his homebrew 6146 forty-watter, BC-342 receiver, ground-planes and long-wire. (Photo via K2UYG)

W1BAN, K3NHL, W4PLL, W5WZQ, K0CYG, W8DWP, K9PNV and W0IIN (no Sevens shown). Canada's best were VEs 1EK 2NV and 4ZX. VP9s EP and DL ran one-two on the home front. . . . W4SHJ calls attention to Richmond Amateur Radio Club's Civil War Centennial Award (VA-CWC) which is available to non-W/K/VE/VO stations on the basis of contacts with 10 Virginia stations (3 in Richmond) between April 1, 1961, and May 31, 1965. U. S. and Canadian entries must work 25 Virginians including five in Richmond. Check with W4JUU for the detailed specs. . . . Jeeves & Co. truly appreciates the many expressions of well-wishers concerning the XYL's recent illness. She's coming along, now, and doing her best to facilitate our hitting "How's" deadlines. . . . "At last official count 72 Navy and Coast Guard ships had 'mm' amateur stations aboard," enlightens W3BOA/mm who operates on USS *Rankin* in the Caribbean bailiwick. . . . K7HDB makes us wonder what DX effects, if any, result from that 240-mile-high invisible auroral belt discovered in 1957 and now closely scrutinized by scientists the world over. It's in the red range and lies over the U. S. midlatitudes. . . . W4QDKM has a crumpled folded dipole in his attic that works Siberia with ease. . . . W4KHW gleefully writes, "I've been a ham for more than two years but never really enjoyed the hobby till this summer. I put up a beam in July and decided to try my hand at 20 c.w. Until that time I had been working only sideband. A whole new world opened up to me — DX? DX! I now have 51 countries worked and have been back on single-sideband only twice." You'll probably be hearing from some s.s.b. DX men now. Jeff. . . . ZL2FX/mm from HMNZS *Royalist* dined with VE7BBB recently. Eva reports VK8VK and XYL heartily enjoying their U. S. A. tour. . . . According to TG9AD and W8KX, TG9DM has forsaken c.w. for a.n./s.s.b. pursuits. . . . W9NN needs only Oceania for his all-phony 7-Mc. WAC. (After this appears in print Bob should clinch it quickly). . . . W42PXI finds VE1UA of rarish Prince Edward Island quite available on 40 phone. . . . W4PC has a Germany tour coming up and is hard at work building a compact 150-watt traveling companion.

**Ten Years Ago in "How's DX?"** — In November, 1952, our friend Jeeves points out that a determined DX man can obtain a pretty good liberal education. . . . Twenty phone is rolling along in fair shape with help from CS3AC, HI6TC, JY1OG, MF2AA, MI3a AB KE, OE13TM, SUs 1AS 1JY 1SS 1TH 5EB, TA2EFA, VSs 2BS 2CY 2DL 7DB 7ER 7FG 7GR 7RF 7SP 7WA, YA3VB, YIs 2AS 3WH, YJ1AA, YK1s AA AC, ZC6UNJ, ZD4s AX BC and BF. . . . Twenty c.w.'s choice ones are C3AR, EK1FM, HE9s LAA LAB, JY1AJ, KH16CB/KJ6, KM6AH/KB6, KT1PU, LB6XD, MF2AG, OE13s HP RN, ST2s GL HK, TA3AA, VK1GN, VR7AB, W5AGB/In of Fletcher's Ice Island, W5MPU/KS6, ZC2MAC, 9sIs AR and AX. . . . Curious FKIAN and rarish CM1AR keep 40 c.w. on the DX map. . . . Fifteen hams on with OE13USA, VS2CR, YI3BZL and ZD9AA. . . . Miscellany of the vine: OD5s come on from Lebanon. . . . ZS6GV is after ZD7 fame. . . . The 6th All-European DX Test is announced. . . . U.S.S.R. amateur activity appears to have hit a new low. . . . CE3AG & Co. point toward Easter Island. . . . Jeeves is floored by a new safety-interlock idea, and photos of ZS6BW, KG4AF, PY2RT and DL4JN (W4LAP) grace the grist. QST

## Strays

See page 160 for info on the annual RSGB 10, 15 phone contest.



CONDUCTED BY SAM HARRIS,\* W1FZJ

LAST month W1OOP had an article about an L harmonic generator which produced power at 432 Mc. You might think that the article didn't concern you. If this is so, you are not thinking the right thoughts! The little gadget that Hank wrote about is in fact a new step forward in amateur techniques. Not only is it a simpler and more reliable way to get a signal on the u.h.f. bands, it is a practical way to get a signal on *any* band. W1FRR came over the other night with a similar box that made a 1296 signal out of a 432-Mc. signal. This little goody (see photo) produced about 4 watts at 1296 Mc. with only six watts of drive at 432 Mc. I might point out that in the process of testing it we managed to get about 50 watts into the box without blowing up the varactor. We did manage to blow out the input circuit, however. Strangely enough, the circuit put out a maximum of about six watts no matter how hard we drove it; excess drive increased the temperature of the box but not the output. Of course, the technique of using harmonic-generating varactors is far from being new. I even had a contact with W1OOP almost three years ago using a varactor multiplier from 36 Mc. to 432 Mc.; however, suitable varactors for any use on the u.h.f. have only just become available. Once before, when varactors were really new and just couldn't be obtained, I suggested writing to W1HKK, Dana Atchley, in care of Microwave Associates. I suggest it again if you are really sincerely interested in experimenting with new techniques in the generation of u.h.f. signals. Commercial people are using varactors in all their circuits, even as low as audio.

—♦♦♦—

I keep getting letters from irate readers who are incensed at the loose terminology involved in the manly art of "Ground Wave." Ground wave, unfortunately, was defined a long time ago by some people who never heard of working

\* P.O. Box 334, Medfield, Mass.

more than line of sight on a v.h.f. band. Sometime back in the mid thirties, when amateurs started working beyond the line of sight on frequencies where there was no reflection from the ionosphere, the terms ground wave and extended ground wave were applied, however erroneously. The good books didn't have any term for the type of propagation involved, so the amateurs of the day applied the closest definition they could find. They knew it wasn't sky wave, so it must be ground wave. We have been calling any propagation which doesn't involve reflection from the ionosphere ground wave. It may be true that ground wave as defined in the *Handbook* does not apply to the majority of these contacts, but I am not about to start a fight with City Hall. I might point out that the same books that defined ground wave also defined the maximum limit you could work on the v.h.f. They have changed their minds about how far you can work and they have added a few new terms like "tropospheric scatter," "ionospheric scatter," "ducting," "bending," etc. If you want to work tropo scatter, you go ahead; I'll keep on working ground wave and we'll see who works farthest. After all, condensers are used in steam engines.

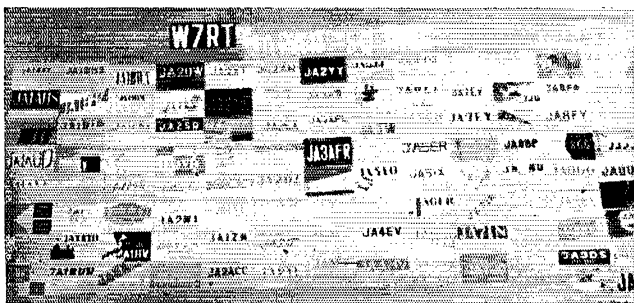
### V.H.F. Roundup

East of the Mississippi and north of the Mason-Dixon line mark the boundaries of the Syracuse VHF Roundup. All of the boys and girls were there. It is true that there were notables like KH6UK and W1RUD and so forth to regale the unwary on the art of "how to," but the real secret of the Roundup lies in the chance to chew the rag in person with other v.h.f. men. All the problems were discussed and nobody is convinced of anything that he didn't already believe. For the sports-car minded, the management managed to have the Watkins Glen Sports Car "do" on Sunday. 'Course, you had to drive another 40 miles or so, but it was there if you were of a mind.

### 144 Mc. and Up

More on the Perseids. W4TLC made state No. 39 for Jack, W8PT, who sez: "Boy, they come hard these days!" Good ping was heard on K7IDD in Utah and W7FGG in Arizona so the great desire now is those two next (probably during the Leonids). Jack is very active on 432 Mc. also.

"Oh! For the dear dead days of '58"! Count 'em! Over a hundred, and all JA districts, too! (I only wanted just one little JA contact.—W1HOY)





For the benefit of the many fellows who have written to Norm (VE6HO), here is the rig he's now using on 144 Mc. Rack contains hv. power supply, control panel, modulator and 2-meter 4CX250B amplifier at the top. W2AZL converter on top of receiver.

with a new 112-element beam, but is wondering "Where is everybody?" K8AXU said the same thing about 220 Mc. Word from Charlie, W4TLC, tells of his contact with Jack and we think the showers will have another proponent in the future. Charlie sez it was his first attempt at working m.s. and that it sure keeps you on your toes. He is also keeping regular skeds with W3RUE, W3UJG, K8AXU, W8PT and W3FEY on 220 Mc.

Out Boulder, Colorado, way, the "shower was rather poor this year" for Tom Clark, W0IUF. Tom was beset with rig troubles for the first two days of the shower and the rest of the period very little was heard. Only successful m.s. sked contact was with W4HHK, making state No. 13 for Tom. He is ready to make skeds for October, November and December showers, but warns the general public that correspondence will probably not be answered until after the first of October, after exams.

W5AJG in Dallas has found some activity on 432 Mc., 'cause he sent us the news that he has worked five states on that band; Texas, Arkansas, Louisiana, Oklahoma and Mississippi. Don, W3LCC sez: "While poking through my 220-Mc. QSLs I discovered that I've worked 10 states in five sections." He also mentions that W3ARW has been extraordinarily strong and stable with his 220-Mc. signal into Maryland, having held an S9 or better for 45 minutes over a 174-mile path. Skeds between W3LCC and W3UJG on 432 Mc. were resumed on August 12 at 0900. Breakers are welcome, say the boys. K8ITF has also been getting a new one now and then on 432 Mc.; George worked K9AAJ in Quincy, Illinois, on August 5 for state number 3; and K2UUR sez: "You can finally put me down for 8 states on 432 Mc. With the help of W1OOP we made contact on August 4." Bob is now using a 16-element colinear on 432 Mc. and says he's never given nor received such good reports. Increased activity on 432 in his area has brought forth W2JTI, W2DWJ and several others new to the band. Before taking down his 1296 Mc. antenna, Bob was able to work Pennsylvania twice with S6 reports.

On August 4 W2YXS worked W4KZC in Hampton, Virginia on 144 Mc., a new state and state number 8 for Bernie. W4MKT in Winston-Salem, North Carolina reports the 144-Mc. band opening of June 28 and 29 when the band was open for several hours each evening. Paul worked ten different states to the north of him that evening and heard others including W4RMU in Florida. Come fall he hopes to be active and competing on 432 Mc. W8VWX writes that

the latest roster of stations in the Detroit, Michigan area, working 146.975 Mc., wide-band f.m. now lists 48 calls. The net has been in operation for two and a half years and will be moving to the national wide-band f.m. frequency, 146.94 Mc. on October 1. The 48 calls represent 33 fixed stations, 23 mobiles and 10 handie-talkies. After perusing a lengthy letter from W4DNU (which we've had to condense) we've come up with the following news. First of all, W4DNU is .6 in Imperial Beach, California, and while trying to sell his mobile rig to W6GTZ he was caught in the web of v.h.f. by a demonstration of same from Frank (W6GTZ). A group of v.h.f. enthusiasts in that area wished to do something noteworthy in the v.h.f. spectrum in order to further the art (one suggestion, I understand, was that they should stay on the d.c. bands, but we don't go along with that), but fear of attempting something too advanced finally decided them to attempt a simple thing like a new 144- or 220-Mc. DX record. Alan, K6QPH, KH6 offered to put on a signal from Kaimuki. If successful, then plans will go ahead concerning a 144-Mc. contact with Midway Island. Equipment is being built for both ends of the contact at the present time, although the attempt is scheduled for the summer months of next year. This will give time to check out the equipment and get in some scatter work before schedule time comes around. The group would then like to try the same thing on 220 Mc., and eventually on 432 Mc. Congratulations to these fellows for their efforts, be they successful or not; but seems like they know some of the difficulties they might run into as they are planning far in advance of the actual "try."

Haven't heard too much recently about amateur TV, but we have received word via W8MBH that K8YQE and K8YQF are working at the project on 432 Mc.; that W8UJC is also on 432 Mc. TV, and that W8MIPR is on 432 audio with camera about ready to go. And, of course, there's the story on page 33 of this issue.

K4PRG tells us that although he's read anything published within the past few years concerning 1296 Mc., it was simply out of curiosity, until he got together with a few other locals. None of them had felt that they could get going alone but after pooling their knowledge they now feel they may come up with a winning combination. This seems to be a very good idea on the higher frequencies as there is so much still to learn concerning every phase of these frequencies in the way of equipment, etc., and every ham has his own bit of "special" knowledge of one sort or another if he is at all interested in these frequencies. K8HRR and W8BAX in Columbus, Ohio, are also working on equipment for 1296 Mc. To date one trip, portable, at a distance of six miles was made successfully and two more such trips are planned in the near future at ranges of twenty and forty-five miles respectively. Another pair working at 1230 Mc. is VE6DB and VE6FF.

Paul, W4HHK, sez that the regulars heard on 144 Mc. in his area include W5JWL, W5ML, W4LOJ, W4FLW and K4GFL; and that K4ZQM in Athens, Alabama has a sideband signal on 144.1. Tropospheric openings into Collier, Tennessee, were noted on July 9, 12, 26 and 27; with states heard and worked including Ohio, Illinois, Georgia, Texas, Arkansas and Mississippi. W5RCI was heard giving W8TYY a 219x report on his 432-Mc. signal. Nothing heard on 432 Mc. by Paul, W4HHK.

W0RVA tells us that 144-Mc. ground wave has been on the good side with stations working 150 miles or better with low power; several openings into the Dakotas and Nebraska. Wisconsin and the southern states; W0DQY is running 150 watts to a 15-element beam and will have two stacked and an amplifier with 2 4X250's; that a similar project is under way at QTH of K0GRI; that many new stations are constantly appearing locally on two meters; and that W0VOM is monitoring 432 Mc. and would welcome skeds.

From Georgia and W4FWH we hear that July was a good one for 144-Mc. operation in that area. On July 8 signals were heard from Kentucky, Indiana and Illinois but no contacts were made; however, on the 9th, Nebraska, Missouri, Iowa, Arkansas, Mississippi, Kentucky and North and South Carolina were heard and worked. Walt says there is little activity in his area on 220 and 432 Mc., but still lots of talk about it. K4LXG has missed the two-meter openings during July but hopes to make up for it when his new thirty-two element beam (under construction) goes up in the near future. Pete tells us that K4LXC has heard his Massachusetts sked (?) on 144.079 several times but no contact as yet.

In Gainesville, Florida, Ed, W4KZL has completed his n.b.f.m. transmitter for 144 Mc. and operates at 145.696



Mc. A quick note from Bob, K8PBA sez that two meters was open in Minneapolis and St. Paul on August 10 and 11 when he worked W01FS and W0AWK. Benton Harbor, Michigan and W8PT sez that there was a good tropo opening into Missouri and Illinois on July 1; that on July 14 W8RQI, W8JCQ and W8HCC in Ohio were all above S9 on 432 Mc. Jack also comments that his nightly schedule with W9AAG on 432 Mc. has been very satisfactory at 225 miles. Jack keeps nightly skeds with W9AAG at 2100 EST on 432 Mc.; with W8RQI at 2130 EST on Tuesdays and Thursdays; with W9BTI and W9GDP at 2200 EST on Mondays. 220 Mc. skeds are kept on Mondays at 2130 EST with W8GOV, W8CVQ, W9REM and W9SKN.

Down Louisiana way, Art, W5ML, an ardent and long-time v.h.f. man, has been getting in his licks on 144 and 432 Mc. On two meters he (A5ML) has been successfully working A4HKK in Collierville, Tennessee four nights weekly for the past three months on 143,990 Mc.; with Art running 300 watts and Paul a gallon. According to Art, "no pain, no strain, with only occasional QSB of about five-seconds duration." This over a 300-mile path. W5ML also works W5BAU in Morro, Louisiana (300 or more miles) almost nightly at 2100. As for 432 Mc., Art has been operating 432.-080 since May of this year and has worked five states using a Jones 432 Mc. converter into a new BC-453-B in conjunction with an 85-ke. Q multiplier. His antenna is 55 feet high, stacked long-john yagis. Others active on 432 in that area are: W5RCI, W5HTZ, W5JWL, K5JHG, W5AJG, W5NU, W5PZ, W5SWV and others. Those now building for 432 Mc. are: W5BEP, W5FYZ, K5WOR and W5JSW.

Another well known v.h.f. man, W7RT, had poor luck as far as the Perseids m.s. went. On August 11, 12 and 13 he heard W6YX several times with best reception on August 11 when several call sequences were heard. But, no contact. Other skeds with K6HMS, WA6MLT, W6WSQ and VE8BY were also no dice, except for a few pings from W6WSQ. John was running 950 watts input to a 13-element long yagi. W5RCI in Mississippi worked W7JRG in Montana (1280 miles) for his state No. 38 on two meters; and also worked W5ML in Louisiana for state No. 11 on 432 Mc. during the Perseids. Rex now has a 4X250B in coax cavity on 432 and sez it works real good. VE6HO kept several skeds during the Perseids with only one paying off, but that was a good one. On August 10 Norm worked W6YX for the first VE6 to W6 contact on 144 Mc. Bursts were strong but short; distance about 915 miles. Other skeds with W0IUF, W6DNG and W0QDH all produced negative results, although the one with W0QDH all produced negative results, although the one with W0QDH proved most interesting. Norm says that on the August 11 sked, Don heard him several times for short bursts, but no such luck in VE6 land. On August 12, short bursts were heard on both ends with identification and signal reports going both ways, but not enough to complete a contact. Norm expects to be trying again during the November showers and has skeds, to date, with W6QDH and W8PT. His next project will be 1296 Mc., and sometime in the future, Moonbounce. Out Michigan way, Jack, W8PT heard good workable signals from K7HKD, W7JRG and W0ENC but having already worked them on 144 Mc., he continued looking. On August 12 Jack worked W4TLC in South Carolina for state No. 39 on two meters, and also worked W5KFU in Texas making a new state worked for W5KFU. K7IDD was heard from Salt Lake City on sked, and he reported hearing Jack but not enough to make it a contact although it was positive identification. K7ICW in Las Vegas, Nevada sez: "General conclusions so far are that conditions (during the Perseids) were poor, tapering off August 12 early in the morning. For me, the signals heard from W0ENC were the best heard in two years of m.s. but I have yet to make a QSO." W4AWS in Orlando, Florida, says that he heard quite a lot during the Perseids on two meters. "Heard W8KAY very well for ten-second bursts; had a sked with WA2TUO, both running 100 watts, but no results although we both heard short bursts. K4LXC worked K9UIF, a W2 and a 4 in Kentucky. W4VTJ, Lantana, Florida, worked WA2EMA on sked. I have been listening on and off to K4IXC and W8QOH/MM skeds. Heard W8QOH/MM out to about 350 miles." Another Michigan report from K8JEE in Detroit who heard stations in Indiana, Illinois, Wisconsin and Pennsylvania during the m.s. Craig sez he heard an Akron, Ohio, station and a Michigan station working m.s. with some success at the low end of two meters. He, K8JEE, would like some skeds on 220-Mc. phone; used to be several locals on the band but repeated monitoring fails to catch any signals at the present time.

He is running 100 watts in with a 4X150A at 220.300. K8AXU in West Virginia is now on 432 Mc.; 5894 at 50 watts, 417A converter, 13-element yagi. Al has two states and two call areas and willing to increase that total by keeping skeds.

## Clubs and Nets

When *QST*'s v.h.f. editor met with the Carolina V.H.F. Society in Greensboro, North Carolina, last spring he noted a considerable increase in v.h.f. interest since his earlier visits to North Carolina cities. Feeling that this was due, in part, to the work of the relatively new club, he asked that details of the Society's founding and growth be put on paper as a guide for other groups serving the v.h.f. field. Here is the story, as supplied to Ed by W4OAB.

About two years ago there were four v.h.f. stations in Charlotte, North Carolina: W4VIII, W4SVP, W4CAH and W4OAB. Only W4VIII was on 144 Mc., the others were on 50 Mc. W4SVP and W4OAB talked of forming a club for the promotion of v.h.f. activity. At length a meeting place was arranged and the twenty or so 50-Mc. hams within reliable range of Charlotte were invited to a planning session. A much-used mimeograph machine was obtained from a local office-supply store, and the founders-to-be dipped into their pockets to print and mail a brochure about the proposed organization. This paper later became *The Rag-Chever*, the widely read publication of the Carolina V.H.F. Society.

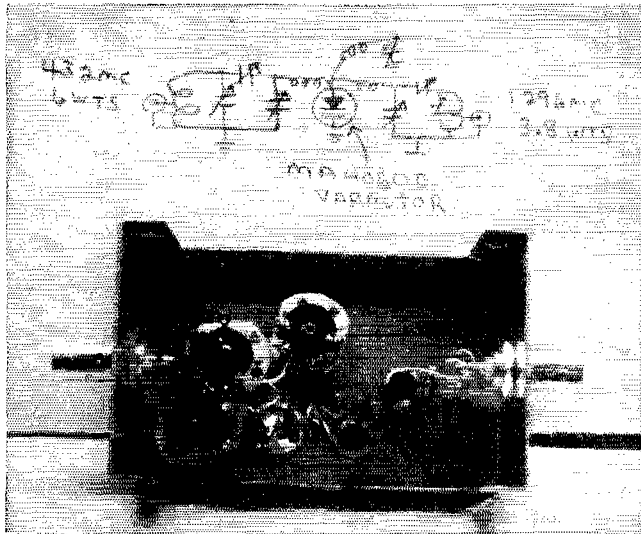
The first issue was mailed to about 75 people, including everyone known to be active on the v.h.f. bands within easy driving range of Charlotte. On-the-air talk had indicated that long-winded business sessions were high on the list of undesirable club activities, so business was held to a minimum at this and subsequent meetings. Instead, the founders concentrated on a bang-up program, including demonstrations of TVI prevention and cures — major items of interest among prospective members. Around 30 people showed up at the appointed time, and the Carolina V.H.F. Society was on its way.

A charter membership offer was set up, to expire in three months, involving an initiation fee of \$1.00 and \$1.00 per year dues. (Presently the rate is \$1.00 and \$1.50 respectively.) Money so obtained was used to defray immediate operating costs. Refreshments were provided for the first meeting by wives of the organizers.

Club problems differ with population density in the area to be served. In the Carolinas prospective club members are scattered around two or three in a place in most instances. To grow and prosper the Society would have to serve a wide area, rather than a single population center. Accordingly, it was decided to hold successive meetings in different cities, 50



Some of the members of the Cleveland 50 Mc. DX Club, winners of the June VHF Contest for Ohio (W8HB/1) Standing, l. to r.: K8UQA, W8HBI, WA8EH, K8MMM. Kneeling l. to r.: K8JCG, K8TOL, K8NUE.



432 Mc. in, 1296 Mc. out, à la W1FRR

miles or more apart. This lightened the driving chore for at least one group per month, and afforded opportunities for v.h.f. men of a large geographical area to meet one another personally.

Technical progress and home construction of v.h.f. gear were encouraged from the start. Members and guests were invited to bring new projects to meetings, and discussion of technical problems occupies a portion of each get-together. The host group also makes an effort to bring in guests and prospective members, including refugees from the "d.c. bands." The club's program is discussed on all bands used locally, to this end.

At first the Society was made up mainly of 6-meter men, but branching out on 144 and higher frequencies was encouraged. This worked so well that 144-Mc. activity now exceeds that on 50. Interest in 220, 420 and 1215 Mc. has been fostered. A 50-Mc. MARS net is going strong. A 6-months-long contest is run, from July through December, with multipliers galore, including one for counties. This encourages expeditions to hard-to-get areas. An Oscar group was formed and put to work, with the result that most of the gang were ready for Oscar I when it went into orbit. An "Operation Santa Claus" conducted each December has helped to improve the neighborhood images of hams who have been known in the past mainly for their disruption of TV reception.

Rotation of meetings lightens the program load for all, and makes attraction of good speakers more practical, since a sizeable audience is always assured. Attendance runs around 80 per meeting. *The Rag-Chewer* has kept pace. It is now a 3-page monthly paper, filled with lively v.h.f. notes and useful technical information. Its swap column is a popular feature. Currently the paper is produced by a Press Committee consisting of W4BUZ and K4GPL.

No two radio clubs encounter exactly the same problems, or find the same solutions, but perhaps the success of the Carolina V.H.F. Society will suggest ideas for your group.

### K1HMU — W6DNG 144-Mc. Moonbounce

You saw the eastern end on the cover of October *QST*. The big question about the big antenna is "Did it work?" The answer, based on August and September skeds kept by K1HAMU, Farmington, Conn., and W6DNG, Long Beach, Cal., would seem to be "Maybel" Here is the day-by-day score from both ends.

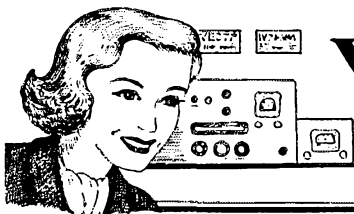
Aug. 21 — K1HAMU positively identified W6DNG. W6DNG heard only two dashes. Aug. 25 — K1HAMU heard W6DNG and sent report. W6DNG nil. Aug. 26 — Nil, both ends. Sept. 3 — K1HAMU heard W6DNG at start of sked, up to 10 db. above noise in 500-cycle filter, but soon blocked by c.w. QRM. Later copied weak "S3." W6DNG positively identified K1HAMU. Sent S3, then RS4. Sept. 4 — K1HAMU nil. Dense cloud cover, so aimed antenna by instinct. High noise level. W6DNG heard K1HAMU. Sent

### 220- and 420-Mc. STANDINGS

220 Mc.		W9ZIH.....10 5 500	
W1AJR.....11 4 480		K0DGU.....5 3 425	
W1AZK.....8 3 412		K0ITF.....6 3 515	
W1HDQ.....11 5 450			
W1JX.....10 3 450		KH6UK.....1 1 2540	
W1OOP.....12 4 400			
W1RFU.....15 5 480		VE3ATB.....7 4 450	
W1UHE.....11 4 385		VE3BPR.....3 3 300	
		420 Mc.	
W2AOC.....13 5 450		W1AJR.....11 4 40	
K2AXQ.....9 3 240		W1HDQ.....8 3 210	
W2ABAH.....4 2 167		W1MFT.....8 3 170	
K2CBA.....13 6 650		W1OOP.....11 3 390	
K2DIG.....4 3 140		W1QWD.....9 3 410	
W2DWW.....15 6 740		W1RFU.....7 4 430	
W2DZA.....12 5 410			
K2TFB.....11 5 265		W2AOD.....6 4 290	
K2ITQ.....11 5 265		W2BLV.....12 5 360	
K2JWT.....6 3 244		K2CBA.....5 3 225	
K2KIB.....12 4 300		W2DTZ.....6 3 200	
W2LRJ.....10 4 250		W2DWJ.....10 4 196	
W2LWL.....12 4 300		W2DZA.....15 5 130	
W2NTY.....12 5 300		W2HQE.....8 4 280	
K2PPZ.....11 4 190		W2NTY.....10 4 100	
K2QJQ.....13 5 540		K2UUR.....9 3 280	
W2BUE.....9 3 225		W2VCG.....9 4 280	
K2UUR.....4 3 105			
		K3CLK.....9 4 250	
W3AHQ.....4 3 180		K3EOP.....8 3 296	
W3FEY.....11 5 350		W3FEY.....8 4 296	
K3IUV.....8 3 310		K3IUV.....7 3 310	
W3JYL.....8 4 295		W3LCC.....2 2 95	
W3JZL.....4 3 250		W3RUE.....2 2 96	
W3KKN.....10 4 255		W3UJG.....6 4 350	
W3LCC.....9 5 300			
W3LZD.....15 5 425		W4HHK.....6 4 550	
W3RUE.....9 5 450		W4HVV.....7 4 430	
W3UJG.....13 5 400			
W3ZRF.....5 4 112		W5AVG.....5 1 425	
		W5H7Z.....5 3 440	
K4TFU.....8 4 400		W5RC1.....11 3 600	
W4TLC.....5 1 315			
W4UYB.....7 5 320		W6GTG.....1 1 180	
		W7LHL.....2 1 180	
W5AJG.....3 2 1050			
W5RC1.....5 700		K7ICW.....1 1 250	
		W8HCC.....3 2 355	
K6GTG.....2 1 240		W8HRC.....3 2 250	
W6MMU.....2 2 225		W8JLQ.....4 2 275	
W6NLZ.....3 2 2540		W8NRM.....3 2 390	
		W8PT.....6 3 310	
K7ICW.....1 1 250		W8QAL.....4 2 270	
KSAXU.....10 5 1050		W8TYY.....5 5 580	
W8JLQ.....9 5 475		W8UST.....3 3 225	
W8LZD.....6 4 480			
W8NRM.....8 4 390		W9AAG.....8 4 525	
VSPT.....10 5 660		K9AAJ.....7 5 425	
W8SVI.....6 4 520		W9BAB.....9 4 608	
		W9EJF.....9 4 540	
W9AAG.....9 4 660		W9OVL.....6 3 475	
W9KOC.....11 5 740		W9UFD.....4 4 605	
W9JCS.....8 2 340			
W9EJF.....9 4 540		W9AAB.....7 5 425	
W9OVL.....6 3 475		W9BAB.....9 4 608	
W9UFD.....4 4 605		W9JJI.....6 5 330	
		K9UIF.....6 3 240	
		K0ITF.....3 3 185	

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





# YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,\* W1QON

## EXPOSÉ

THE possible ramifications that may ensue by publishing the following letter from an intrepid OM from California may be so far-reaching as to give us pause to consider the wisdom of disseminating such information. On the other hand, artifices and ruses of the type described below may already have been known and employed by any number of wide-eyed, curly-lashed, pink-toed charmers. Well — at the very least we must be fair and give the poor chap a chance to plead his case anyway.

"I should have known what would happen when my XYL made RCC on her first Novice contact in April 1961, but I sure couldn't figure out how she spent so much time on the air and still managed to be cleaning house whenever I came home. That is, until I overheard her tell Peggy, WA6UPK, that she always set the vacuum cleaner out in the living room each morning and left it there till she finished hamming that evening. It developed that Peggy used the same ruse to give any callers the idea that she was a dedicated housekeeper as well as a ham! In divulging this secret, I may be starting other YLs on the road to domestic ruin, but at the same time, I am alerting any OMs who read your department, so my conscience is clear.

P.S. Ruth made General in March this year — WA6RCR, and she is now well-known around Southern California and Arizona as "Ruthie, the Rag-Chewin' Rascal."  
— Max P. Vander Horck, WA6HUW

Dear Sir:

We are, of course, delighted that your conscience has now been cleared. And we do hope that forevermore you will lose no sleep in pondering the electric mixer reposing in the middle of the kitchen counter (with cook book appropriately propped up beside it); the open sewing machine (with the little sewing light switched on); the bulging basket of *Bab-O, Thrill, Mr. Clean, Hide-It, Once-In-Five-Years Floor Wax*

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

Operating FD for the first time as a club, the enthusiastic Portland Roses (K7UER) made 200 contacts on 6, 10, 40, and 75. Next year, though, YLs (l. to r.) W7REU, Dorthie; W7GKU, Donna; W7ZMN, Phyllis; W7GRC, Lillian; and W7HPT, Beverly, will not hoist that 750-watt light bulb quite so high. (See text)



(placed in prominent view, of course). Your XYL would never dream of going *that* far, would she? But if she did, how *could* you blame her? You're a ham too, aren't you?" — W1QON.

## Field Day

Our Field Day reports are sparse this year. However, we're sure there were a good number of YLs "out there."

Using the call K7UER, the Portland Roses operated Field Day for the first time as a club. A Communicator for six meters and a Morrow mobile transmitter and receiver for 10, 40, and 75 were set on top of Mt. Scott, three miles outside the limits of Portland. Power was supplied by a field generator, gas operated, with all transmitters operating 50 watts or under. Two hundred contacts, with a claimed score of 1350, were made by operators Lillian, W7GRC; Beverly, W7HPT; Donna, W7GKU; Dorthie, W7REU; Dee, W7ZKY; and Phyllis, W7ZMN.

Unexpected excitement developed when a man, in agitated state, drove up the mountain to inform the girls that their 750-watt light bulb had caused countless patrons of the water district to telephone and warn of a low water supply. The bulb that the girls had mounted on their light pole was the same type of signal that the water district used to warn of low water pressure. The problem was simply solved by lowering the bulb a bit.

Additionally, other than a blown power tube and an invasion by moths of all varieties and sizes, the Portland Roses first FD was recorded in the annals of club history as a "stimulating success."

In California the BAYLARCS joined the San Francisco Radio Club for FD doings at Golden Gate Park, two blocks from the Pacific Ocean. Mermaids K6HIW, W6BDE, WA6s ALK, GQC, JGR, and PKP operated the 6-meter position during daylight hours to log 120 contacts.

K8BPQ, Vera, Secretary of the Genessee County Radio Club, reported on FD out Alichigan way: "The Genessee County RC encouraged YL participation in their Field Day operation (W8ACW-8) at Bishop Airport, Flint. The 40-meter phone station had K8BPQ as chairman, with W8MHE, W8UAP, K8IOP, K8QNA, and WN8BQB as operators and loggers. K8WKE, Gloria, operated 2 meters. Vacations and illness kept some of the "regular YL" participants away this year, but lots of fun was recorded."

## YLRL Election Results

Congratulations to the new officers of the Young Ladies Radio League! The officers will serve for a one year term, commencing Jan. 1, 1963.

President — Jean Kincheloe, K6OQD  
12007 So. Georgette Ave.  
La Mirada, California

QST for





The new Treasurer of the YLRL, Shirley Rex, K8MZT of Canton, Ohio, is also the General Chairman of the Fourth International Convention of the YLRL to be held in 1964 in Columbus, Ohio. An organizer of the Chix on Six and the Buckeye Belles, Shirley is an NCS for the Ohio SSB net and the 10th YL to receive the CHC award.



YLRL Secretary for the past two years, Blanche Randles, K1IZT (ex W4GXZ), moves up to serve as club Vice President for 1963. Blanche is custodian of the WRONE certificate. Her OM is W4COW/K1HTK.

- Vice President — Blanche Randles, K1IZT  
62 Linda Ave.  
Framingham, Mass.
- Secretary — Fran Bailey, K7MRX  
Box 3, University Station  
Moscow, Idaho
- Treasurer — Shirley Rex, K8MZT  
2225 Mt. Vernon N.W.  
Canton 9, Ohio

Gladys Eastman, W6DXL, of Glendale, California, will continue as Editor of *YL Harmonies*.

New District Chairmen are:

- |                          |                          |
|--------------------------|--------------------------|
| Peggy Harnois, K1GSF     | Betty Swansay, K7JPI     |
| Lillian Klarfield, W2IQP | Alice Nelson, K8MQB      |
| Edith Roser, W3AAU       | Marion McCone, K9JJS     |
| Marge Campbell, K4RNS    | Elizabeth Auer, K0MAS    |
| Marge Klar, K5PIO        | Ebbe Kristjansson, VE5DZ |
| Martha Edwards, W6QYL    | Jeanette DeLong, KH6AFN  |

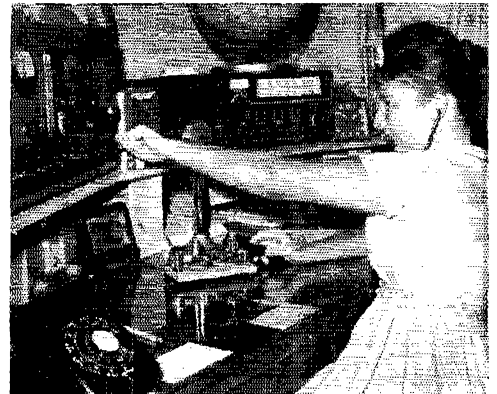
YLRL members issue a vote of thanks for a job very well done to 1962 officers, Pres. Onie Woodward, W1ZEN; Vice Pres. Lillian Byrne, K2JYZ; Secretary Blanche Randles, K1IZT; and Treasurer Jean Kincheloe, K6OQD.

### The YLRL — Young Ladies Radio League

Newcomers to the hobby soon notice the frequent references to the YLRL on these pages. The questions —



Pat Kiernan, WA2CPT, pounded brass FD week end with the Monmouth ARC (WA2DNI) at Freehold, N. J. Pat's father is Larry, WA2FGO, and her grandfather is Bill, WA2CPS. (photo courtesy K2SLI)



At the tender age of 11 Joyce Wright of Pomona, Calif., displays an exceptional talent for keys—code keys and organ keys. As WA6YSD, Joyce works almost entirely c.w. on 40, 20, 15, and 10 meters. As organist at a church in West Pomona, Joyce plays a complete formal morning service each Sunday. Joyce sets a shining example of ambition for all.



The Jersey Tomaters—I. to r.—back row—WA2PGR; Rose Hall; Charlotte Mechanick; WV2ZOY; WV2WPB; Charlotte Cooper; K2OTW; WV2WOY; W2IQP; WA2QCE; front row: K2OTV; WA2QGW; K2AGJ; WV2WOZ.

ceive *YL Harmonics*, published by the YLRL bi-monthly. Applications for membership may be obtained from Treasurer Jean Kincheloe, K8OQD, 12007 So. Gettys Ave., La Mirada, California. 33.

(Join YLRL and learn the meaning of "33")

### The Jersey Tomaters

Introducing the Jersey Tomaters! The state of New Jersey is famous for luscious tomatoes, so the name of the new YL club there is a natural, according to member Eileen Holmes, K2AGJ (like the Georgia Peaches, *et al.*, of course). Meeting the first Monday of each month at the home of Debbie Klarfeld, K2OTW, 69 Mertz Ave., Hillside, N. J., any female resident of N. J. who is interested in amateur radio is welcome to join. A two-meter net is conducted Monday at 0300-0400 GMT. Charter officers are Pres. K2OTW; V.P. W2IQP; Secy. Rose Hall; Treas. WV2WPB; Rec. Secy. Helen WV2ZOY; Trustees K2OTX, W2IQP, and Julienne Winsarsky.

### Coming Events

*WRONE YL-OM Luncheon*—The 1962 Fall luncheon marks the first time the Women Radio Operators of New England will have met in the state of New Hampshire and



Floridora YLs (l. to r.—W4VSG, Sue; WA4EXO, Marilyn; K4PPX, Fran; K4RCX, Jeri) had a field day with the Hi-Banders of Broward County, operating from Hallandale, Florida.

the first time that OMs have been invited to the affair. The date is Nov. 3 at the N. H. Highway Hotel, Concord, N. H. Luncheon committee co-chairmen are K1NZK, Mary Goulart, and K1OGU. Maxine Andrews, with K1PCZ, K1JFQ, and K1SLS assisting.

*YLRL Anniversary Party*—the 23rd annual contest for all YLs. Phone section Nov. 7-8. See October column for rules.

### Worked All Cables

Work all five members of the Cable family of Tucson, Arizona, and you'll receive a special WAC award—Worked All Cables. The five Cable hams are Dad Lowell, KN7SUT; Mother Marty, KN7SUT; son Gary, K7RQP (age 14); son Gene, KN7SJM (age 13); daughter Shirley, KN7TND (age 10). OM K7PSU, who passed along this information, says that he expects to see the Cable dog wag by with a Novice ticket between his teeth any day!

W7QYA, Flo Majerus of Lewistown, Montana, left Oct. 1 on a six-month trip around the world. Flo plans to contact YL hams wherever possible in Europe, Africa, Asia, and Australia.

## Strays

W7QXG ran up against a weird case of TVI. Everytime he parked himself on a couch to watch TV, the TV signal would distort. The culprit was a woolen blanket which apparently would generate enough static electricity when rubbed against the couch springs to foul up the TV set.

We don't have the details, but in February K8DQG was electrocuted while in QSO with another station. He may have tried to make some adjustment while operating the transmitter.

WA2MPP recently pointed out (August *QST*, p. 69) that not all the gang on 160 are old timers. K9VJS backs him up, listing sixteen 160-meter regulars in the Chicago area who are between 15 and 18 years of age. K9AAL, W9CUY, WA9DEW, K9DHN, K9DRS, K9FTB, K9RAS, K9RPE, K9SQG, K9UOV, K9VBS, K9VJS, K9VQC, K9WWT, K9YWO, and K9ZAT all

report in daily on the Chicago Area Emergency Net, 1805 kc. at 1900 CST. Net manager is 16-year-old K9UOV and assistant is 17-year-old K9RAS.

K0DEX (J. Sparky Summers, 1400 McGee St., Springfield, Mo.) is looking for an adventuresome young amateur between 21 and 35 to participate in what he calls an extraordinary enterprise. Applicant must be in good physical shape, be free to travel, speak at least one foreign language, and be a skilled movie and still photographer with own equipment.

Any Spanish teachers in the house? K3OJD (Guy Bohner, 262 Gibson St., Carlisle, Pa.) would like to hear from you.

Almost an all-ham family. Brothers K3LQJ and K3QCW, sister KN3UXI, mother KN3UVG. Dad is still studying.

# And Here We Go Again

BY C. W. DAVIES, \* WØYCR

**I**N LATE October you meet, as must every contest hound, that perennial problem — to enter the Sweepstakes or not to enter. Your thoughts go back to previous years and grasp for the resolutions you made as you neared the fortieth hour of operation.

Memory has dimmed somewhat of the items on the negative side of the problem. Almost gone are the recollections of the shack reeking of stale cigarette smoke for several weeks after the fray; of the permeating smell of wax and tar from overheated transformers and capacitors; of the wracking headache on Sunday after only thirty minutes of sleep the previous night; of the boss's sour comments as he wakes you from a sound sleep at your desk on Monday; of the drumming of 'CQ SS' in your ears for days; of your secretary's horrified look as she pulled back from your cramped keying hand clutching at the papers she handed you across your desk.

More distinct are the memories of the thrill of several years ago when you handed out NR 1000 early Sunday afternoon; when your contacts would spur you on with a 'FB OM GL'; when after a CQ you heard 'de VE5 . . . for your 73rd and last section; of published QST results showing you with the highest SS score ever posted by a WØ.

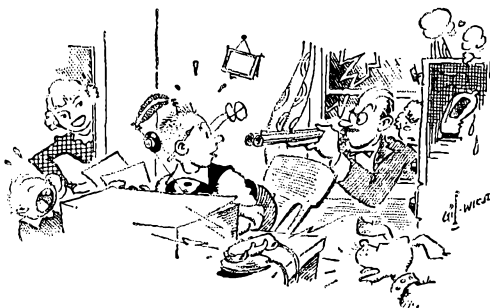
Then you remember the phone call from your next door neighbor saying you must have slipped off your wavelength on to the Bears-Lions football channel; your unsatisfactory explanation that you have only five more hours to go and he will be able to watch TV for another fifty weeks; your wife's sarcastic comments about your deafness and red-rimmed, baggy eyes when you stagger upstairs to a hurried meal; your feeling of smallness on Sunday morning when you know your wife is trying to get five little ones and herself dressed for Sunday School and church; your silly replies to your three-year-old daughter when she talks to you while you're in the middle of a hot one-per-minute period on 14 Mc.

But, remember in last year's contest a Colorado station surpassed your previous high WØ score; that several of the locals have been readying their equipment for weeks to give you a shellacking this year? Mustn't your honor be upheld?

Then again — how about your son, KØBPO, twelve years old and out of the novice ranks. He's getting to be a crackerjack of an op — wouldn't he glory in being able to operate a Sweepstakes contest? And wouldn't your XYL be proud of you if you spent a SS week end with the family instead of down in the 'molehole'? Wouldn't you feel proud of yourself sitting in church on a SS Sunday morning? Besides, you're getting too old for this sort of thing.

And how about the rig? It's been six years

\* 1228 East Como Boulevard, St. Paul, Minn.



since you built the exciter. The bandswitch contacts must be about at the limit of their endurance from countless switchings; the surplus 807s can't have a  $G_m$  of more than five; the elements of the homemade 14-Mc. beam are bent and twisted from seven years of wind and ice — 0 db. gain probably is too much to expect from it. The receiver? Fifteen years of hard operating have put the Super-Pro on its last legs; the sensitivity control is run up two points higher than normal to hear signals. The footswitch contacts are acting erratically; the receiver muting relay hums like a hive of bees; the old bug has no spring.

Conditions? Boy, have they been horrible recently! We're nearing the bottom of the cycle and it wouldn't take much for them to be worse than the first week end two years ago when the only signals coming through were W5KC and W5WZQ. Even if things go well the first week end and you reach 700 or more contacts — it's too much to expect two good week ends in a row and your good start will peter out. . . .

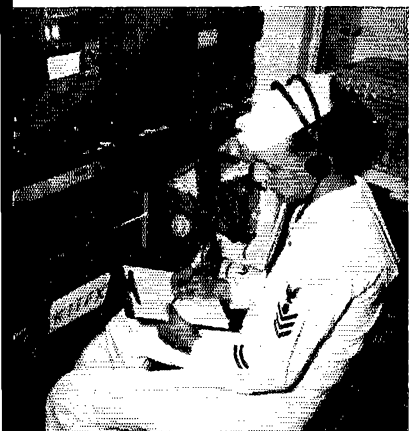
Nope, it's not for me this year. Maybe I'll get on for a couple of hours after midnight on 80 and give the boys a few contacts. Boy, won't KØBPO have fun in his first real contest?

— . . . —

. . . Well, here it's four and the football game is over. Minnesota sure gave it to Michigan today. Guess that should put them up in the first ten. . . . Think I'll wander down to the shack and see how things sound on the bands. . . . Hmm, 14 Mc. seems pretty good . . . wonder how 7 Mc. is . . . not bad, either. . . . Only an hour until the contest starts. . . . Maybe if I cut down to one cigarette per hour I wouldn't get such a splitting headache. Heck, those bandswitch contacts should be able to stand another contest . . . and the beam can't be too bad — managed to pull FB8XX out of the pileup the other morning. . . . KØBPO won't mind if I spend a few hours on the air now. . . .

CQ SS CQ SS . . . W2HAQ TU Heinz HR NR 1 WØYCR 589 Minn 2301 Date Bk . . . R 73 QRZ . . . and so on into the night. . . .

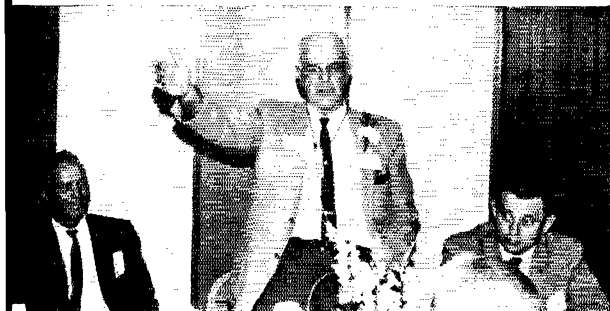
QST



Ham stations are now authorized on over a hundred Navy ships. Above left is K1TFX on the U.S.S. Hardhead. Other Navy hams who wish similar privileges should read OpNav Instruction 2070. 2F. Incidentally, work five or more ham stations aboard Navy ships, send the details to the Head, Amateur Radio Branch, Op-945N, The Pentagon, Washington 25, D.C., and receive a certificate . . . In the center, l. to r., are W4NJF, Rosemary Volk (a would-be ham), and W4OCQ. The station is W4NPT, of the Naval Air Station, Norfolk . . . K5FXW and K5FXX, seated, have received a certificate of appreciation from the Navy for their relaying of traffic from the destroyer escort Woodson. Standing are CDR Cucullu, skipper of the Woodson; W5SZG, chief radioman aboard the Woodson; and Captain Hank, 8th Naval District Deputy Chief of Staff.



Above left is WN4IHI, eleven years old and totally blind since birth. He is a member of the Talladega (Alabama) Amateur Radio Club, several of whose members have given him much help. Look for him on 7162 c.w. . . Isn't she pretty! But the *real* reason K6GKX sent in the photo is to point out that the Microwave Society of Long Beach recently donated several technical books to the Long Beach Public Library, including an ARRL Handbook. L. to r., Librarians Alice Appell and Diane Leland, and K6UPR. Don't buy any books, fellows, go down to the Long Beach Public Library . . . At the right is K5CXN, who recently was awarded a cover plaque for having had his article judged by the League's Directors to be the best in the April issue.



Len Cuff, VE4LC, recently retired after serving for 16 years as ARRL QSL Bureau Manager for the VE4 gang. He was honored at a banquet in Winnipeg on August 29. L. to r. in this photo are Eric Shea, VE4OR, D.O.T. representative; VE4LC; and Mike Pura, VE4MP, master of ceremonies. Many other distinguished guests were present.





# Correspondence From Members-

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

## CHAOS OR QSOS?

¶ I have just read the editorial in the September *QST* and am moved to set down a few of my thoughts on the question you raise: "CHAOS — OR QSOS?"

Perhaps the League has contributed to the situation it deplores by fostering a continuous competition for DX recognition. This League-sponsored competition has in part been responsible for such illegal activities as super-powered stations and out-of-band operation, at least part of the "deliberate interference . . . short tempers and selfishness" it now seeks to eliminate.

My suggestion is simply to deemphasize the dog-eat-dog competitive aspect of working DX by discontinuing the monthly publication in *QST* of the DXCC Honor Roll and the annual rank-order listing of the active DXCC membership. Publish only the calls of new members. Continue to issue endorsements as before, but let the DX score of individuals be their private business. I'm confident that without the bait of competition continuously dangled by the League, some of the sharp-elbow tactics, mean language and malicious practices attendant to maintaining or improving position in these listings will be less prevalent. — *Gabe Sellers, W2ZGB, Summit, N. J.*

¶ In reference to the editorial in September *QST*, I do not believe the QRM on our h.f. bands is cause for alarm.

Although the band appears to be a mass of QRM with a casual tuning, on the 20-, 40-, and 80-meter c.w. bands it seems always possible to find a "hole" in the QRM with careful listening. Most hams nowadays have v.f.o.s (on the h.f. bands, that is) and can get out of the QRM if they're not too lazy to look for a spot.

On phone, of course, the problem is not so easily settled, because there really is a space problem here. We should have rather definite agreements on where to operate phone and where to operate s.s.b. There will always be some nonconformists, but most of the time fellows break agreements because they are unaware of the existence of such agreements. — *Ronald W. Ming, WA2HGB, White Plains, N. Y.*

¶ Your editorial, "Chaos or QSOS?" is very timely and a crusade should be as effective in 1962 as it was in the earlier days. Might I suggest another future editorial, crusading the need for more use of the v.h.f., u.h.f. and microwave bands. It is needless to say that some day commercial communications will occupy these bands unless the radio amateurs begin to think more seriously in increased activity in this part of the spectrum. Our society is continually crusading in this direction and we hope that our small contribution will have some effect for the future. — *Ralph Steinberg, K6GKX, Microwave Society of Long Beach, Inc., Long Beach, Calif.*

¶ I have read with interest your editorial "It Seems to Us . . ." in the September issue of *QST*. I heartily agree that the technical quality of trans-

missions as well as operating practices must improve if the ham bands are to avoid becoming complete chaos in years to come.

I think that a step in the right direction would be the adoption of a three-number signal report for phone transmissions: Readability, Strength, and Quality. The Quality report would be the phone counterpart of the Tone report on c.w.; it would range from 1 for a horribly distorted, unintelligible splatter to 9 for a clean, hum-free, crisp audio signal.

It is appalling, the number of amateur phone stations that radiate unsatisfactory signals; signals that fill 20 kc. of spectrum, signals that are full of hum to mention a few; all without the knowledge of the operator. If a Quality report were included with the signal report, and if hams would use it truthfully, I believe many of the delinquent signals would be cleaned up. — *Sydney T. Fisher, W3USV, Philadelphia 18, Pa.*

¶ I've been home a few weeks after having taken a long trip to Asian waters as KV4CI/MM. Within a few days after firing up my home rig I was twice pounced upon by angry voracious hams waiting for DX on 7 and 14 Mc. Neither of these was audible at my QTH but the foul language from anxious and angry but unsigned calls was QSA 5.

After this experience I combed through the 14-Mc. band and found that there were five different DX stations with pile-ups either five or ten kc. either side of them. These five stations with their pre-empted sub bands took up most of the 14-Mc. band, making it almost impossible to operate except as part of one of the insane pile-ups. To try to do otherwise resulted in threats and abuse.

With the growing ham population something has to give. If we are to continue as a hobby we have to leave some room for the ragchewer and the casual DX man. There is no room for cliques, for fanatics and, least of all, for foul and abusive language. — *Pat Miller, KV4CI, St. Thomas, Virgin Islands.*

## PIONEERS!

¶ Has anyone else noticed that getting two Oscar satellites up is not the only achievement hams have made in the project? In getting up two Oscars before AT&T got up its first Telstar, the amateurs connected with the project have gotten up the first non-Governmental satellites. Yes, they actually beat the mighty AT&T to the punch.

Just goes to show that the little guy still has a chance, I guess. In any event, just let me add my congratulations, on two counts (getting them up and doing it before AT&T), to the many already voiced. Two jobs well done. — *Kim A. Boriskin, K1PLG, Burlington, Vermont.*

## HOMEBREW vs. KIT

¶ . . . I can't help chuckling at some members of the General class when they sound off about homebrewing. Usually, they don't mean designing and

(Continued on page 152)



# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator  
ELLEN WHITE, W1YIM, Ass't. Comm. Mgr., Phone

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, WIZJE, Administrative Aide

W1AW c.w. on 1805 kc. Starting officially with the new fall-winter W1AW sked (from Oct. 28th) W1AW adds a code practice frequency of 1805 kc.; will also use this 160-band frequency for OBS and two-way c.w. work, additional to other stated frequencies. Operators west of the Miss. River have asked us to "put out" on 1805 kc. so our signals in the west will not have the Loran problem to contend with. Likewise we bow to the requirements of the sun spot cycle to include a code practice transmission on 1805 kc. Last season was the first one in about forty years in which users of our OBS/CP services reported 3.5 Mc.-skip on a scale that rendered such reception (augmented at a distance) poor to useless in near-by Boston and N.Y.C. areas. 160 is coming into its own. To net operators and any with receiver problems may we earnestly recommend building a fixed-tune converted that will put these frequencies with decent band-spread into your 80-meter tuning range. See pages 55-57 of Jan. 1962 *QST* for details of such a converter. Also please note the full new fall-winter sked for W1AW elsewhere in these pages.

**Code Contest Winners.** The National Convention Code Competition was conducted by Al Davis, W7DIS assisted by Mel Govig, W7RCL, ARRL represented by Communications Mgr. Handy, WIBDI. Elimination runs in plain text were followed by run-offs in four entry classes, these at 30 w.p.m. using cipher messages. There was wide participation among some seventy spectators.



This scene of the 1962 ARRL National Convention Code Competition shows runners-up W7OEB (left seated) and W7DZL (right front) with amateur class champion W6OMR shown behind W7DZL.

**THE WINNERS:** *Amateur Class* (24) Irv Astmann, W6OMR, Mt. Shasta Calif. Runners-up W7OEB and W7DZL. *Commercial Class* (4), Don Newman, W7CO, Seattle Wash.; 2nd W6KG. *Novice Class* (9), Mary Burbach, KN7SWK, Lebanon, Ore. *YL Class* (7), Helen Conrad, K7HSB, Seattle, Wash.; 2nd. K4LMB. Honorable Mention: Don Bunker, W7ZB, mill copy, no competition.

"DXCC Twenty Five" . . . 'Twas twenty-five years ago this fall that ARRL announced the availability of its DX Century Club certificate award. The familiar and striking certificate was reproduced on page 51 of November 1937, *QST*, with publicity to the first five amateurs receiving the award. Eleven amateurs having between 75 and 100 country credits were also mentioned as comers for the new award "representing the highest honor in DX circles . . ." The total DXCC Roster in this initial presentation included the following:

- Frank Lucas, W8GRA . . . . . 112
- Doug. Borden, W1BUX . . . . . 105
- Jeff Borden IV, W1TW . . . . . 104
- Henry Sasaki, W6CXW . . . . . 101
- Ham Whyte, G6WY . . . . . 100

**Operational Recommendations from Portland.** The DX Forum at the National Convention engaged in discussions touching on band use. The well-attended sessions profited from the on-the-air experience of those participating. What steps might better conditions cited in Chaos-or-QSOs, our September *QST* editorial? The Willamette Valley DX Club's bulletin reports the deliberations and recommendations of this forum.

Here are some highlights as given by W7GXA and W7GBW: That the DX group of conventioners (1) Were well nigh unanimous for a return to incentive licensing (at some future date for reinstating a merit system of reserved frequency sectors for qualifying amateurs). (2) Recommended a voluntary understanding that all phone-relay traffic utilize 14,325 to 14,350 kc. frequencies, and not be spread over the band. (3) "Overwhelmingly approved" the principle that USA sidebanders start increased operational use at the 14.2 Mc. end; also that DX phone stations be requested to operate below 14.2 Mc. and listen above 14.2 Mc. In their rationale for this, the conventioners pointed to the precedents on 3.5 and 7 Mc. where there has been steady

increase in use of s.s.b. The ARRL blue card survey made about two years ago showed an s.s.b./a.m. ratio, 65% to 35%. The DXers urged this plan of operation for s.s.b. at the low end of twenty as due to "the growing number of s.s.b. stations on twenty which makes such a move practical and inevitable." (4) A standing ovation and vote of confidence was given ARRL and Bob White re DXCC affairs after a near-unanimous vote not to change the representation on the DXCC rules committee.

**The November Sweepstakes!** This is the 29th running of the ARRL "SS," perhaps the most popular radio operating activity of all the spot activities. For all those working for WAS it is a chance to polish off the few remaining states, or get another contact where someone has been slow to QSL. The Sweepstakes is most of all a chance to show what one's station and radio efforts can do. Invariably one increases his personal operating keenness at the same time he works new (and old) radio friends who get in the fray.

Whether you make your "clean sweep" by phone or c.w. in an aim to work all or most all ARRL Sections is up to you. Use your favorite mode throughout. Send in your score, large or small, for a listing in *QST*. We have two "SS" week-ends to minimize the effect of any poor conditions that might hit a given day of operation. We'll hope to C U in the SS.

—F. E. H.

#### A SLIGHT CORRECTION

A couple of high speed codesters have complained that they were left out of the *Operating News* item on page 84, Sept. *QST*. Checking with the Connecticut Wireless Assn. man in charge of their high speed program (WINJAM), we find that several winners were indeed omitted from the list, for the reason that the records on one complete high speed code test were lost. We therefore wish to make mention that W2UAP should have been listed at 50 w.p.m. in addition to 50 w.p.m., K6VYJ should have been listed at 60 w.p.m. in addition to 50 w.p.m., and W2CVW should have been listed at 50 w.p.m. There are no doubt others who were left out, but that Hart guy lost the records of the Sept. 1960 code test and we don't know who they are. Woe!



West Virginia PAM K8CFT, Dewey Collins, makes a noteworthy addition to this fine shack. Dewey is shown hanging a plaque voted to him as the most outstanding amateur in West Virginia for 1962.

#### RE NET DIRECTORY

As announced in Sept. *QST* (p. 90), there will be no net directory listing in *QST*. Instead, we are trying to streamline our net registration procedures in order to make them more efficient and, if all goes well, in future years enable us to get our printed net directory out somewhat before Nov. 1. Head the section entitled "New Net Registration Procedures" in Sept. *QST* for full details.

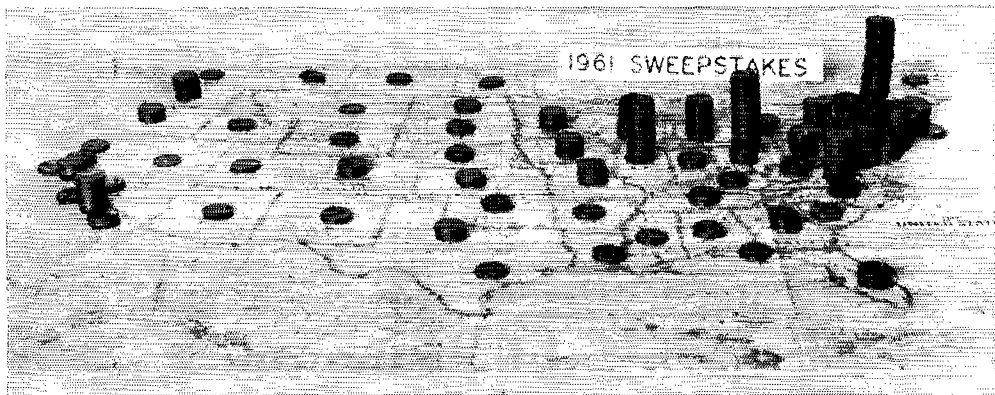
We are at present in the process of sending out status cards on all nets now registered with us. At this writing, we are about half way through the list, and by the end of September all net registrants and net managers should have been informed of their exact status.

In some cases, where last registration dates are a year or more ago, the recipient of the card has misunderstood our saying that the net is being transferred to the "inactive" file. This means inactive as far as registration information is concerned. You may have the hottest net in the country, but if you don't re-register it at least once per year, it is "inactive" as far as our net registry is concerned, and will not make the printed directory or the supplements thereto.

Please use CD-85 (we'll be glad to send you one or more) for registering nets, or give us the information listed in Sept. *QST*. — WINJAM.

#### CONTEST NOTE

The June V.H.F. Party Scores, shown in September *QST*, incorrectly lists the call of the 3rd place E. Pa. score. The 4832 point score was submitted by W3CLA.



This map shows the relative density of participation (logs received) in last year's leading activity, the November 1961 Sweepstakes. Our thanks to Smitty, K6DYX, of Monterey for the graphic presentation. The May *QST* report showed plenty of stations to be worked even in the sections that sent us least logs. It looks like winners in the central plains had less competition getting their Section Certificates! This map is an invitation to get in there and pitch Nov. 10-12 and 17-19. Let's see by your log how you made out in '62!

# With the AREC

We are now having big discussions on the subject of "priorities" for emergency traffic. As in all such discussions, the subject goes 'round and 'round, and when it comes out, fully discussed, it will bear little resemblance to anything logical or cogent. The discussion won't settle anything, it will merely give us food for thought, and ideas on the subject. Any conclusion or decision that results will come after a careful sorting out of all the ideas and consideration of their respective merits and demerits. Such a decision is arbitrary only to the extent that it is made at this level, without referendum.

In the recent Emergency and Traffic Bulletin, mailed to leaders in the Amateur Radio Public Service Corps, there was quite an exposé on this subject. Before we make any broad and sweeping decision, we feel it only fair to acquaint ARPS members in the field with some of the salient points made so far.

To begin, then, we suppose we have no chance to call the subject anything but "priorities." Actually, it is more correct to call it "precedences." Be this as it may, the principal schools of thought that have arisen so far include (1) those who feel we should adopt a system originated and now being used in Florida, (2) those who feel that a different system of a simpler and more logical nature would be preferred, (3) those who feel that precedences are desirable, but should be left to the agency or organization for whom the traffic is being handled, and (4) those who feel that it is not desirable for the amateur service to bother with message precedences at all, the content being the best indicator.

Very briefly, the Florida system sets down seven numbered categories, ranging from the most urgent to the least important in that numerical order. Each category is described in detail, so the originating operator (if he has the descriptions) will know which designation to give any particular message and handling operators (if they too have the descriptions) will know in what order to handle it. A number of section AREC groups other than Florida have already adopted their system.

The main fault we found with the Florida system was its complexity and the need for memorizing the various types of messages falling within each numerical category. We therefore proposed a different system in which message precedences were designated by name, or on c.w. by an initial letter of that name. We proposed seven designations also, namely Urgent (U), Rush (R), Notification (N), Routine (RT), Assurance (A), Worry (W) and Deferred (D); The principal advantage to this, as over the numbered categories (we opined) was that the designation itself gave each handling operator some indication of the precedence, without referring to a list (although each category, of course, is fully explained in the list), and would prevent such occurrences as happened to this writer recently when a local amateur called at 0500 GMT to deliver a routine Florida SET report labeled "Priority 6." He figured it must be pretty important because it had such a high priority number. Under *our* system, it would have been labeled "Routine" or "Deferred."

Most comments have been, so far, to the effect that while the Florida system is complex, ours is even more

so, and that the biggest need is to "make it simple." We agree with this, but at the same time it is simple it must also be logical and complete. Sometimes simplicity and completeness don't go together. The Florida definitions are complete enough, but hardly anybody is going to learn them; the descriptions will have to be available "under the glass." We're naturally prejudicially disposed toward the system we worked out, but up to now there seems no avalanche of favorable disposition toward it on the part of the great amateur radio public.

So, where are we? The perpetrators of the Florida system aren't completely sold on it themselves, but they are using it and it works — a pretty formidable argument! A basic simple system has been in use informally, especially among phone nets, for a long time; almost any time you can hear a net manager calling for "emergency or priority traffic only," implying the existence of three categories: emergency, priority and non-priority. Is this good enough? If not, should we adopt one of the more complicated systems described briefly above? Do you have a net system you would like to advocate? Or are you with the group who think that amateur messages shouldn't have precedence classifications — a group the ARRL has been in for a long time?

We're still pondering the whole question. If you have some thoughts on it, drop us a line. We can't promise to comment on each if the mail gets too heavy, but we will read it and add it to the brew already in the making. — W1VJM.

On July 22 a small tornado hit a service station on the southwest side of Chicago, disrupting communications. K9GDO and K9BGV, from the north side of the city, proceeded to the scene and established emergency communications on 145.35 Mc. until they were no longer needed. — K9BGV.

New Mexico SEC K5QIN sends in the details of a search for a missing light plane on Aug. 20, in which amateurs played a prominent part in cooperation with the Civil Air Patrol. W5PDO, the Los Alamos Amateur Radio Club station, was activated at 1100 by W5s VDY and DWB, and at 1400 mobiles K5s EJW and QIN left for airports at Santa Fe and Espanola respectively and established communication between them on 10 meters, with W5PDO as relay. At 1800 W5s ZMN and DWB set up an s.s.b. rig at Santa Fe on 40 meters, and 30-watt base stations were set up at both airports and at W5PDO. K5s VQU HTT, W5s GXU LNG joined the staff at W5PDO at 1700. Bad weather prevented searching that day, but at 1430 the following day (Aug. 21) W5PDO was activated by W5VQU, while K5WVR and W5VDY left for Santa Fe and mobiles W5QVZ and K5QIN left for Espanola at 0500, establishing full communications by 0600. A roll call of all search planes was made each half hour, with as many as 25 planes in the air at one time. At 0800, K5EJW and W5DWB took additional equipment to the airport stations. At 0700 K5HTT and W5MYQ joined the staff of W5PDO. Long and detailed flight information was handled on 29.6 kc. from Espanola and 7210 kc. from Santa Fe. W5GXU relieved W5MYQ at W5PDO at 1300. K5JTF helped install a 2-meter beam at W5PDO and a channel on 146.9 Mc. was established at 1600. Communications were used primarily for ordering parts for planes during the afternoon and operations were secured at 1900.

Similar operations were begun on Aug. 22, with W5s QVZ and GNH at Espanola and W5s VDY and SOT at Santa Fe. W5PDO was opened by K5VQU at 0500 and was joined by K5QIN at 0545. K5HTT at 0730, WN5ANZ at 0830 and K5EJW at 1000. Operation settled into the



At a recent Iowa 75-meter picnic, ECs and assistant ECs attending posed for the above group picture. From left to right, front row, are W0YDC, W0NWX (ARRL Director), W0GQ, (Vice Dir.), W0PTL, K0DFH, K0SQB, K0BRE, W0JPI, W0NTB (SCM), W0CYY. Back row, left to right, K0JTG, W0EEG, W0TFN, W0IAE, K0BBL, K0EXN (SEC), K0MYU, K0YCG, K0KTP, W0UHA.

usual procedure. One of the net's most important functions was the squelching of rumors. At 1315, W5VDY 5 at Santa Fe reported that the missing pilot had been found alive. A rescue helicopter was dispatched while W5PDO made arrangements for the helicopter to land at Los Alamos and have an ambulance and police escort standing by. K5HTT was dispatched to the Los Alamos Airport with a pack set. The helicopter arrived at Los Alamos at 1700 and W5PDO remained on the air until 2110 to maintain contact with a ground party which had gone to the crash scene. — *K5QIN, SEC New Mexico.*

On Aug. 28 the little town of Cameron, La., was again visited by disaster, this time in the form of a tornado which ripped through the eastern section of the town. The tornado struck at 2215, knocking out all power and communication. SW Louisiana EC W5SKW was notified along with Red Cross Communications Officer K5CXB. Just before midnight a relief convoy was sent into the stricken area. W5HNS, WA5DEQ and K5ARIH accompanied the convoy and set up communications. On August 29 they were relieved by K5s HQT and YJX. At 0600, net control was assigned to WA5ARV, relieving W5SKW, and during the day the job was variously handled by W5s CZV and BWZ. During the operation, W5B11 conducted successful 6-meter communications between Cameron and Lake Charles. The operation was terminated at 1030, Aug. 30 and the equipment returned to Lake Charles. Other amateurs participating: K5s BTG HAH LXX MAMQ OPN AIC QXV KMH KZQ LUN MOJ QXJ SGY SGX UYL VJT YHI VDF IOU LQL MWC DMI KJC TCY UYI FMQ CDC REN, W5s BSR CCD CEZ DEA ENK HCF IHR KHC NJN ZAK GUU MXQ ZPJ QME ANV JVN ZPD, WA5s DEV BQB BCK, W3JOR, W4CFB, K4ZCB, K8ALJ 5, K9JNZ 0, K9OOL, K9DQA 5. — *W5SKW, EC Southwestern Louisiana.*

The AREC at Lafayette was also alerted on Aug. 28 and two mobiles (K5VDF and K5SGY) left for the disaster area, maintaining contact on 3860 kc. with K5s VJT UYL and DMI. They arrived at about 0330, after much difficulty getting through and around high water, and established contact with Lafayette and Lake Charles. WA5ARV relayed for Lafayette to the mobiles. The two mobiles, relieved during their stay by K5s QXJ and CS1, operated on 3860 kc. until six meter e.d. equipment arrived from Lake Charles and took over. — *K5DPII, EC Lafayette, La.*

Amateur radio supplied the communications on Sept. 3, for a search for a lost 6-year-old boy in Garner State Park, near Uvalde, Texas. Agencies served included the Texas Rangers, the Uvalde County Sheriff's Department, the e.d. director and the Civil Air Patrol. The searching CAP aircraft was equipped with a portable rig on 3885 kc. maintaining contact with the ground search parties through the mobiles in Garner State Park. Frequencies used for contact with the Sheriff's Department and the Texas rangers were 3995 kc. and 7290 kc. V.H.F. operation was impossible because of the terrain. Three Texas District 31 RACES units also participated in the search. Amateurs participating included K5s HUS MIQK BDR LLK HZR, W5s HHT BRC VPQ EJT VW, W8TSP. — *K5HZR, EC San Antonio, Texas.*

The Erie County (Ohio) AREC was placed on stand by on August 8 when a severe windstorm visited the area, threatening disruption of communication. A tie-in was made with the police department, but only minor damage was suffered and the AREC was secured after having been on alert from 1945 until 2150. — *K8JSQ, EC Erie County, Ohio.*

Continuing "The Diary of the AREC" from the point at which we had to terminate it last month.

May 26: K7GHH reports details on a simulated explosion in a Billings, Mont., high school in which five amateurs participated as a RACES net.

May 27: Five amateurs from Los Alamos, N. Mex., supplied communications and official timing for the Rio Grande White Water Boat Race.

Sixteen members of the Lehigh County, Pa., AREC helped supply communications for the Allentown Bi-centennial Parade.

May 30: For the fourth time, AREC members of Josephine County, Ore., supplied communications for the Rogue River Boat Race, Grants Pass to Galice and return.

The West Jersey Radio Club provided radio control for the Memorial Day parade at Whitehouse Station, N. J.

June 2: AREC-RACES amateurs of Wayne County, N. Y., took part as communicators in a Boy Scout canoe race from Palmyra to Lyons, N. Y. Solid communication for four hours was provided on 144 Mc. by a mobile following the canoes along the riverbank.

June 2-3: Amateurs of the Oakland County (Mich.) Amateur Radio Society responded to a call for help in handling communications problems at the Boy Scout Jamboree at Union Lake. Scout officials declared that without the amateurs' help they could not have handled the 7,000 boy scouts and 300,000 visitors.

June 10: Under the direction of Assistant EC K8NGL, the Wayne County AREC participated in a simulated emergency landing of Air Force planes at the Detroit Metropolitan Airport. Thirteen amateurs took part.

June 26: AREC RACES amateurs of Pembina County, N. Dak., participated in the tabulation of primary election returns. Over 170 messages were handled using eight transceivers and the home station equipment and mobile unit of Radio Officer W0HNV. EC K0HOZ directed the handling of returns.

That brings us up to July, and perhaps from here on in we will be able to devote a little more space to each item — that is, provided we don't have too many emergencies to report. Keep these items coming, fellows. Even if we can't give them much space, just mentioning them is worth while, because it gives ECs some ideas for generating some activities of their own.

Thirty-five SECs reported July statistics, which beats by a mile the previous July high of 29, and is a new record for any month in total number of reports received. Total AREC members represented was 14,776, an all-time high for the month and second-highest ever reported (May, 1962, showed 13,707). We have now received reports from 48 ARRL sections in 1962, as four new sections were reported in July. These are encouraging statistics, fellows and gals. The way the August reports are pouring in while we write, it looks as though we might break all previous records for that month, too.

Some time ago, we threatened to list the sections which did not report if we ever received reports from more than half the sections. Since then, however, we promised not to be negative any more, so we'll continue listing those who do report and hope the others will "get the message."

Sections reporting for July (new ones in italics): Conn., Ont., Mich., S. N. J., E. Mass., Ohio, Nevada, E. Fla., W. Mass., Alberta, Wyo., Ind., S. Dak., Wash., Los A., Utah, E. Bay, N. M., Iowa, NYC-LI, Ore. E. Pa., N. N.J., Ala., Colo., S. Tex., Okla., Sac. V., S. C. V., Hawaii, Miss., Mo., N. Texas, N. Dak. Texas.

## RACES News

The RACES organization of Los Angeles County, Calif., was called out on Aug. 28 to assist with communications during the disastrous Golden and Onadarka fires. Stations

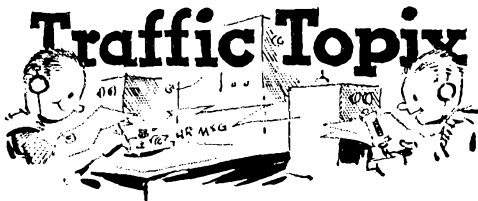
in the County Information Center, East L. A., and in the Newhall and Montrose districts were activated on 3995 kc. and stood ready to mobilize more than 200 mobile units on the same frequency. At the request of the Sheriff's Office, RACES was ordered to replace the microwave relay, which was out of operation, with a link between sheriff's headquarters and the Lancaster station,

50 miles away and across the San Gabriel Mountains, and to organize a simultaneous channel to the Los Angeles County Fire Department's command post in Newhall Park. These two links were established on 3995, with 1995 kc alternate.

When commercial power was restored, RACES had another job, this time for the Army. Personnel manning a Nike site in the fire area discovered that they could not get through to Fort MacArthur headquarters on military frequencies, but that signals could be heard on 3995 kc. RACES operators manned the Nike station on 3995 kc until 2300, Aug. 29.

Amateurs taking part in these activities included the following: K6s QMP MP1 ICN TBN QAY ZHT LUZ RLI SCL VID KDG IDB GXO AAY QYL, W6s OLG AEL UQL YOL GVU BVG WPF, WA6s UXQ GHJ.





We suppose it is natural enough for net discipline to fall apart when conditions are bad, but, natural or not, this is precisely the time when rigid discipline in directed nets is most necessary. During recent weeks we have begun to experience the first signs of the kind of conditions we are going to be facing every night by the time you read this. The faint of heart will wander off to other pursuits, and only the stalwarts will still be in there pitching, trying to keep the nets going even though the NCS is skipping over and they can hear only one or two of the other net members.

Let's take a hypothetical situation. The NCS is calling the roll, Station A calls but is not heard. The NCS continues the roll call, unaware that Station A answered him. Now, the hypothetical question: should someone break in and tell the NCS that Station A answered? The answer: yes, someone, but not anyone. The next station on the roll call, if he heard, or otherwise the first station on the roll call after that who

did hear the missing station call. Often, Station A will get panicky and call another net member, not the NCS. This is decidedly improper, and even more improper is the station called answering. In any net worthy of the name, no two stations should contact or call each other under any circumstances unless directed by the NCS to do so. If one station breaks this rule, it is compounding the felony for another one to break it also, even to hawl him out. In a directed net, the NCS is boss! If he needs help, he'll ask for it. If he doesn't ask for it, you are out of order if you try to give it to him.

A good NCS, therefore, will look forward to some of these problems. When skip conditions exist, he will quickly designate a station with a good signal to "pick up" any call-ins (QNI) he misses. He will check carefully after every call in the roll, and if he thinks he heard an answer but isn't sure, he'll ask for help. When the roll call is completed, he'll ask for any other reports. It's a good idea and may save time to designate someone before the net to help call the roll in this manner.

Of course not all nets have roll calls; many of them have stations report in at random. Even so, most of the above principles still apply. Here are some more good rules to follow in traffic net operation.

1) Report into your net on time. It can even be helpful to check with the NCS before the net to make sure your QNI will go smoothly -- but don't report in officially until invited to do so.

2) Don't talk directly to any station in the net except the NCS unless directed by him to do so -- and don't call the NCS unless it is really necessary. Some net stations always have a long story to tell. The best net stations observe one very important rule: *Shaddap!*

3) Traffic should start to flow just as soon as any two stations are in the net with traffic for each other. Don't wait for the completion of roll call. (This rule applies especially to c.w. nets, where QNY frequencies can be used to advantage.)

4) Excuse all stations who are "clear" not later than 15 minutes after the net starts. Don't hold the net open for late-comers; you are just encouraging them to be late again.

5) If the NCS asks you if you can take certain traffic or if you will perform a certain function, say yes (*not* "roger") or no -- C or N on c.w. Never mind the reason, if your answer is negative. If you're not going to do it, it doesn't make any difference. Also, don't qualify your answer by saying "if needed," or "OK but W3XXX is supposed to do it," or "rather not but will if you insist." This is a lot of time-wasting splatter.

6) Never, never leave the net without telling the NCS, even for a minute. If you leave temporarily, be sure to let him know when you come back.

In short, nothing delights an NCS more than to have net stations eager and willing and on the ball, but nothing gives him a bigger pain in the neck than net stations too eager and willing to the extent that they keep breaking in and disrupting the proceedings. If you don't like the way he is handling the net, tell him about it afterward, or write him a letter. From the standpoint of a net station, on the other hand, the participation in the net loses much of its flavor if the net is handled by an inept and bumbling NCS who doesn't know what he is doing. A great deal of patience and tolerance is required on both sides. Don't fight your NCS, work with him; and NCSs, don't be pompous with the net stations. Remember that the object is to get the traffic handled with the greatest efficiency and dispatch (E = AS), not to show off. After the net is QNF, one should sit back with a feeling of accomplishment and satisfaction rather than of nursing injured feelings or frustration.

*August Net Reports.* The North East Teen Net announces that effective Sept. 1 its name is changed to Eastern Region Traffic Net (ERN). It meets daily at 2235 GMT on 3560 kc.

### BRASS POUNDERS LEAGUE

Winners of BPL Certificate for August Traffic:

Call	Ortg.	Recd.	Rel.	Del.	Total
W3CUL	230	2143	1588	491	4452
K6BPL	96	1606	1495	111	3308
W9JQZ	26	1467	1486	4	2983
W9RRE	31	741	714	27	1513
W0LGG	144	695	639	33	1511
W0ZRU/E	110	642	627	125	1504
K00NR	125	622	571	12	1330
K7JHA	39	631	617	7	1294
K6EPT	10	520	477	43	1050
W7BA	12	502	472	27	1013
W1PEX	52	471	435	37	985
W4PIL	7	485	443	22	977
W3EM/L	24	454	412	30	920
W7DZX	8	469	414	16	907
W6WPF	87	412	371	35	905
W8DAE	44	427	296	78	845
W9DHR/S	43	382	252	122	799
W42EM/P	29	366	323	43	761
K1NEP	68	352	321	0	741
K1RYT	39	339	298	41	717
W9DYG	47	349	284	30	710
K0VPH	33	336	322	10	701
W3IVS	5	340	323	17	685
W4KCG	94	276	239	33	602
K6MDD	7	300	257	50	614
W42BRK	41	292	252	25	610
W3VR	19	293	279	6	597
K7KBN	162	202	97	102	563
K6KCB	12	299	248	4	553
K1GVX	12	248	227	7	523
W1TXL	102	210	114	96	522
K3QDD	22	247	229	12	510
W42GPT	49	233	219	6	507
K4AKP	23	240	151	89	503
Late Report:					
K2UCY (July)	46	251	235	16	548

### More-Than-One-Operator Stations

Call	Ortg.	Recd.	Rel.	Del.	Total
W61AB	216	1501	1421	80	3218
KP40GB	29	318	312	0	659

BPL for 100 or more originations-plus-deliveries

K6GZ	278	WA2QJU	145	WA4JHH	105
W48HJ	232	K4VFX	135	W4UGU/0	104
WA4BMC	199	WA4CJC	126	K9ARV	103
W4NTR	197	W0AFG	122	K1KSE/4	102
WA2TQT	184	W6GYH	121	W4AKB	102
W2EW	183	W7APS	119	W42CCF/1	100
W9AZ	166	K9KZB	114		
W9NZZ	161	K0GEA	114	W3RV	100
K9CQA	155	WA4JFY	110	Late Report:	
		W0WHE/7	107		
		K9ARW (June)	129		

### More-Than-One-Operator Stations

W0BIV 300

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K2UBG, K4ZYI, K8ZZW, K9YIC.

The BPL is open to all amateurs in the United States, Canada, and U. S. Possessions who report to their SCAM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard AERL form.

Net	Sessions	Check-ins	Traffic
North East Teen	15	81	57
Fourth Region Day	41	203	148
Northeast Area Barnyard	—	917	8
Eastern Area Slow	31	132	55
Q5 Traffic	31	174	133
7290 Traffic	46	1577	799
All Service	4	26	8
20 mtr. I.S.S.B.	23	498	1110
Mike Farad E & T	54	383	527

**National Traffic System.** In connection with the late lamented Simulated Emergency Test, we would like to remind all NTS nets that they are a basic part of the Amateur Radio Public Service Corps, along with the AREC, and that during emergencies, simulated or actual, NTS is activated to the extent called for by the emergency situation. Such activation is spontaneous and automatic. If the emergency is local, probably only the local and section net will be activated. If it is a regional emergency, such as a flood, the region net should go into action; and if a widespread emergency, such as a hurricane, the area net might also come into play. During the SET there are simulated emergency conditions on a nationwide basis, and so all NTS nets should have been active as an integral part of the ARPS.

The question arises, just what does this entail? Does it mean that the NTS cycle is set in operation more often than its normal once-per day? If so, how often?

In an emergency widespread enough to cause the activation of NTS nets up to region level or beyond, we would assume that the system would operate hourly, or bi-hourly, or on whatever basis the extent of traffic flow seemed to require, and that NTS nets at all required levels would operate simultaneously. That is, net controls would be in command of directed nets and liaison would be conducted in normal fashion but on a shuttle basis. While out-of-section traffic on the section was being placed in the hands of a designated station to take it to the region net, a designated station from each section in the region net would be collecting traffic to go back to the section. The same shuttle relationship would exist between the region and area net, if activated — and, if the emergency were nationwide in scope, between area nets and the TCC. Liaison stations would pass each other, so to speak, as one went from lower to higher echelon while the other went from higher to lower echelon. The only difference from normal NTS operation and operation during emergencies would be that the nets concerned would operate simultaneously instead of in time sequence, for as long a period as the emergency situation required.

Most likely this is an aspect of NTS that many of you traffic handlers haven't yet considered, and we feel that it should receive more detailed consideration. NTS isn't primarily an emergency system, as the AREC is, but by its very nature it is nevertheless capable of handling great quantities of traffic during emergencies. We are set up for normal one-cycle-per-day operation. In an emergency, we can simply speed up that cycle to as many per day as are required to handle emergency traffic with whatever speed the situation requires. Shall we look forward to trying to do just this in the next SET? — W1NJM.

#### August reports.

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	30	1510	.991	50.3	98.3
CAN	31	1606	.890	51.8	97.8
PAN	30	1726	.815	57.5	91.1
1RN	62	500	.358	8.1	66.8
2RN	62	496	.435	8.0	97.7
3RN	62	784	.422	12.6	97.9
4RN	56	512	.309	9.3	84.3
RN5	62	369	.204	6.0	71.9
RN6	31	690	.552	22.2	84.9 <sup>1</sup>
RN7	62	748	.305	12.2	64.7
8RN	62	326	.176	5.3	77.2
9RN	57	1118	.753	19.6	69.7
ECN	20	51	.143	2.6	46.7 <sup>1</sup>
TWN	31	326	.386	10.5	80.0 <sup>1</sup>
Sections <sup>2</sup>	935	5876		6.4	
TCC Eastern	124 <sup>3</sup>	524			
TCC Central	93 <sup>3</sup>	1470			
TCC Pacific	124 <sup>3</sup>	1134			
Summary	1593	19775	EAN	10.5	EAN
Record	1973	25618	1.440	14.8	100.0
Late Report:					
RN6 (July)	44	524	.415	24.4	74.8

<sup>1</sup> Region net representation based on one session per day. Others are based on two or more sessions per day.

<sup>2</sup> Section nets reporting (33): WSB & WIN (Wis.), SUN & SCVN (Calif.), BUN (Utah), QMN & Wolverine (Mich.), NCSN & NCN (N.C.), MDDS & MDDC (Md.-Del., D.C.), BN (Ohio), YO (Wyo.), GEM (Idaho), SCN (S.C.),

VSN, VFN & VN (Va.), AENB, AENM, AEND & AENO (Ala.), ILN (Ill.), WSN (Wash.), GBN (Ont.), NJN (N.J.), RISP (R.I.), CPN & CN (Conn.), MJN, MSN, MSPN Eve, MSPN Noon (Minn.).

<sup>3</sup> TCC functions reported, not counted as net sessions.

W8SCW submits his last report as EAN manager, after eleven years. W9DYG says August was a terrible month on CAN, but nothing that could not be fixed by some help from all concerned. PAN returned to 3675 kc. on Aug. 27, and now the rate is climbing but representation is dropping. WA2GQZ will replace W2EZB as manager of 2RN as the latter becomes EAN manager. K4LAN has been awarded an RN5 certificate. RN6 has gone to one session per day; W6FNE is now assistant manager to K6KCB. RN7 continues the progress shown in the past two months and threatens to become a contender for system honors. W8DAE submits his final report as 8RN manager as W8CIT takes over; he leaves the net in better shape than it has been in for quite some time. W9FEO is looking forward to a rate over 300 and says things are looking up for the fall season.

**Transcontinental Corps.** Central Director K4AKP gives high praise to the work of K6IVQ, who has been lost, temporarily, "to higher education." W7DZX attended the National Convention in Portland; he reports quite a few TCC failures this month because of changing conditions on 40 meters.

August reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	74.2	1354	524
Central	93	88.2	3054	1470
Pacific	124	86.3	2268	1134

Summary . . . 341 82.4 6676 3128

The TCC roster: Central Area (K4AKP, Dir.): — K4AKP, W9s JOZ, DYG, USR, VAY, ZYK, K9UGY, W0s SCA, LGG, Pacific Area (W7DZX, Dir.): — W5ZHN, W0s EOT, WPF, HC, YHM, WA6ROF, K6GID, W7s DZX, GMC, K7NWP, W0s WHE, KQD, K0s EDK, EDH.

### A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

- Nov. 2: CP Qualifying Run — W6OWP
- Nov. 10-12, 17-19: Sweepstakes Contest
- Nov. 17: CP Qualifying Run — W1AW
- Dec. 6: CP Qualifying Run — W6OWP
- Dec. 18: CP Qualifying Run — W1AW
- Jan. 4: CP Qualifying Run — W6OWP
- Jan. 5-6: V.H.F. Sweepstakes
- Jan. 12-14: CD Party (c.w.)
- Jan. 16: CP Qualifying Run — W1AW
- Jan. 19-21: CD Party (phone)
- Feb. 8-10: DX Competition (phone)
- Feb. 2-17: Novice Roundup
- Feb. 7: CP Qualifying Run — W6OWP
- Feb. 15: Frequency Measuring Test
- Feb. 22-24: DX Competition (c.w.)
- Feb. 21: CP Qualifying Run — W1AW
- Mar. 8-10: DX Competition (phone)
- Mar. 22-24: DX Competition (c.w.)
- June 8-9: V.H.F. QSO Party
- June 22-23: Field Day

### OTHER ACTIVITIES

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

- Nov. 3-5: Virginia QSO Party, Virginia SCM. (p. 136 this issue).
- Dec. 1-2: 21/28 Mc. Telephony Contest, RSGB (p. 160, this issue).
- Dec. 8-9: New England QSO Party, Conn. Wireless Assn. (p. 122, this issue).





## NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

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

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

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

### SUGGESTED RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

### GMT CONVERSION

To convert to local times subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7  
PST -8, Honolulu -10, Central Alaska -10.

## 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 Nov. 17 at 0230 G.M.T. Identical tests will be sent simultaneously by transmitters on 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6WHP only will be transmitted Nov. 2 at 0500 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION:** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given: *Example:* In converting, 0230 GMT Nov. 17 becomes 2130 EST Nov. 16.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

W1AW conducts code practice daily at 0230 GMT on all frequencies listed above with speeds of 15, 20, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 7½, 10, and 13 w.p.m. other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of QST text is sometimes reversed. To improve your fist, try to send in step with W1AW.

Date	Subject of Practice Text from Sept. QST
Nov. 2:	<i>It Seems to Us</i> . . . . . p. 9
Nov. 6:	<i>A Crystal-Controlled 1266-Mc. Converter</i> . . . . . p. 11
Nov. 7:	<i>QST De Front Seat</i> . . . . . p. 16
Nov. 10:	<i>Transmitting with Transistors</i> . . . . . p. 19
Nov. 12:	<i>Another . . . S.S.B. Exciter</i> . . . . . p. 28
Nov. 15:	<i>DX-100 Modifications</i> . . . . . p. 34
Nov. 21:	<i>6GJ5s on 6 Meters</i> . . . . . p. 36
Nov. 27:	<i>Oscar 1: A Summary</i> . . . . . p. 46

## W1AW SCHEDULES

(November 1962)

### Operating Visiting Hours

Monday through Friday: 3 P.M.-3 A.M. EST.

Saturday: 7 P.M.-2.30 A.M. EST.

Sunday: 3 P.M.-10.30 P.M. EST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request. The station will be closed Nov. 22, Thanksgiving Day.

### Operating Frequencies

C.w.: 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800

Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

### Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time:

C.w.: Monday through Saturday, 0100; Tuesday through Sunday, 0500.

Voice: Monday through Saturday, 0200; Tuesday through Sunday, 0430.

**Caution:** Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

## W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from *any* amateur station in accordance with the following schedule:

GMT	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0030-0100	.....	.....	7255	.....	7080	.....	7255
0120-0200 <sup>1</sup>	.....	.....	7080	.....	7080 <sup>2</sup>	3555 <sup>2</sup>	7080
0210-0230 <sup>1</sup>	.....	.....	3945	50.7 Mc.	145.8 Mc.	3945	3945
0330-0430	.....	.....	3555	3945	7080	1820	3555
0440-0500 <sup>1</sup>	.....	.....	3945	14,280	3945	14,280	3945
0520-0600 <sup>1</sup>	.....	.....	3555 <sup>2</sup>	7255	3555	7080 <sup>2</sup>	3945
0600-0700	.....	.....	14,280	14,100	3555	14,100	.....
0700-0800	.....	.....	7255	3945	7080	3945	7255
2000-2100	.....	.....	14,280	21 28 Mc. <sup>3</sup>	14,100	.....	.....
2100-2200	.....	14,280	21 28 Mc. <sup>3</sup>	14,100	21 28 Mc. <sup>3</sup>	21,330	.....
2200-2300	.....	14,100	14,280	21,075 <sup>2</sup>	14,280	14,100	.....

<sup>1</sup> General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.

<sup>2</sup> W1AW will first listen for Novices before checking the rest of the band for other contacts.

<sup>3</sup> Operation will be conducted on either 21,075, 21,330, 28,080 or 29,000 kc.

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

**ATLANTIC DIVISION**

**EASTERN PENNSYLVANIA**—SCM, Allen R. Breiner, W3ZRQ—SEC: W3DUL, RA1: W3EML, PAM: K3-BHU, V.H.F. PAM: W3SAO. We add two new Emergency Coordinators to our active file, K3KHV for Berks County and K3AIK for Dauphin County. Also the first RTTY OBS goes to W3DTH and OES to K3HEY. The EPA C.W. Net had a QNI of 304 and a traffic total of 311. K3RBN vacationed in Ohio and visited K8VAK and WA8APB. K1OAF is operating mobile marine in the Philadelphia Area, and our USN has added K3KNV to its ranks. W3MVE, just back from Korea, will be a welcome Scranton traffic outlet. KN3PSU is running 75 watts to a DX-40 on the 40- and 15-meter bands and is all set for his General. W3GRS added a 46-ft. crank-up tower to the antenna farm. K3LKR gave K3LKQ an SX-101A for their 14th wedding anniversary. EC K3-AKN reports Juniata County now has a 6-meter drill Fri. at 9 P.M. on 50.46 Mc. K3s CNN, MNT and HTZ are back to school. The Susquehanna Valley ARC is issuing an award for 6-meter activity. Details can be obtained from the club station, W3VPJ, RD 1, Sunbury. K3RJK has moved to a new QTH at Millersville. New Gear Dept.: W3CHC, an HT-40 driving an 813; K3-ARR, a 4-85A in grounded-grid linear; W3NNL, a new weapon for battering holes in 80-meter QRAI, a 304TH and quite important, a new roof for W3EU's shack. W3s NOH, HNK and ELI are back from vacation and looking for a busy fall and winter season. Instead of 275 watts, W3JKX settled for a pair of 807's as r.t. generators. The Knuckthead Picnic, the Mt. Airey V.H.F. Club Picnic and the York County Hamfest, to mention a few, were visited by the SEC and SCAM. W3YA and W3ZRQ had quite a skull session at the York Hamfest. We also had the great pleasure of swapping ideas with the SCM of Md-Del. D.C., W3JZY, in an eye-ball QSO. There still are a number of activity reports coming in with no names or calls entered. Also, our crystal ball is not functioning quite right on all the letters received with no call letters or return address listed. Do we owe you a reply? Traffic: W3CUL 4452, W3EML 920, W3IVS 685, W3VR 597, K3JSX 290, K3MQE 191, K3MNT 73 189, W3RV 153, W3IKY 127, W3HNK 112, W3PAF 108, W3-ZRQ 80, W3MVK 72, K3JHF 65, K3BHU 44, K3MVO 37, W3NNL 36, K3CAH 32, K3ARR 29, W3BFF 12, W3-BUR 11, K3HTZ 9, W3EEN 8, K3EOL 8, W3VO 8, K3AKN 5, W3GJA 5, W3ADE 4, K3JLG 4, W3DUI 3, K3ANU 2, K3CNN 2, W3EU 1.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA**—SCM, Andrew N. Abraham, W3JZY—Asst. SCM Delaware: Skip Nelson, K3GFK, SEC: W3CVE, RA1: K3JYZ for MDD Traffic Net, which meets on 3649 kc. at 0000Z daily. MDDS (slow) Net meets on 3650 kc. daily at 0130Z; MEPN on 3820 kc. M-W-F at 2300Z, Sat. and Sun. at 1800Z; Del. Eng. Net on 3905 kc. at 2230Z on Sat. Del. The Del. Hamfest was a big success. The Governor of Delaware proclaimed the week of the hamfest as Amateur Radio Week. K3GKF, K3LEC and K3AZH were interviewed about amateur radio over radio station WAMS, giving the amateurs a big boost. K3GKF and family had a wonderful camping trip while on vacation. K3KAJ is a new ORS in Sussex County and is enjoying traffic work. K3AXW worked 5 new countries on 6 meters. K3AZH has been appointed EC for New Castle County. Officers of the newly-formed Delaware Radio Assn., K3UMY, are W3CCT, pres.; K3LBI, vice-pres.; K9TJY, secy. Anyone associated with the university (located at Newark) interested in joining the club should contact W3CCT (Phone Sycamore 8-9261). Md. D.C. W3BKE has worked 2 new countries. W3CDQ enjoys working the old-timers on the air. W3EBF is NCM for MEPH, and will be on the air with an SF-10. W3AFR is on the sick list. W3ECP reports the D.C.

Chapter of the American Red Cross is now equipped to operate on all bands from 3.5 Mc. to 148 Mc. as W3PZA/W3ZT. W3EOV will be QRL with college math problems but will check into the nets for traffic. W3FRAI is back with Westinghouse specializing in x-ray equipment. K3-GJW is using a new antenna. W3FRV is operating with a KWS-1 and a 75A-4 and sure likes s.s.b. operation. K3GVE has a transistorized mobile converter. W3HQE is back on the air using a.m./s.s.b./e.w. W3IVC has been attending the hamfests in the area. K3JYZ reports a total of 29 attending the MDD Picnic. K3KPZ gave up his EC appointment to attend Penn. State College. K3-RGD will take over as EC for the Baltimore Area. K3LFD was NCS on MDDS in the absence of W3ZNV. K3NEX worked mobile while in Canada on 10 meters. K3QDD sends in a very fine traffic report. K3QFG made the highest QNI on the MDD so far this year. W3CAY and W3YYB are on the air with new 30-L-1 equipment and working DX. W3GBJ has put up a quad antenna for 20 meters. K3DUP is a professional engineer. W3YZI has redecorated his shack. W3ZNV is back handling traffic after a vacation. K3SGD passed the General class exam. K3MWQ and K3LFD presented a film and slide spectacular at the Friendship Amateur Radio Club. W3-ZAQ is doing a little more ham operating now that cooler weather is here. W4FXM/3 has accepted another field engineering assignment and is employed in Teheran, Persia. The Frederick Amateur Radio Club is handling the communications for the big Civil War Centennial Parade in Frederick, Md. The Antietam Amateur Radio Club of Hagerstown, Md., is handling the communications for the Civil War Centennial reenactment of the Battle of Antietam lasting four days at Sharpsburg, Md. Traffic: K3QDD 510, W3IVC 153, K3QFG 135, K3-OZM 105, K3JYZ 98, W3TIN 95, W3HQE 63, K3WBJ 47, K3SGD 40, K3LFD 30, W3EOV 19, K3MVCY 16, W3BKE 15, W3ECP 13, K3LLR 11, W3QZZ 10, W3FRV 6, K3KAJ 4, K3AZH 3, W3YZI 2, W3ZNV 2.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG; SEC: K2ARY, PAM: W2ZI, RMs: W2-HDW and WA2VAT. The N.J. Phone & Tlc. Net held its 6th Annual Picnic at Browns Mills. Net August totals were 31 sessions, QNI 488, traffic 91. WN2DAE is a new Novice in the Millville Area. Old-Timer W2BEI, Audubon, qualified for DXCC with 106 confirmed. His daughter is WN2CKK, Riverside. WA2QZ, NJN mgr., reports August totals as 31 sessions, QNI 556, traffic 73. The Levittown (N.J.) Radio Club is proud of the following WNs: 2DET, 2CPS, 2CRT, 2CKK. The club's new theory class started Sept. 9. W2RIF, Camden, who has been doing a fine job as OO, is moving to Laurel Springs. WA2LBL, Lawrenceville, has moved to Princeton. The Gloucester Co. ARC, in the interest of public relations, supplied mobile units for use in the 75th Anniversary Parade. Units were operated by WA2ELW, W2AFZ, WA2VWF and K2AQL. The same club assisted at the Lake Garrison Water Carnival. Operators were W2RJQ, W2MMD, WA2VWF, WA2FMO and W2CKX. K2OYW, SJRA's "Hamfest" Chairman, reports everything is planned to accommodate 1500 at the picnic. The Clubs Harmonics staff is publishing a special "Hamfest" issue. WA2GSO is editor. The Lenape Amateur Radio Club is now affiliated with the League. The club is located in the Mt. Holly Area. K2CPR vacationed on St. Pierre Island signing FP8AA. Please note: All appointees are required to supply the SCM with monthly reports. Traffic: (Aug.) W2RG 104, W2ZI 24, W2BZJ 17, WA2-WLN 17, WA2ARJ 12, WA2BLV 11, W2BEI 4. (July) WA2BLV 8.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE, RMs: W2RUF, W2EZZB and W2FEB, PAM: W2PVI, NYS C.W. meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 1800; NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun. and 7102.5 kc. at 1930 Wed.; TCNP 2nd call area on 3970 kc. at 1900; IPN on 3980 kc. at 1600; 2RN on 3690 kc. at 0045 and 2345 GMT. Appointments: K2IMI as ORS, WA2VOK as OES, Endorsements: K2RYH as ORS, K2TDG as OPS. Your SCM now gets eight regular monthly bulletins from various clubs. Are you proud of your club? The most active and successful organizations publish a regular newsletter. If your club is sick you'll find this a proven remedy. It pays to advertise. W2RQF uses a windshield wiper motor to resonate the rotary inductor on the mobile rig. W2MTA/2 is leaving the area temporarily. WA2RE left for the Air Force in August. W2QHQ left to attend M.I.T. WA2DAC reports

(Continued on page 100)

# WHY HAVE DXPEDITIONS?

**T**HERE are a few rough, tough and ready amateurs who each year expose themselves to the elements, poor living conditions, considerable expense and sometimes criticism, just to bring a new country to their fellow amateurs.

**W**E HAVE talked to quite a number of DXPEDITION veterans in an effort to find out what makes them tick. Apparently, many of them have the same urge to conquer that drove Sir Edmund Hillary to the top of Mt. Everest. They want to do the near impossible just to prove that it can be done.

**W**HEN mountain climbers are asked why they climb mountains, they frequently reply "just because it's there". The motivation for many DXPEDITIONS is, I am sure, the same. It is a challenge, and Malpelo could be likened to Everest.

**T**RUE, the thrill of signing a rare call and then trying to fight down the terrific pileups must be a never to be forgotten experience known only to those who have participated in DXPEDITIONS. The deep feeling of excitement, thrill and eventual satisfaction that is derived from operating a DX station was superbly expressed in the September 15th issue of DX magazine.

**B**UT what does this do for the hobby? The results are obvious. Just listen in when a rare one is on and you'll find a few thousand DX'ers competing to work him. Since the competition is tough and since the DXPEDITION can copy the loudest signals first, everyone wants to be in the top layer. This means better receivers, transmitters and antennae in top condition so that every available watt is put into the ether. It also means better operators, as the good operator seems to get through even though he frequently has less power.

**D**XPEDITIONS also create a continuing interest that helps keep many amateurs active, thus maintaining a higher over-all level of operating skill.

**T**HESE are but a few of the reasons why Hallicrafters will always applaud those individuals who are willing to make the sacrifices that make DXPEDITIONS possible.

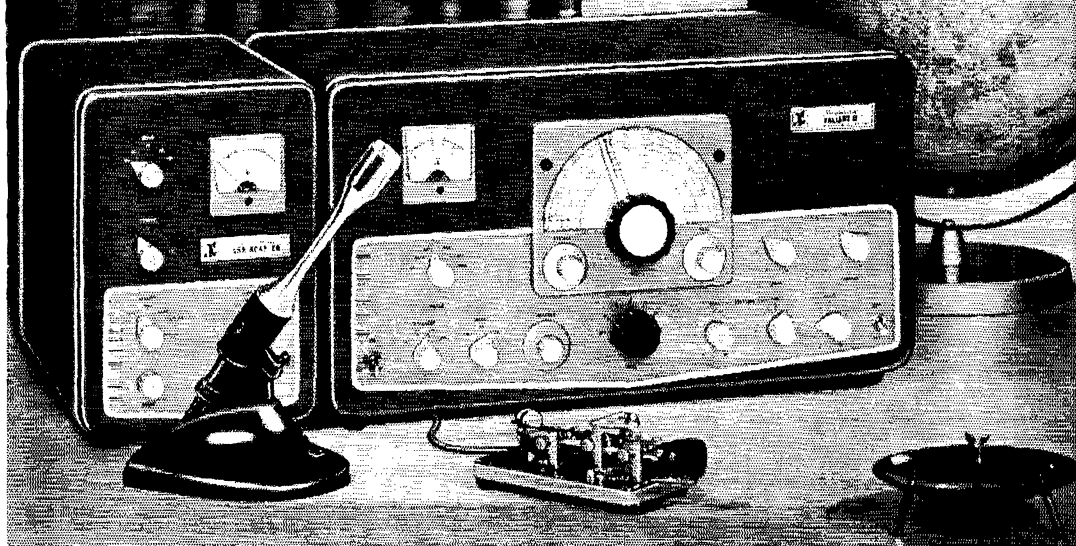
— TRAV MARSHALL, K9EBE

*W. J. Hallegan* W9AC

*Travis Marshall* K9EBE

for **hallicrafters**

**New!  
Matched pair for  
SSB, AM and CW!**



## Outstanding performance on SSB, AM and CW with absolutely no compromise on any mode!

**"SSB ADAPTER"**—Here's the filter-type SSB generator amateur operators everywhere have been asking for! Bandswitching 80 through 10 meters . . . more than 50 db sideband suppression . . . more than 45 db carrier suppression! When used with the Viking "Valiant" or "Valiant II" it places 275 watts P.E.P. at your command—gives you the punch and penetration necessary for solid communications on today's crowded bands!

Two compact units and interconnecting cables . . . RF unit is only 8" wide—may be placed on your operating desk—power supply unit may be placed in any convenient location. Unique design features built-in multiplier requiring VFO input only—band-pass interstage couplers require no tuning—design and front panel layout make operation practically "foolproof"! Superb audio fidelity and balanced audio response; excellent sideband, spurious and carrier suppression. Other features: positive VOX and anti-trip circuits with built-in anti-trip matching transformer and adjustable VOX time delay.

**Cat. No. 240-305-2**—Wired and tested with remote power supply, tubes, crystal filter, less microphone. **\$369.50**  
**AMATEUR NET**

**"VALIANT II"**—Newly restyled, the "Valiant II" gives you outstanding flexibility and performance in a compact desk-top rig! Bandswitching 160 through 10 meters—delivers a full 275 watts input CW or SSB (with auxiliary SSB exciter or the new Viking SSB Adapter) and 200 watts AM! Low level audio clipping prevents overmodulation and increases modulation level and intelligibility—differentially temperature compensated VFO provides the extreme stability necessary for peak SSB operation! High efficiency pi-network tank circuit—final tank coil is silver-plated. Other features: complete TVI suppression; timed sequence (grid block) keying; high gain push-to-talk audio system built-in low pass audio filter; self-contained power supply; and single control mode switching.

**AS AN EXCITER**—Drives any of the popular kilowatt level tubes, and provides a high quality speech driver system for high powered modulators.

**SSB OPERATION**—Provision for plug-in SSB operation with no internal modification necessary. Rear panel fittings provided for VFO output and SSB input, connections for remote control of final amplifier bias and VFO keying through the VOX control of the SSB adapter.

**Cat. No. 240-105-1**—Kit with tubes, less crystals. **\$375.00**  
**AMATEUR NET**

**Cat. No. 240-105-2**—Wired and tested with tubes, less crystals. **\$495.00**

## New Catalog

*E. F. Johnson Co. also manufactures other transmitters and accessories . . . all described in our newest amateur catalog. Write for your copy today!*



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# Pick your power and features from these popular Viking Transmitters!

**"INVADER"**—More exclusive features than any other Transmitter/Exciter on the market! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db. sideband suppression, more than 55 db carrier suppression! Instant bandswitching 80 thru 10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts AM (25 to 30 watts output-upper sideband and carrier). Built-in VFO—exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech power. Wide range pi-network output smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested, with tubes and crystals.

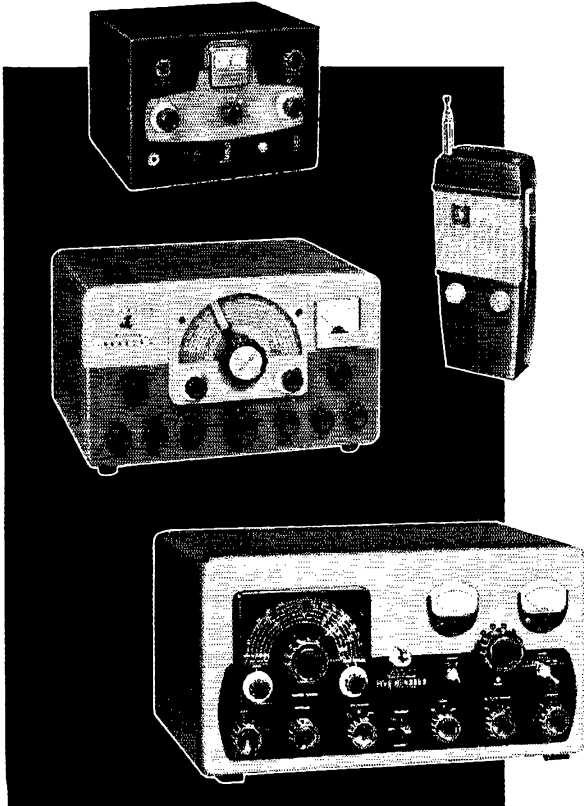
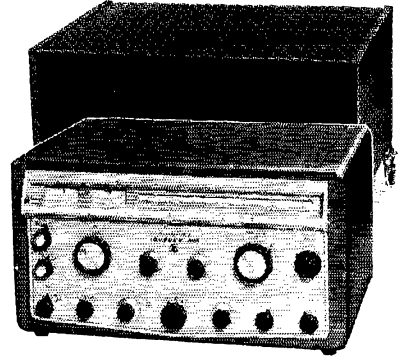
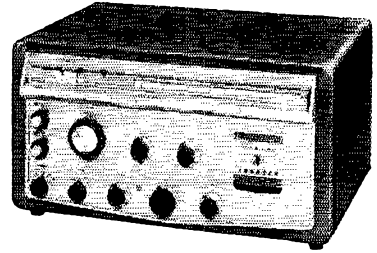
Cat. No. 240-302-2 Amateur Net.....\$619.50

**"INVADER 2000"**—All the features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts AM (250 to 300 watts output-upper sideband and carrier). Wide range output circuit 40 to 600 ohms (adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested, with power supply, tubes and crystals.

Cat. No. 240-304-2 Amateur Net.....\$1229.50

**"HIGH POWER CONVERSION"**—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Hi-Power Conversion and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net.....\$619.50



**"ADVENTURER"**—Completely self contained single knob bandswitching 80 thru 10 meters . . . effective TVI suppressed . . . and puts 50 watts of power into a rugged 807 transmitting tube. Operates by crystal or external VFO control. Front panel meter switching permits monitoring of the final grid of plate currents. . . keying is clean and crisp. Wide range pi-network output with tubes, less crystals.

Cat. No. 240-181-1 Kit.....Amateur Net \$69.95

**10 METER "PERSONAL MESSENGER"**—Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes-super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity two stage transmitter punches signal home, "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells) Rechargeable cadmium battery and other accessories available.

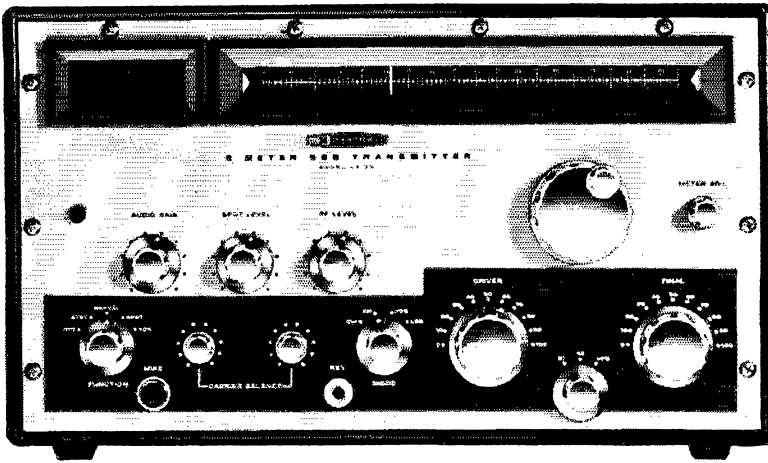
Cat. No. 242-103 100 milliwatt.....Amateur Net \$109.50  
242-104 1 watt.....\$129.50

**RANGER II**—Now a new version of the popular 75 watt CW or 65 watt AM "Ranger". The Ranger II transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 thru 6 meters! Operates by built-in VFO or crystal keying, TVI suppressed. Pi-network load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No. 240-162-1 Kit.....Amateur Net \$249.50  
240-162-2 Wired, tested.....\$359.50

**FIVE HUNDRED**—Full 600 watts CW—500 watts phone and SSB (P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desktop operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 thru 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

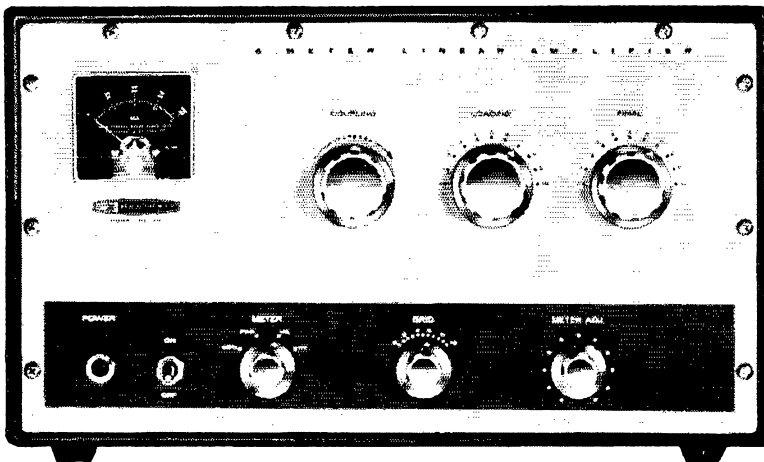
Cat. No. 240-500-2 Wired, tested.....Amateur Net \$1050.00



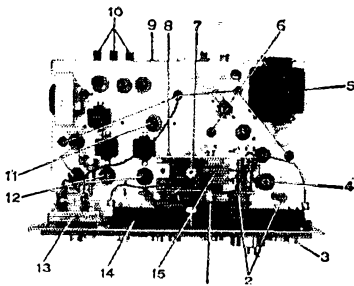
HEATHKIT HX-30 SIX METER SSB TRANSMITTER

# SSB SIX PACK

A NEW EXCITER & AMPLIFIER FOR 125 WATTS PEP ON SIX

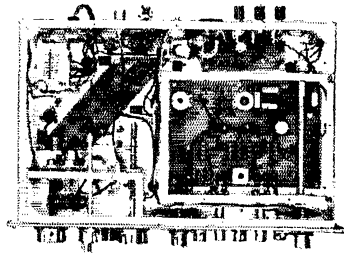


HEATHKIT HA-20 SIX METER LINEAR AMPLIFIER



**HEATHKIT HX-30  
SIX METER SSB TRANSMITTER**

1. Anti-backlash helical gear for smooth VFO tuning. 2. Adjustable final amp. coupling and loading. 3. Meter control with push-button over-ride to check carrier null. 4. 6360 final amplifier for 20 watt PEP RF input. 5. Regulated power supply. 6. Five test-point jacks for easy alignment using panel meter. 7. Low frequency heterodyne VFO electronics on circuit board. 8. VFO frequency determining components mounted on "heat-sink" plate in enclosure. 9. Accessory socket for control functions. 10. Built-in VOX & anti-trip circuitry. 11. Three audio stages with speech filter. 12. Phasing type SSB generator heterodyned to output frequency. 13. Meter indicates relative power output. 14. Lighted slide-rule dial with 9° per megacycle of bandspread. 15. Two crystal sockets for net or MARS operation (provides frequency coverage down to 49.8 mc).

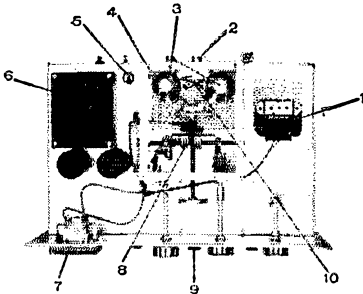


**TAKES LESS THAN 30 HOURS TO ASSEMBLE:** 3 extra-strength circuit boards and 3 pre-cut, cabled wiring harnesses simplify assembly and insure correct parts placement. Compartmentalized construction and thorough shielding assure stable, reliable performance. Advanced design features provide 50 to 54 mc coverage in four 1 mc segments (crystal for 50 to 51 mc supplied); USB, LSB, CW, AM operation; 50 db carrier suppression; 40 db unwanted sideband suppressions; grid block keying with filter; 50-75 ohm coax output and many more. Overall dimensions only 16 1/4" W x 10 1/8" H x 10" D.

Kit HX-30, 50 lbs., no money down,  
\$18 mo. .... **\$189.95**

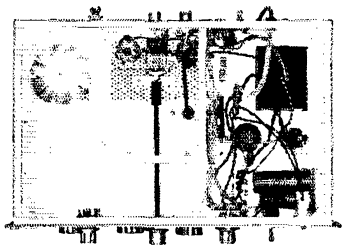
**SSB  
SIX PACK  
as low as  
\$27 per mo.**

Attention all six-meter fans! Here's another Heathkit first! A brand new SSB exciter and linear for six meter operation at sensational savings! Only \$289.90 for the pair . . . less than the cost of most transverters. Together they form a complete, high performance 6-meter SSB station designed for maximum efficiency and operating convenience. Check the many features of these two units . . . you'll find them the perfect pair for your station . . . enter your order today and go SSB on Six!



**HEATHKIT HA-20  
SIX METER LINEAR AMPLIFIER**

1. Fan forced-air cooling of final amplifier. 2. Only 2.5 to 10 watts PEP driving power required. 3. 125 watts PEP input. 4. Completely shielded RF circuitry. 5. Regulated screen voltage. 6. Solid-state rectifiers for cool, efficient operation. 7. Metered grid current, plate current, plate voltage & relative power output. 8. Link coupled RF output, 50-75 ohm coaxial. 9. 50 ohm tuned grid input to accommodate various levels of driving power. 10. Neutralized push-pull 6146 final amplifiers.



**EASY ASSEMBLY:** Clean, open circuit layout permits conventional wiring with less than 10 hours actual construction time. As in the HX-30, a heavy steel copper-clad cabinet provides strength, beauty and superior shielding, measures just 16 1/4" W x 10 1/8" H x 10" D. Frequency coverage is 49.8 to 54 megacycles. All power supplies are built in. A tremendous value at this low Heathkit price!

Kit HA-20, 43 lbs., no money down,  
\$10 mo. .... **\$99.95**



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CATALOG**  
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new kits since  
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over 250 kits in  
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## this complete Hy-Gain ANTENNA SYSTEM

WITH 56 foot Spaulding Tower

WORTH OVER \$500.00  
or one of 24 other valuable prizes

IN HY-GAIN'S  
SECOND ANNUAL

# Skyhook II CONTEST

Contest open to any Licensed Amateur\*  
on Planet Earth. • All entries must be post-  
marked no later than 23:30 GMT, 31 De-  
cember 1962.

## NOTHING TO BUY...

Here's all you have to do —  
Simply pick up an Official Skyhook II Entry  
Blank from your favorite Hy-Gain distributor  
and, in twenty-five words or less, complete the  
following statement: "If I were the New Product  
Manager of Hy-Gain, I'd ask my engi-  
neering department to develop an antenna  
design that would (25 words or less)." Send  
your entry to Hy-Gain Antenna Products, NE  
Highway 6 and Stevens Creek, Lincoln, Ne-  
braska. All entries will be judged on the con-  
tribution the suggestion offered will make  
toward universally improving reception or  
transmission and will remain the property of  
Hy-Gain Antenna Products, Inc.

**FIRST PRIZE...** 3.5-500 MC including RBX-1  
Rotator and Directional Indicator, DS-1 Dis-  
cove with range of 50 thru 500 mc., TH-4  
Tribander, 402-B 40 Meter Monobander,  
2BDP Multiband Doublet and 56' Spaulding  
Tower.

**2nd PRIZE**—DB-24 Duobander, 20-40 meters

**3rd PRIZE**—18HT All Band Vertical

**4th PRIZE**—TH-4 Thunderbird Tribander

**5th PRIZE**—TH-3 Thunderbird Tribander

\*Sorry, we must exclude entries from  
Cities, States or Countries where con-  
tests are prohibited by law.

**BE A WINNER!** Pick up an Official Entry  
Blank TODAY and submit your suggestion NOW to:

**ANTENNA PRODUCTS**  
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- ALABAMA**  
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3101 Fourth Ave., South  
Huntsville — Curle Radio Supply, 106 Winston Ave.
- ARIZONA**  
Phoenix — Southwest Electronics Devices,  
129 East Jefferson, P. O. Box 3751  
Tucson — Elliott Electronics, Inc., 418 N. Fourth Ave.
- ARKANSAS**  
Dewitt — Horsetrader "Ed" Morry Wholesale Radio,  
12th & Jefferson
- CALIFORNIA**  
Anaheim — Henry Radio, 931 N. Euclid Ave.  
Buena Park — S. J. Radio Electronics Co., 6306 Beach Blvd.  
Burbank — Valley Electronics, 1302 W. Magnolia Blvd.  
Burlingame — Amrad Supply, Inc., 999 Howard Ave.  
Goleta — Dow Electronics of Goleta, 5857 Hollister Ave.  
Hemet — Gil Severns Wholesale Electronics,  
40400 East Florida  
Inglewood — Acorn Radio, 4736 W. Century Blvd.  
Long Beach — South Supply, 266 Alamitos Ave.  
West Los Angeles — California Electronics Supply, Inc.,  
11201 West Pico Blvd.  
Los Angeles — Federated Purchaser, Inc.,  
11275 W. Olympic Blvd.  
Henry Radio, 11240 West Olympic Blvd.  
Radio Products Sales Co., 1501 South Hill  
North Hollywood — Arrow Electronics,  
7035 Laurel Canyon Road  
Oakland — Elmar Electronics, Inc., 140 11th St.  
Oxnard — Dow Electronics, 1505 South Oxnard Blvd.  
Palo Alto — Zack Electronics, 654 High St.  
Pasadena — Arrow Electronics, Inc., 2650 E. Colorado Blvd.  
Dow Radio, 1759 E. Colorado Blvd.  
Riverside — Mission Ham Supplies, 5474 Mission Blvd.  
Sacramento — Selectronics, 4113 Franklin Blvd.  
San Diego — Western Radio & TV Supply, 1415 India St.  
San Francisco — Amrad Supply, Inc., 3425 Balboa St.  
San Francisco Radio & Supply, 1284 Market St.  
Zack Electronics, 1422 Market St.  
San Jose — Quessent Industrial Electronics,  
161 West San Fernando Ave.  
Santa Ana — Arrow Electronics, Inc., 2713 South Main St.  
Santa Maria — Dow Electronics of Santa Maria,  
222 West Main St.  
Vallejo — Electronics' Best Buys, 1219 Monterey St.  
Van Nuys — Valley Electronics, 17647 Sherman Way
- COLORADO**  
Denver — Radio Products Sales Company, 1237 - 16th St.
- CONNECTICUT**  
Hartford — Hatry of Hartford, 100 High St.  
West Hartford — Radio Shack Corporation,  
39 South Main St.  
New Haven — Radio Shack Corporation,  
230 234 Crown St.  
New London — Aikins Electronic Supplies, 531 Broad St.  
Norwalk — Arrow Electronics  
Stamford — Radio Shack Corporation
- WASHINGTON D. C.**  
Electronic Wholesalers, Inc., 2345 Sherman Ave., N.W.
- DELAWARE**  
Wilmington — Almo Radio Company, 1122 French St.
- FLORIDA**  
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Miami — Amateur Radio Center, Inc., 2805 N.E. Second Ave.  
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Tampa — Kinkade Radio Supply, 1719 Grand Central
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Benton — Lampley Radio Company, 452 E. Church St.  
Chicago — Allied Radio Corp., 111 N. Campbell  
Amateur Electronics Supply, 6450 Milwaukee Ave.  
Newark Electronics, 223 W. Madison St.  
Chicago Heights — Heights Electronics, Inc.,  
1145 Halsted Street



**Galesburg**—Knox Electronic Supply, Inc., 67 North Cherry St.  
**Genoa**—Crawford Electronics, 233 W. Main St.  
**La Salle**—Klaus Radio & Electronics, 1055 First St.  
**Maywood**—Allied Radio Corporation, 2200 Maywood Drive  
**Peoria**—Selectronics Supplies, Inc., 801-03 S. W. Adams St.  
 Klaus Radio & Electronics, 403 E. Lake River Forest—Trigger, 7361 W. North Ave.  
**Rockford**—H & H Electronic Supply, Inc., 506-510 Kishwaukee St  
**Springfield**—Bruce Electronics, 1120 E. Ospital Ave.

**INDIANA**  
**Evansville**—Castrups, 1014 W. Franklin St.  
 In-State Amateur Supply, 8 East Iowa St.  
**Fort Wayne**—Ft. Wayne Electronics Supply, Inc., 3606 E. Maumee Rd.  
 Warren Radio Company, 1716 S. Harrison St.  
**Indianapolis**—Brown Distributing Co., 3746 College Ave.  
 Graham Electronics Supply, Inc., 122 S. Senate Ave.  
 Van Sickle Radio Supply Co., 4131 N. Keystone Ave.  
**Jeffersonville**—Wakler Electronic Supplies, 600 E. Chestnut St.  
**Lafayette**—Lafayette Radio Supply Co., Inc., 406-408 E. North St.  
**Muncie**—Muncie Electronics Supply, Inc., 222 N. Madison Ave.  
**South Bend**—Radio Distributing Co., 1212 High St.  
 Colfax Company, Inc., 747 South Michigan St.  
**Terre Haute**—C. I. Evinger Company, 1216 Wabash Ave.  
 Terre Haute Radio Company, 501 Ohio St.

**IOWA**  
**Cedar Rapids**—Iowa Radio Supply Co., Inc., 719 Center Point Rd., N. E.  
**Council Bluffs**—World Radio Labs, 3415-27 W. Broadway  
**Des Moines**—Radio Trade Supply Co., 1224 Grand Ave.  
 Amateur Radio Center, 1214 Grand Ave.

**KANSAS**  
**Salina**—Electronics, Inc., 227 North Santa Fe  
**Wichita**—Amateur Radio Equipment Company, 1203 E. Douglas

**KENTUCKY**  
**Lexington**—The Collins Company, 411 W. Hayman Ave.  
**Louisville**—Arby Electronics, Inc., 540 East Gray St.  
 Universal Electronics Supply, Inc., 533 South 7th St.

**LOUISIANA**  
**Baton Rouge**—Davis Electronics, 1735 North Acadian Way  
 Lake Charles—Wholesale Radio Equipment Co., Inc., 1722 Common St.  
**New Orleans**—Crescent Electronic Supply, Inc., 537 S. Claiborne Avenue  
 Radio Parts, Inc., 1112 Magazine St.  
 Southern Radio Supply, 1909 Tulane Ave.

**MARYLAND**  
**Baltimore**—Amateur Radio Center, TV Sound Communications, 2203 Fulton Ave.  
**Salisbury**—Almo Radio, 317 Park Heights Ave.  
**Wheaton**—Uncle Georges Radio Ham Shack, 11324 Fern Ave.

**MASSACHUSETTS**  
**Boston**—Demambro Radio Supply Co., Inc., 1095 Commonwealth Ave.  
 Lafayette Radio, 110 Federal St.  
 Radio Shack Corporation, 730 Commonwealth Ave.  
**Braintree**—Radio Shack Corporation  
**Hyannis**—Demambro Radio Supply, 223 Barnstable Rd.  
**Lawrence**—Alco Electronics, 3 Wolcott Ave.  
 Demambro Radio Supply, 473 Haverhill  
**Leominster**—Demambro Radio Supply, 760 North Main St.  
**Medford**—Demambro Radio Supply, 135 Mystic Ave.  
**Reading**—Graham Radio, Inc., 505 Main St.  
**Salem**—Demambro Radio Supply, 280 Highland Ave.  
**Saugus**—Radio Shack Corporation,  
 Saugus Shopping Center  
**Springfield**—Demambro Radio Supply Co., Inc., 169 Spring St.  
**Worcester**—Demambro Radio Supply Co., Inc., 222 Summer St.

**MICHIGAN**  
**Ann Arbor**—Purchase Radio Supply, 327 East Hoover Ave.  
**Battle Creek**—Warren Radio Company, 93 W. Bidwell  
**Detroit**—Midway Electronic Supply, 17801 W. McNichols Rd.  
 M. N. Duffy & Co., Inc., 2040 Grand River Ave.  
 Northwest Electronics, 20926 Schoolcraft Ave.  
 Radio Electronic Supply Co., 14405 Wyoming Ave.  
 Radio Supply & Engineering Ham Shack, 90 Sheldon Ave.  
 Radio Supply & Engineering Co., 10605 Fenkell  
 Radio Supply & Engineering, 10001 Chalmers  
 Reno Radio, 1314 Broadway  
**East Lansing**—Tone Recording Industries, 1101 E. Grand River Ave.  
**Flint**—Shand Radio Specialties, Inc., 2608 Leith St.  
**Kalamazoo**—Warren Radio Company, 1710 S. Westnedge St.  
**Marquette**—Northwest Radio, 1010 W. Washington St.  
**Monroe**—Warren Radio Company, 112 Cass Street  
 Warren Radio Company, 1155 W. Front St.  
**Muskegon**—Electronic Dist., Inc., 1960 Peck St.

**MINNESOTA**  
**Minneapolis**—Electronic Center, Inc., 107 3rd Ave.  
 Harry Starks, Inc., 112 3rd Ave. North  
 Lew Bonn Co., 67 South 12th St.

**MISSISSIPPI**  
**Butler**—Henry Radio Co., 211 N. Main  
**Kansas City**—Burslein Applebee Co., 1012-1014 McGee St.  
 Burslein-Applebee Co., 305 E. 55th St.  
**Saint Louis**—Walter Ashe Radio Co., 1125 Pine St.

**NEBRASKA**  
**Lincoln**—Scott Electronics Supply Corporation, 2201 'O' St.  
**Omaha**—Ladd Electronics Co., 111 North 41st St.

**NEVADA**  
**Las Vegas**—Metcalfs, Inc., 25 East California St.

**NEW HAMPSHIRE**  
**Concord**—Evans Radio, Inc., P. O. Box 312  
**Dover**—Demambro Radio Supply Co., Inc., 286 Central Avenue  
**Keene**—Demambro Radio Supply Co., Inc., 300 West St.  
**Manchester**—Demambro Radio Supply Co., Inc., 1308 Elm St.

**NEW JERSEY**  
**Atlantic City**—Almo Radio, 1800 Verona Ave.  
**Camden**—Almo Radio, 1133 Haddon Ave.  
**Mountainside**—Federated Purchaser, Inc., 1021 U. S. Route 22  
**Newark**—Lafayette Radio, 24 Central Ave.  
**Paramus**—Lafayette Radio, 182 Route 17  
**Plainfield**—Lafayette Radio, 139 West 2nd St.  
**Shrewsbury**—Federated Purchaser, Inc., 483 Broad St.  
**Trenton**—Almo Radio, 201 Calhoun St.  
**Vineland**—Almo Radio Co., 219 Landis Ave.

**NEW MEXICO**  
**Albuquerque**—Radio Equipment Co., 523 East Central  
 Roswell—R & R Electronic Supply, 605 E. 2nd St.

**NEW YORK**  
**Albany**—Fort Orange Radio Dist., Co., 904-916 Broadway.  
**Amsterdam**—Adriackad Radio Supply, Inc., 191 W. Main Street  
**Elmira**—Chemung Electronics, Inc., 403 E. Third St.  
**Farmingdale**—Gem Electronics, 34 Hempstead Turnpike  
**Jamaica**—Harrison Radio, 144-24 Hillside Ave.  
 Lafayette Radio, 165-08 Liberty Ave.  
**Mineola**—Arrow Electronics, 525 Jerricho Turnpike  
**New York**—Arrow Electronics, 65 Cortlandt St.  
 Harrison Radio, 225 Greenwich St.  
 Harvey Radio, 103 West 43rd St.  
 Lafayette Radio, 100 Sixth Ave.  
**Scarsdale**—Lafayette Radio, 691 Central Park Ave.  
**Syosset**—Lafayette Radio, 111 Jerricho Turnpike  
**Syracuse**—Harvey Electronics Syracuse, Inc., Pichard Drive  
 Radio Shack Corporation  
**Vestal**—Federal Electronics, Vestal Parkway

**NORTH CAROLINA**  
**Asheville**—Freck Radio & Supply Co., 38 Billmore Ave.  
**Burlington**—Womack Electronic Supply Co., Inc., 623 South North Street  
 Womack Electronic Supply Co., Inc., 315 North Church  
**Durham**—Womack Electronic Supply, 601 Ramseur St.  
**Goldsboro**—Womack Electronics Corporation, 106 N. Carolina St.  
**Greenville**—Womack Electronics Corporation, 311 Boyd St.  
**High Point**—Womack Radio Supply Co., 130 S. Lindsay  
**Raleigh**—Womack Supply Co., Inc., 421 S. Salisbury St.  
**Rocky Mount**—Womack Electronic Supply Co., 105 Marigold St.  
**Winston Salem**—Womack Electronics Corporation, 926 Brookstown Ave.

**NORTH DAKOTA**  
**Minot**—John Iversen Co., 216-2nd St., S.W.

**OHIO**  
**Akron**—Warren Radio Company, 71 S. Broadway  
**Canton**—Walkerradio, 1546 Fulton Rd., N.W.  
**Cincinnati**—Costin Electronic Distributors, 2345 Ferguson Rd.  
 Mytronic Co., 2145 Florence Ave.  
**Cleveland**—Bernon-Ray Service, Inc., 2118 E. 21st St.  
 Jeff-Tronics Unlimited, 4719 Memphis Ave.  
 Pioneer Electronics Supply, 5403 Prospect Ave.  
**Dayton**—Custom Electronics, Inc., 1918 South Brown St.  
 Stecco, Inc., 314 Leo St.  
**Elyria**—E I A Company, 235 Lodi St.  
**Toledo**—Warren Radio Company, 1002 Adams St.  
**Youngstown**—Armes Electronics, 320 W. Federal St.

**OREGON**  
**Albany**—Oregon Ham Sales, 409 First Ave.  
**Portland**—Portland Radio Supply Co., 1234 S. W. Stark St.  
 United Radio Supply, Inc., 221 N. W. Ninth St.

**PENNSYLVANIA**  
**Allentown**—A.A. Peters, Inc., 231 North 7th St.  
**Easton**—Federated Purchaser, Inc., 925 Northampton St.  
 **Erie**—Warren Radio Company, 1313-15-17 Peach St.  
**Lancaster**—George D. Barby Co., 622 Columbia Ave.  
**Norristown**—Almo Radio Co., 550 Markley St.  
**Philadelphia**—Almo Radio, 913 Arch St.  
 Almo Radio, 7450 Frankford Ave.  
 Almo Radio, 6205 Market St.  
 Almo Radio, 5801 Rising Sun Ave.  
 Radio Electric Service Co., 709 Arch St.  
**Pittsburgh**—Iydings Co., 933 Liberty Ave.  
**Reading**—George D. Barby Co., 333 North 4th St.  
 Wyncote—Ham Buerger, Rices Mill Rd. at Glenside Ave.

**RHODE ISLAND**  
**Cranston**—Radio Shack, Corporation, 1301 Reservoir Ave.  
**Providence**—Demambro Radio Supply Co., Inc., 1290 Westminster St.  
 W. H. Edwards, Inc., 116 Hartford Ave.

**SOUTH DAKOTA**  
**Rapid City**—Burghardt Radio Supply, Jackson Blvd.  
**Sioux Falls**—Burghardt Radio Supply, 208 N. Weber  
**Waterloo**—Burghardt Radio Supply, Box 746

**TENNESSEE**  
**Chattanooga**—Curle Radio Supply Co., 439 Broad St.  
**Dyersburg**—Warren Radio Company, Hiway 51 North  
**Memphis**—W & W Distributing Co., 644-46 Madison Ave.

**TEXAS**  
**Abilene**—Howard Radio, 1425 Pine  
**Amarillo**—R & R Electronic, 707 Adams  
**Corpus Christi**—Electronic Equipment & Engineering Co., 805 S. Staples St.  
**Dallas**—Amateur Electronics, Inc., 2802 Ross Ave.  
**Denison**—Denison Radio Supply, 310 W. Woodward St.  
**El Paso**—R & R Electronic, 2530 E. Yandell  
**Fort Worth**—Amateur Electronics, Inc., 215 So. Jennings  
**Houston**—Busacker Electronic Systems, Inc., 1216 West Clay  
**Lubbock**—R & R Electronic Supply, 1607 Ave. G  
**Victoria**—Electronic Equipment & Engineering Co., 1007 North William St.  
**Wichita Falls**—R & R Electronic Supply, 1300 - 12th St.

**UTAH**  
**Salt Lake City**—Manwill Supply Company, 251 S. State St.  
 Standard Supply Company, 225 E. 6th St.

**VIRGINIA**  
**Arlington**—Key Electronics, 100 South Wayne St.  
**Danville**—Womack Radio Supply Co., 513 Wilson St.  
**Norfolk**—Priest Electronic, Inc., 6431 Tidewater Drive

**WASHINGTON**  
**Aberdeen**—C & G Electronics Co., 510 West Wishkah  
**Bremerton**—C & G Electronics Co., 1301 Pacific Ave.  
**Centralia**—C & G Electronics Co., 217 So. Tower  
**Olympia**—C & G Electronics Co., 318 No. Capitol Way  
**Seattle**—C & G Electronics Co., 2221 3rd Ave.  
 Seattle Radio Supply, Inc., 2117 2nd Ave.  
**Spokane**—Northwest Electronics, Inc., East 730 First Ave.  
 HCl Electronics, E. 6904 Sprague  
**Tacoma**—C & G Electronics Co., 2502 Jefferson Ave.

**WEST VIRGINIA**  
**Wheeling**—Radio Parts Company, 1312 Main St.

**WISCONSIN**  
**Fond du Lac**—Harris Radio Corporation, 289 North Main St.  
**La Crosse**—Communications Equipment Co., 518 State St.  
**Madison**—Satterfield Electronics, Inc., 1900 South Park St.  
**Milwaukee**—Allied Radio of Wisconsin, 5314 N. Port Washington Rd.  
 Allied Radio of Wisconsin, Point Loomis Shopping Center, 3555 S. 27th St.  
 Amateur Electronic Supply, 3832 W. Lisbon Ave.

**ALASKA**  
**Anchorage**—Yukon Radio Supply, P. O. Box 406

**CANADA**  
**ALBERTA**  
**Calgary**—Smalley's Radio Limited, 1105 7th Ave., West  
**Edmonton**—Sacker Electronics, 10235 - 103rd St.

**BRITISH COLUMBIA**  
**Prince George**—Western Agencies, Limited, 409-3rd Ave.  
**Vancouver**—Canadian Electronics Limited, 971 Richards St.  
 Pacific Electronics, 1641 West 2nd St.  
 Western Agencies Limited, 951 Seymour St.  
**Victoria**—Western Agencies Limited, 2500 Douglas St.

**MANITOBA**  
**Winnipeg**—Cam-Gard Electronic Distributor, 397 William Ave. at Ellen St.

**NOVA SCOTIA**  
**Amherst**—Canadian Assemblies Limited, Station St.  
**Halifax**—Consolidated Supply Limited, 86 Hollis St.

**ONTARIO**  
**Downsview**—Alpha Arcon Radio Co., Limited, 555 Wilson Ave.  
**Fort Williams**—Inter-Comm Supply Co., 1315 Victoria Ave.  
**Hamilton**—Crawford Radio, 119 John St., North  
**London**—C. M. Peterson Co., Limited, 575 Dundas St.  
**Ottawa**—Wackid Radio & TV Labs., 149 Gloucester St.  
**Toronto**—Alpha Arcon Radio Co., 29 Adelaide St. West  
 Electro Sonic Supply Co., 543 Yonge St.  
 Wholesale Radio & Electric Limited, 66 Orfus Rd.

**QUEBEC**  
**Montreal**—Etco Electronics, 464 McGill St.  
 Payette Radio Limited, 730 St. James St., West  
**Quebec City**—Grobrel Limited, 225 Rue Lee St.

**NEWFOUNDLAND**  
**St. John's**—Electronic Center, 90 Campbell St.

**GERMANY**  
**Bamberg**—Ing Hannes Bauer, Hornthal Strasso 8

**ITALY**  
**Genoa**—Standard Elettronica Italiana S.R.L.

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- Self-supporting
- No Traps
- Automatic Band Switching
- No Compromise for Multi-Band Operation

A multi-band vertical system with automatic band selection of 10-80 meters, the Hy-Tower can be permanently installed on 1 square ft. Sturdily constructed 24 ft. self-supporting tower supports, 26 ft. top mast and unique stub decoupling system. Fed with 52 ohm coax, the Hy-Tower is absolutely fail-safe. Unquestionably the finest vertical system on the market today—ask the man who owns one.

**MODEL 18 HT...\$139.50 List**

Get Additional Gain by phasing two 18 HT's. For the epitomy in antenna systems on 80 and 40 meters, mount two Hy-Towers 69 feet apart. Attain gains of 2.2db end fire; 3.9db broadside and 4db cardioid on 80 meters.

### TRAP VERTICALS—14 AVS 12 AVS

- Automatic Band Switching
- Exclusive Hy-Gain Slim Traps

#### 14 AVS—For 10 to 40 METERS

The world's most popular multi-band antenna. Self-supporting and completely factory pretuned, the 14 AVS features a low angle DX radiation pattern. Thoroughly weatherproof. May be roof top or ground mounted. Height: 21 ft. Weight: 10 lbs.

**MODEL 14 AVS...\$29.95**

**MODEL 14 RMK Roof Mounting Kit...\$11.95**

**MODEL LC80 Loading Coil for 80 meter operation...\$7.95**

#### 12 AVS—For 10 to 20 METERS

The companion of the 14 AVS for 10-20 meters. Completely self-supporting and factory pretuned with SWR 2:1. 13.5 ft. high. Weight: 9 lbs.

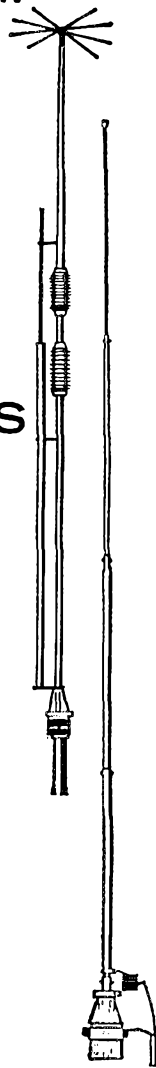
**MODEL 12 AVS...\$21.95 List**

**MODEL 12 RMK Roof Mounting Kit...\$9.50**

### NEW...LOW-COST TRAPLESS VERTICAL Manually adjustable to all bands

The Model 18 V is a new low-cost, 18 ft. vertical which can be tuned to any band, 10 thru 80 meters, by a simple adjustment of the feed point on the matching base inductor. Designed to be fed with 52 ohm coax, the 18 V is amazingly efficient for DX or local contacts. Self supporting, this radiator will survive winds in excess of 50 mph. Installs in minutes—highly portable—knocks down to overall lengths of 5 ft. A real buy.

**MODEL 18 V...\$16.95**



### Hy-gain GROUND PLANES

**100-500 MC** Heavy duty commercial construction. Nominal impedance: 52 ohms. Better than 1.2:1 SWR. Radiator and radials solid 1/4" aluminum rod. Weight: 4 lbs.

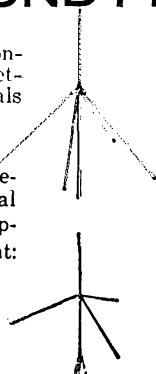
**MODEL GP-3C...\$14.97**

**25-50 MC** Easy assembly for any frequency between 25-50 MC. Omni-directional radiation pattern with unity gain. Telescoping radiator and radials, 7/8" to 3/4". Weight: 10 lbs.

**MODEL GP-2C...\$32.70**

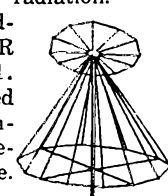
**50-88 MC** Easy assembly to any frequency. 50-88 MC. Telescoping radiator and radials, 7/8" to 3/4". Weight: 7 lbs.

**MODEL GP-1C...\$21.90**



#### DISCONE 50-500 MC

Vertically polarized, omnidirectional broad band antenna, 50-500 megacycles without adjustment. Unity gain, low angle radiation. Nominal impedance 50 ohms. SWR less than 1.5:1. Sturdy heat-treated aluminum construction. Iridite-treated hardware. Weight: 9 lbs.



**MODEL DS-1...\$29.97**

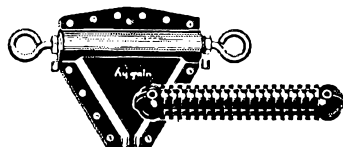
# Hy-gain MULTI-BAND DOUBLET

Featuring a matched set of Hy-Gain Slim Line Traps for each band, various sections of the doublet are effectively isolated so that a true 1/2 wave length exists on all bands. Can be adjusted to phone or CW. SWR 2:1 or less at resonance on every band. Complete units guaranteed to equal or surpass the performance of any other doublet system and to withstand winds up to 100 mph.



## SLIM LINE SOLID STATE TRAPS

Completely sealed against moisture through exclusive triple molding process. Almost indestructible—Manufactured to rigid specs incorporating extremely close tolerances. Power rating: 1000 watts CW or AM... 2000 watts peak envelope power single side band.

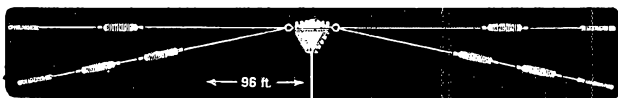


## HY-GAIN CENTER AND END INSULATORS

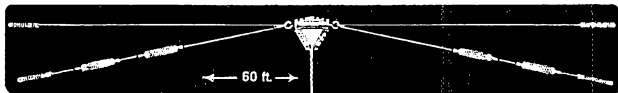
Lightweight, strong weather-proof doublet insulators molded from high impact cyclac plastic. Center Insulators accept 1/4" or 3/8" coax and are furnished with iridite-treated hardware in accordance with military specs. 7" End Insulators feature heavy serrations increasing leakage path to approximately 12 inches.

**Center Insulator,**  
**MODEL CI, Wt. 4 oz. . \$3.95**  
**End Insulator,**  
**MODEL EI, Wt. 3 oz. . \$1.00**

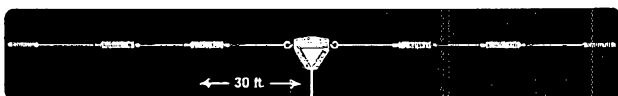
**MODEL 5BDT**  
 for 10, 15, 20,  
 40, 80 meters  
**\$34.95**



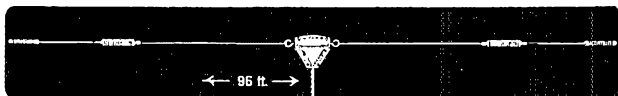
**MODEL 4BDT**  
 for 10, 15, 20,  
 40 meters  
**\$24.50**



**MODEL 3BDT**  
 for 10, 15,  
 20 meters  
**\$17.50**



**NEW**  
**MODEL 2BDT**  
 for 40,  
 80 meters  
**\$19.95**



**MODEL 2BDP**  
 Trapless  
 Fan Doublet  
 for 15, 40,  
 80 meters.  
 SWR less  
 than 2:1  
**\$19.95**



### TRAP KIT for 40 & 80 M TRAP DOUBLET

Kit consisting of two solid state Slim Line Traps and necessary hardware for attaching to antenna wire. Also includes complete instructions for construction of a 40 & 80 meter band switching doublet. **MODEL 2TD... \$12.95**

# Hy-gain MONOBANDERS

All Hy-Gain Monobanders feature the performance-proven Hy-Gain Beta Matching System... are completely factory pretuned to an SWR of less than 1.5:1. Designed for 52 ohm coax, the Beta Match allows tuning of the array for zero SWR and still retaining optimum gain and F/B ratio. All hardware iridite treated to Mil Specs for maximum durability.

**40 METER MONOBANDER** can be stacked with any Tribander... only 10 ft. of separation required.

Here's a 2-element beam of extremely high efficiency that is of a convenient size and very light weight (only 36 lbs.). Easily stacked on the same mast with your present single band beam or Tribander. (Exclusive linear loading shortens antenna and retains near perfect radiation efficiency.) Ruggedly constructed 16' boom with longest element less than 40 ft. Guaranteed to outperform any 2-element beam of equivalent size.

### 20 METER

"Full Spacing" 16 ft. boom—longest element is 35 ft. Has 8db forward gain with 25db front-to-back ratio. Wt. 29 lbs.

**Model 203B ... \$65.95**

### 15 METER

Quickly and easily installed—12 ft. boom, longest element 23 ft. Has 8db forward gain with 25db front-to-back ratio. Wt. 16 lbs.

**Model 153B ... \$38.50**

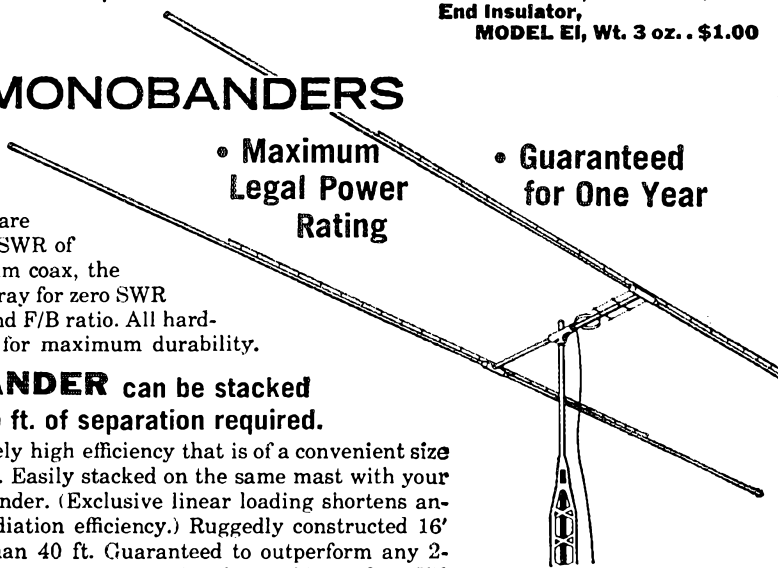
### 10 METER

The world's most popular 10 meter beam. Extremely light weight (only 9 lbs.). 8 ft. boom with longest element 17 ft. Has 8db forward gain with 25db front-to-back ratio. Wt. 12 lbs.

**Model 103B ... \$32.95**

• Maximum  
 Legal Power  
 Rating

• Guaranteed  
 for One Year



**In Stock at your favorite Hy-Gain Distributor's**

# Hy-Gain DUOBANDERS

## MODEL DB-24 for 20 and 40 METERS

Featuring Hy-Gain's exclusive linear decoupling stub which effectively isolates the 20 and 40 meter sections of the element and eliminates the need for inductance and capacity traps, the DB-24 is Beta Matched for 52 ohms on both bands. Linear decoupling stub also reduces overall length of 40 meter element to approximately  $\frac{3}{4}$  normal size. There are 3 full sized elements on 20M; 2 reduced size elements on 40M. Forward gain over a tuned dipole 20M-8.1db; 40M-4.9db; F/B ratio, 20M-20 to 30db; 40M-15-20db. 24 ft. boom; longest element, 40 ft. Aluminum construction with hardware iridite treated to Mil specs.

**DB-24... \$169.50**

**MODEL DB 10-15** A trapless 3 element beam for 10 and 15 meters. Single 52 ohm feedline. Develops 8db forward gain on both bands; 25db F/B ratio. Boom approximately 18 ft. Longest element approximately 22 ft. Wt. 30 lbs. Price to be announced.

## MODEL DB-62

A single transmission line beam for 6 and 2 meter operation with 4 elements on 6M, 18 elements on 2M. 52 ohm coax fed, DB-62 develops forward gain of 8db on 6M and 15db on 2M. F/B ratio averages 15-20db and SWR will remain below 1.5:1 on both bands. 10 ft. boom; longest element, 10 ft. Weight 6 lbs. Comes completely pre-assembled.

**DB-62... \$32.95**

# Hy-Gain THUNDERBIRD TRIBANDERS

Unquestionably the finest line of 10, 15 and 20 meter multiband antennas on the market today. All feature Hy-Gain's exclusive solid state Slim-Traps for isolating various sections of the antenna. Slim-Traps are the world's smallest, lightest weight trap with highly efficient coil and capacitor circuit completely imbedded in, new low loss polypropylene plastic. All Thunderbird Tribanders deliver outstanding performance and are mechanically constructed for maximum durability.

## TH-4 4 ELEMENT THUNDERBIRD

Features true full size performance. Also features Beta Match—completely factory pretuned. Low SWR over entire band. Fed with 52 ohm coax. Longest element 32 ft. Weight : 38 lbs.

**MODEL TH-4... \$117.50**

## TH-3 3 ELEMENT THUNDERBIRD

Unconditionally guaranteed to be better constructed and to outperform any other 3 element trap Tribander regardless of price. Overall boom length 14 ft.; longest element 26 ft. Weight: 29 lbs.

**MODEL TH-3... \$89.95**

## TH-2 2 ELEMENT THUNDERBIRD

Lightweight (ships at 23 lbs.), easy to install most anywhere. Same top construction as TH-3. Rotates easily with TV rotator. Boom 6 ft. Longest element 28 ft.

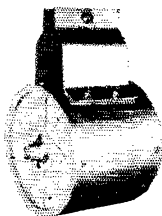
**MODEL TH-2... \$69.95**

### PRETUNED BETA MATCH

Permits optimum gain and F/B and low SWR over entire band at resonance—1.05 on 10M, 1.15 on 15M and 1.1 on 20M. Shunt fed with 52 ohm coax—no further adjustment necessary.

# Hy-Gain BALUNS

Easily and quickly mounted on the boom of a Monobander, Duo-bander or Tribander to improve F/B ratio and offer uniform radiation pattern. Eliminate stray RF on coax feed line and improves efficiency by matching transmitter and receiver to antenna system. **BN-12 for 10, 15, 20M... \$13.50; BN-24 for 20 or 40M... \$13.50.**



# Hy-Gain HY-LITE

Dramatic black and grey "On-the-Air" indicator of high impact styron mounts atop gear or on wall brackets. Internally illuminated—adds professional touch to Ham Shack. Attaches to antenna change-over relay or transmitter control relay. 4x8 inch oval.

Supplied with TH-4 and TH-2



**MODEL HL... \$8.95**

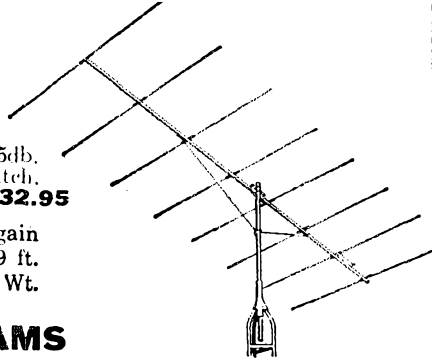
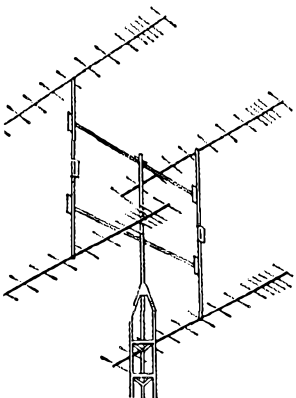
Write for Full Line Brochure on Amateur Antennas

# Hy-gain VHF BEAMS

## 6 METER BEAMS

**8 ELEMENT** Tremendous forward gain of 10.1db; F/B ratio, 25db. Rotated on any TV rotator. Factory pre-assembled with Beta Match. Boom 18 ft.; longest element, 9'8". Wt. 13 lbs. **MODEL 68B... \$32.95**

**5 ELEMENT** Easy to install—rotates on TV rotator. Forward gain 9db; F/B ratio, 25db. Factory pre-assembled with Beta Match. 9 ft. boom; longest element, 9'8". May be stacked for additional gain. Wt. 13 lbs. **MODEL 65B... \$18.95**



## 2 METER BEAMS

**10 ELEMENT** World's most popular 2M beam. Develops 13.4db forward gain with excellent F/B ratio. Can be rotated with TV rotator. 12 ft. boom; longest element 41 3/4 inches. Weight: 6 lbs. **MODEL 210... \$14.95**

**5 ELEMENT** Extremely lightweight, completely factory pre-assembled. Either coax or parallel fed. 9db forward gain. 5'4" boom; longest element 41 3/4". Weight: 3 lbs. **MODEL 25... \$8.95**

**1 1/4 METER 11 ELEMENT BEAM** A 220 mc beam with 12 ft. boom. Longest element, 27". Folded ratio dipole. Factory pre-assembled and pretuned. Optimum spacing and high Q, small diameter rod element design allow high gain of 14.2db. Heavy wall aluminum. Weight: 5 lbs. **MODEL 111... \$13.95**

**3/4 METER 13 ELEMENT BEAM** Terrific gain of 16.1db with this efficient extended multi-element Yagi. Consistent long range contacts on 430 mc. 8 foot boom; longest element, 13 3/4". Excellent construction of heat treated aluminum. Weight: 3 lbs. **MODEL 313... \$12.95**

### STACKING KITS

Dual stacking kits for 2 VHF beams. Adds 3db gain. **MODEL DS... \$4.95**

Quad stacking kits for 4 VHF beams. Adds 6db gain. **MODEL QS... \$15.95**

Stacking frame for mounting 4 stacked beams. **MODEL SF... \$59.50**

*(Specify model number of beams used when ordering stacking kit)*

# Hy-gain HALOS

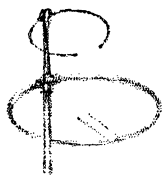
**2 METER** 14" diameter, heavy wall 1/2" aluminum tubing with high impact cyclac bracket accepting 1" masts. Beta Match for 52 ohm coax. Factory pretuned but adjustable over entire 2M band. Up to 15db improvement over vertical whips. Stack for additional gain. Wt. 1 1/2 lbs. May be stacked with HH-6B by ordering HMB and using double feed line. **MODEL HH-2B... \$5.95**

**STACKING KIT** for two 2M halos for additional gain. Weight: 1/3 lb. **MODEL HHS-2B... \$4.95**

**6 METER** High mechanical stability with 1" OD aluminum tubing. Cyclac base takes 1" masts. No external matching—Beta Match supplied. Factory pretuned to 52 ohm coax. Adjusts to any frequency in 6 meter band. Weight: 5 lbs. May be stacked with HH-2B by using HMB and using double feed line. **MODEL HH-6B... \$12.95**

**HEAVY DUTY 5 FT. MAST** for either Halo or for stacking. Weight: 3 lbs.

**MODEL HMB... \$4.95**



# Hy-gain MOBILES

**MODEL W-96** Top quality 96" 17-7 PH stainless steel whip supplied with 3/8"x24 standard stud. Weight: 1 1/4 lbs. **\$6.90**

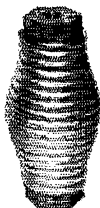
**MODEL W-72** High quality 72" 17-7 PH stainless steel whip supplied with standard 3/8"x24 stud. Weight: 3/4 lbs. **\$6.00**

**MODEL M-36** 36" chrome plated 5/8" OD steel tube base extension for center loaded whips. Weight: 2 lbs. **\$5.25**



**BODY MOUNTS** Standard body mount, cadmium plated, split ball type. Grey cyclac plastic base. Weight: 1 lb. **MODEL BDYS... \$3.03**

**HEAVY DUTY MOUNT** Same as standard but with Chrome plated split ball. Weight: 1 1/2 lbs. **MODEL BDY... \$4.77**



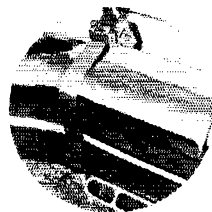
**SPRING MOUNTS** Standard model, taper ground and cadmium plated. Weight: 1 1/2 lbs. **MODEL SPGS... \$2.04**

**HEAVY DUTY SPRING MOUNT** Same as standard featuring triple chrome plating. Weight: 2 lbs. **MODEL SPG... \$4.77**

### UNIVERSAL BUMPER MOUNTS

**MODEL BPR** Fits virtually any bumper. Stainless steel with heavy duty stainless steel strap that obsoletes bulky chains. Weight: 1 1/2 lbs. **\$6.57**

**MODEL BPRS** Same as BPR except that all stamped steel parts are cadmium plated for lasting durability. Weight: 1 1/2 lbs. **\$5.97**

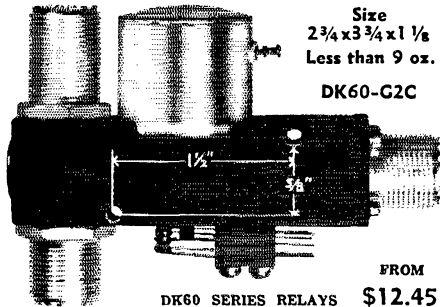


## COMING SOON... NEW, Highly Efficient All Band Mobile Antennas—10 thru 80 Meters!

HY-GAIN ANTENNA PRODUCTS 8403 N.E. Highway 6 at Stevens Creek, Lincoln, Nebraska

# DK60 SERIES COAXIAL RELAYS

4 different models, A.C. or D.C.  
(and Types C, TNC, BNC, N, UHF Connectors)



STANDARD RELAYS WITH TYPE UHF CONNECTORS INCLUDE:

- DK60 — SPDT r.f. switch.
- DK60-G — SPDT r.f. switch with special "isolation" connector in de-energized position.
- DK60-2C — SPDT r.f. switch with DPDT auxiliary contacts.
- DK60-G2C — SPDT r.f. switch with DPDT auxiliary contacts and special "isolation" connector in de-energized position.

**r.f. SPECIFICATIONS:**

Low VSWR: less than 1.15:1 from 0 to 500 mc. Low Losses:

Low Cross-Talk (greater than 80 db) (in energized position) in DK60-G and DK60-G2C through use of patented "isolation connector."

High Power Rating: (a) 1 kw through straight connectors (b) to 10w through "isolation connector" — excellent for video switching.

Long life expectancy greater than 1 million operations. Continuous Duty:

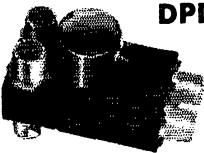
**ELECTRICAL SPECIFICATIONS:**

Wide Variety of Coil Voltages: 6, 12, 24, 32, 48, 110, 220 D.C. volts at 2.0 watts; 6, 12, 24, 110, 220 A.C. volts at 6 volt-amps, 50-60 cps. (Special voltage or resistance available on request)

Auxiliary contacts available for power control—DPDT at 5a. 110 v A.C. on DK60-2C and DK60-G2C.

- \* Weatherproof relays also available for exterior installation.
- \* Unconditional guarantee for period of one year. (We will repair if faulty within one year.)

## DOW-KEY NEW DK2-60 DPDT r.f. SWITCH



FOR SWITCHING  
TWO COAXIAL  
LINES SIMULTANEOUSLY!  
Size: 2 3/4" x 3 3/4" x 1 1/4"  
Wt. Less than 12 oz.

Freq. 0 to 500 mc; Power Rating to 1 kw; VSWR, less than 1.15 to 1 from 0 to 500 mc; Standard Coil Voltage and other r.f. Connectors Available. Dow Guaranty.

DK2-60 with UHF Connectors ----- ea. \$19.00

See any one of our 700 Dealers and Distributors in U. S. and Canada for catalog sheets or write:

**DOW-KEY COMPANY**  
Thief River Falls, Minnesota

## Station Activities

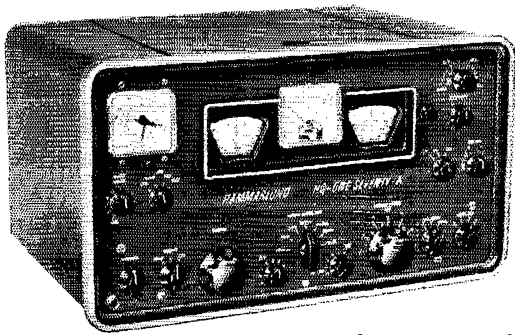
(Continued from page 88)

he can work Albany from Northern N.Y. on 6 any night of the week because of a new 60-ft. tower. He has an auto keyer on 50.04 Mc. WA2KQK has a 75A-4, a Tri-band beam, a tower and a new Valiant. He is editor of *Rags Review*. WA2ADZ and WA2KJT breadboarded a d.s.b. transmitter for 6 in 2 hours and 10 minutes. The Utica Area interference committee found two hootleg operators with d.i. loop and notified the FCC. Hams made up the investigating party. This is a fine example of self policing in the highest amateur tradition. Area means Amateur Radio Editors Assn. If interested, contact W8BAH. The Squaw Island ARC held its annual picnic at the QTH of W2UTH. W2UTH has WAZ on s.s.b. and a 200 sticker for DXCC. K2PPO and K2MIP are mobile on 6 meters. The RDXA and NFDXA got together at a steak roast sponsored by the RDNA. Rochester gets two new TV channels, 8 and 13. Check your equipment for harmonics; a rig that was formerly clean might offend. The ARATS, Six-Meter Mobile Assn. and Chautauqua County RACES all report successful picnics. WA2VBZ has a DX-40 and an HRO-7. Chemung County AREC supplied communications for the motorcycle races at Watkins Glen. Participants were W2BYS, K2LNN, WA2FJR, WA2HFL, WA2KUK, WA2STG, WA2TCZ, WA2YQR, all mobile, and K2TXO, WA2LWL, WA2AMM and WA2ANU. Traffic: (Aug.) W2OE 433, WA2UF1 376, W2RUF 278, W2EZB 248, K2SIL 239, W2FEB 148, WA2HSB 112, WA2KQC 72, K2QDT 68, W2NTA 2 60, W2RKKU 51, WA2IXY 42, W2PVI 42, K2TDG 38, WA2KQZ 33, W2RQF 24, K2OFV 23, K2BWK 18, WA2HEC 16, WA2WEE 16, K2BBJ 11, WA2KQK 11, K2JULY 11, K1BYI/2 10, K2HOH 9, WA2OGI 9, K2DNN 8, W2QHQ 8, K2AFE 7, K2RYH 5, WA2GLA 1. (July) W2EZB 242, K2RYH 8, WA2GLA 5.

**WESTERN PENNSYLVANIA**—SCM, Anthony J. Mroczka, W3UHN—SEC: W3LIV. RMs: W3KUN and W3NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2330 GMT on 3585 kc. Mon. through Fri. The new Section Emergency Coordinator (SEC) is W3LIV. Bill's address is 4916 Fifth Avenue, Altoona, Penna. All ECs take note and forward your reports to W3LIV. W3JHG is working with 4-H projects. K3GSP and K3EBT worked VP8FD on 50.2 Mc. May 23, K3HTJ is attending Rensselaer Polytechnic Institute. The South Hills Brass Pounders and Modulators 25th Hamfest at Pittsburgh was a huge success. Congratulations to W3KJP's *Tri-State News Letter* and AREA's first anniversary. K3HSF is attending Dartmouth College. KN3TTV is a new Novice around the Butler Area. The Erna RC reports via *Oscillator* that K3COU gave an illustrated talk to the club using slides that he had taken in Alaska while serving in the Signal Corps. The Foothills RC bought an HT-37 and reports code and theory classes again this fall. The Bedford County RC reports via *Starts*: K3SAK now is mobile; K3NQT has a Tri-band; K3TLM is a VL Novice; K3GFE is working 6 meters every day. K3AKR is building gear for 2-meter scatter work. The Coke Center RC reports: K3PLQ has a new v.l.o.; W3JW is touring the Northwest; the club family picnic was a success. All amateurs hold ARRL appointments, please check your certificates for expiration date. Many are overdue and should be endorsed. Otherwise they may be cancelled for inactivity. Again I want to thank all club secretaries in the section for forwarding their club papers to this office so that their activities can be mentioned. Traffic: (Aug.) W3MFB 234, K3DKE 140, W3KUN 128, W3OEO 98, K3HKK (K3OOU op.) 55, W3LSS 49, K3EDO 31, W3NUG 31, K3GAO 14, W3NEM 9, K3COT 5, W3UHN 3. (July) W3JHG 1.

## CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9MGE. RM: W9USR. PAM: W9RYU. EC of Cook County: W9HPG. Section net: ILN, 3515 Mon. through Sat. at 1900 CST. The W/K9 QSL Bureau manager asks that all requests be handled through P.O. Box 512 in Elmhurst instead of his QTH. This will help him expedite the processing of the cards. K9RAS is now working 2 meters and reports that it is an FB band. Our sympathy to the friends and family of K9AIDS, who recently became a Silent Key. The DeWitt County amateurs have formed a new club with W9VUD, pres.; K9ISZ, vice-pres.; and K9QGR, secy.-treas. WA9AGX has a new ten-element beam and a Heath Tower. The Loyola Academy Radio Club's new call is WA9DNO. K9UCN is on the air with a Heath Apache. K9OCU has enrolled in the Missouri School of Mines, and K9SRW is attending Northwestern University. The Bloomington C.D. has an FB f.m. net on 2 meters with nine stations operating at the present time, WN9CLJ, WN9CLY, WN9CLS, WN9CLX, WN9CLG. (Continued on page 104)



# RED HOT and ready!

the Scintillating Single Sideband SPECIALIST

## HAMMARLUND'S NEW HQ-170A

### TRY THIS COMBO



Take one  
Hammarlund  
HQ-170A

Hammarlund's  
"Fabulous '50"—the  
new, compact, crystal  
lattice filter-type  
SSB transmitter.



THE BEST AMATEUR  
RADIO STATION  
MONEY CAN BUY!

Fill in the attached coupon and let us send you complete technical data on this revolutionary new equipment.

We did more than add a letter to the famous HQ-170: we added

- ★ Significantly improved electrical and mechanical stability.
- ★ Silicon rectifiers—for cool, high efficiency operation.
- ★ 144 to 148 mc dial scale for 2 meter converter use.
- ★ Accessory power supply socket for converters, etc.
- ★ Separate system socket for convenient transmitter/receiver control.
- ★ "Flip-open" top for greater convenience.

It wasn't easy. We set out to improve the receiver recently voted **FIRST IN ITS CLASS**. The **big and only amateur band receiver** that offers so much for SSB and AM/MCW. Full coverage of 6, 10, 15, 20, 40, 80, and 160 meter bands—plus 2 meter calibration for converter use. Triple conversion with fixed IF frequencies provide optimum spurious response rejection.



AMATEUR RADIO EQUIPMENT  
COMMERCIAL  
COMMUNICATIONS EQUIPMENT  
AUTOMOBILE PORTAL RADIO  
SPECIALTY DEPARTMENTS  
VIDEO VISOR EQUIPMENT  
TELEPHONE SYSTEMS

### HAMMARLUND Manufacturing Company —Dept. Q-11

A Giannini Scientific Company  
53 West 23rd Street, N. Y. 10, N. Y.

Please send me brochures on:

HX-50 \$399.50  HQ-170A \$369.00\*  
(\*24 hour clock-timer \$10 optional)

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

# GOTHAM VERTICALS DELIVER THE CONTACTS

THE ULTIMATE PROOF OF THE FINE PERFORMANCE OF THE  
GOTHAM VERTICAL ANTENNAS IS IN THE ACTUAL FIELD  
RESULTS, BY HAMS ALL OVER THE WORLD.

## PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

### CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

### CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

### CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

### CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when bought it." D. S., New Jersey.

### CASE HISTORY #250

"I have one of your vertical antennas and have been having fine results on 10, 15, and 20 meters." N. S. P., Missouri.

### CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

### CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

### CASE HISTORY #123

"I am full of praise for your vertical. In the recent field day, we went up to the mountains near here and QSO'd a KA2, KZ5, and an XE at 2100 PDST on 15 meters. We got a 59 plus from the KA and KZ and 58 from the XE." D. P., Nevada.

### CASE HISTORY #398

"Some months ago I purchased one of your V80 vertical antennas. I have had wonderful results with this antenna, and I think it was of far greater value than the small amount I paid for it." R. C., Utah.

### CASE HISTORY #766

"The Gotham vertical takes almost no room. I don't see how I could have used any other type very well. Sure do appreciate the fine record this antenna has made so far." H. C., Haiti.

### CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

### CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

### CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

### CASE HISTORY #407

"I recently purchased a Gotham V80 vertical antenna and I am very pleased with the results. Up until now my home brew antenna has had a very high SWR, but with the V80 the SWR is 1:1." J. D. R., Virginia.

### CASE HISTORY #414

"Just a quick note to tell you how pleased I am with my 2 day old V80. My old SX-28 just seems to be re-born. An excellent receiving antenna as well as a fine transmitting antenna." B. J., Utah.

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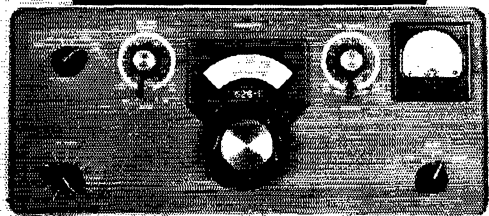
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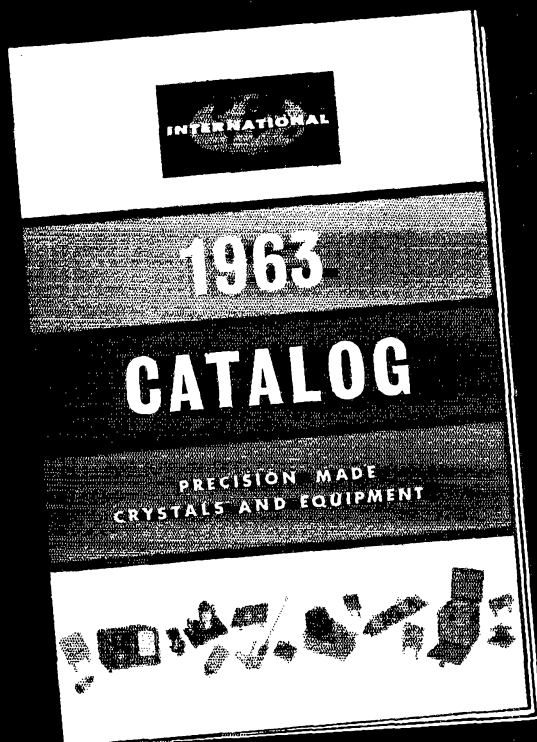
WN9CKL and WN9CKX were graduated from the LeRoy High School code and theory class. K9QYY is building RTTY gear. K9CDX is sporting a new Knight V44 v.f.o. WA9BJY is now on 6 meters with a T-60, an NC-155 and a revamped antenna system. The Chicago Vocational Amateur Radio Club and its station, W9-LBB, have been very active and many new licensees have been added to the roster with the code and theory classes. W9WFR has received confirmation of a contact with the skipper of an atomic submarine while it was submerged in the Atlantic between New York and England. New appointments are K9IDQ as OBS; K9QFR, WA9AGX, WN9CLM, WA9CWJ, WA9BAS, W9DJK and K9DCZ as OESs. K9DLS has just finished a converter for 432 Mc. using a Nuvistor front end. K9HFM has a new Ranger II. W9TPA is building an electric organ. K9WUV is now W8DMG. New calls heard were WA9-ERG, WN9DAU, WN9ETI and WN9EWJ. The North Central Phone Net held its Annual Picnic in New Salem State Park Sun. Sept. 9, renewing old acquaintances with eyeball QSOs. W9JQE worked Project Hope in Peru. W9HOA's new Michigan call is WA8FBL, which he uses when in that State. W9ERU received his AC-5 cards from the Bhutan Expedition. The Joliet Amateur Radio Club erected a new windmill tower for its club station antennas. New officers of the Six Meter Club (Chicago) are K9ARA, K9TWF, K9PAJ, K9QDY and K9DWR. The Chicago Area Emergency Net handled 104 messages during August. K9BAH has been maritime mobile aboard the USS *Constellation* on a trip around Cape Horn, with W0AEJ also operating the rig. Recipients of the BPL Award are K9NBH, W9AZ, W9DFW and K9KZB. Traffic: (Aug.) K9UOV 301, W9AZ 270, K9KZB 252, W9JXV 227, W9AKV 199, W9IDA 180, K9OCT 134, WA9DEW 131, K9ZQT 84, K9DRS 69, K9UCG 63, K9V(L) 23, K9SQQ 21, WA9AJF 20, K9CRT 20, K9LXG 14, W9PRN 8, K9RAS 8, K9CDX 6, W9HPG 4, (July) WA9AJF 56, K9LXG 14. (June) WA9AJF 7.

**INDIANA**—SCM, Donald L. Holt, W9FWH—Asst. SCM; Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: K9KTL, K9CRS, K9GLL. RMs: W9TT, K9SGZ, K9WET. Net, skeds (all times in GMT): 1FN, 1300 daily and 2300 M-F on 3910 kc. ISN (s.s.b.), 0300 daily on 3920 kc.; QIN (training), 0000 M-W-F on 3745 kc.; QIN, daily at 0030 and RFN 1300 Sun, on 3856 kc. New appointments: K9SGZ as RM of QIN, W9KIX as OO Class III, K9TUF as OBS, K9SYQ as EC of Knox County and K9EJZ as EC of LaGrange County. With deep regret we report two Silent Keys: Donald P. Laslev, K9WWJ, and Lewis A. Hanson, W9RCD. A new Novice in the Seymour Area is W9EPD. Two new Novices in Pike County are WN9FBU and WN9EYL. Please notice the following new address for the W/K9-QSL Bureau: Ray Birren, W9MSG, P.O. Box 510, Elmhurst, Ill. QIN Honor Roll: W9TT, K9ARW, W9VAY, K9SGZ, W9BDP, K9EZZP and K9WWJ. Those making BPL: W9JOZ, W9RE, K9ARW, W9NZZ, K9CQA, K9ARW made BPL in July but was not listed. *Amateur radio exists as a hobby because of the service it renders.* Aug. net reports: 1FN 384, ISB 1672, QIN 281, QIN (training) 2, RFN 50, Hoosier V.H.F. 96. Traffic: (Aug.) W9JOZ 2983, W9RE/9 1513, K9DHN 305, K9ARW 251, W9NZZ 245, W9QYQ 213, W9VAY 211, W9TT 199, W9MMI 198, K9CRS 160, K9CQA 155, K9RWQ 127, K9IVG 125, K9SGZ 117, K9HSL 88, W9BUQ 84, K9INF 75, K9ZLA 61, W9FWH 56, K9KTL 56, K9ZLB 47, K9WRJ 44, K9OET 43, K9DOK 40, K9GLL 38, K9HVV 37, K9DZW 35, W9PMT 34, W9RTH 32, W9OG 30, W9EJV 26, K9HMC 26, W9DGA 25, K9OFG 25, K9ILK 22, W9SNQ 22, W9BTZ 20, W9YXX 18, K9MWC 17, W9QLW 17, W9BDG 14, K9WET 14, W9IMU 11, K9MAN 9, W9CC 7, W9DKR 7, WA9AVW 6, W9DZC 6, W9TUF 5, K9KFM 5, W9ETI 4, W9KLV 4, K9QVT 4, WN9BYS 2, K9FEP 2, W9GUX 1, (July) W9VAY 46, W9DGA 12, (June) W9VAY 86.

**WISCONSIN**—SCM, Kenneth A. Ebner, K9GSC—SEC: W9BCC. PAMs: W9NRP, W9NGT and W9SAA. RMs: W9VHP and W9VIK. New appointments: W9CCO as OO Class III and IV; W9FSP as OBS and OBS. Renewed appointments: W9SAA as EC, OPS and OBS; W9ZB as OBS. W9FSP moved to Stevens Point from Minnesota. The new W/K9 QSL Bureau address is Box 510, Elmhurst, Ill. The Milwaukee County AREC assisted with the Racine Jr. Scouts Drum and Bugle Competition. W9YT has a new s.s.b. exciter working FB. WN9CXH moved to Appleton from Ohio. W9DWH operated portable with the Scouts at Ann Arbor, and originated 70 pieces of traffic from there. W9WVK has become a Silent Key. K9GDF received the KKK Award. WA9-AVY, WA9AVZ and WA9BZW have dropped the "N" from their calls. WA9DSO operated portable in the civil defense booth at the Washburn County Fair. K9IMR has an SB-10 and a Valiant. W9EKZ has a new home-brew 10-watt mobile. K9DOL is now active on 2 meters. W9ACG has a new NC-270. K9HEC is back on the air  
(Continued on page 106)

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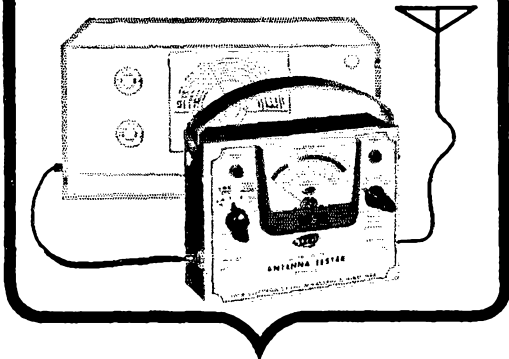
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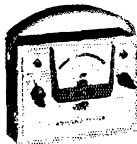
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**HAMS . . . this Seco 8-point antenna and power amplifier check gets more from your rig**

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Analyze Your Antenna and RF Power Amplifier With the SECO 520

3 VSWR scale interpretations—1:1 to 8:1 Standing Wave Ratio—antenna system efficiency—GOOD-BAD scale.

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after 25 years and is looking for the old gang. He was formerly W9HTZ. W9ZB is rebuilding his final and antenna. K9QDA has left Wisconsin for Florida. W9IHN has been elected a member of FOC. K9LGU has a new scope and tape recorder. W9DYG made the BPL in August. Traffic: (Aug.) W9DYG 710. K9BLN 134. K9-LMR 122. W9FSP 111. W9SAA:101. W9DWH 75. K9LGU 74. W9MWQ 39. K9GSC 28. W9AOW 34. W9YT 33. K9-GDF 23. W9UEB 18. K9DOL 16. WA9DSO 15. W9OTT 13. WA9BZW 10. W9HPC 10. K9WIE 9. W9IHN 6. (July) K9RCF 9 48. WA9DHL 22. (June) W9IHN 10. K9WVM 4. K9REC 3.

## DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Harold A. Wengel. W0-HVA—SEC: W0CAQ. RM: K0QWY. Records have been brought up to date with several cancellations being made. Two EC certificates were issued in the month of August and one OO certificate. One ORS certificate was renewed. W0CBN has left North Dakota and taken a practice in Kenton, N.Y. K0TFB is on the air from 119-8th Avenue West in Williston. W0NDGQ is finally on the air. K0QYD is running an Invader 200. A new call in the Minot Area is WB2AGH O, formerly W0-OWY. W0CZR, W0BFN and W0ADAR, all of Bismarck, are building 2-meter equipment. Word was received in Bismarck of the approaching marriage of K0-CEM, in South Bend, Ind. K0AJW lost his life as the result of a harvesting accident. Traffic: K0IVQ 86.

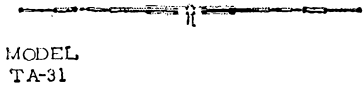
**SOUTH DAKOTA**—SCM, J. W. Sikorski. W0RRN SEC: W0SCT. The Mitchell ARC sponsored a successful picnic with more than 100 amateurs attending. W0-GWW now is running a B & W 5100. W0ADJ has moved to Missoula, Mont. The Sioux Falls ARC met at and inspected the Pathfinder atomic power plant at Brandon Aug. 24. Arrangements were made by W0KPB. W0N0-CWY and W0G0WZ have moved to St. Paul, Minn. K0DIIH has been transferred to Germany by the Air Force. K0WEM and K0WEN have assumed management of the South Dakota Certificate Award and full information will be available next month. The certificate will be sponsored by the Sioux Falls Amateur Radio Club. W0RSP renewed his OES appointment. K0TDS has been appointed EC for Pennington County. The SFARC and individual members sent contributions to the ARRL Building Fund. How about you? Traffic: W0SCT 335. W0DYB 123. K0BMQ 114. K0BSW 17. K0VYY 15. K0PDW 11. K0ALT 10. W0A0OY 4. W00FP 4. W0GWW 3. W0CQN 2. K0KOY 2. K0-TXW 2.

**MINNESOTA**—SCM, Mrs. Lydia S. Johnson. W0KJZ —Asst. SCM: Charles Marsh. W0ALW. SEC: K0KKQ. PAMs: W0GCR. K0EPT. RMs: K0UXQ. W0A0DX. M5SB Mgr.: W0HEN. MSPN. (noon) 1805Z, (evening) 2400Z on 3820 kc. M5SB, 1730Z on 3905 kc. and 0045Z on 3812 kc. C.W. MSN. 0030Z and MIN. 0100Z on 3595 kc. The following have dropped the "N": W0N0AHV. AXH. ANG in new Uln. W0N0. BLU and DIQ can be heard on the Novice bands. The MSPN noon Phone Net had a very good traffic total of 400 messages handled and 1035 total check-ins, reported by PAM W0GCR. W0KLG built the "5-Way" antenna tuner. K0VLD and K0YML are building a 420-Mc. transceiver. The annual picnics at Minneapolis, St. Paul and St. Cloud were very well attended. W0JF and family of Kansas, vacationed in Minnesota. W0JF visited KJZ-URQ on his way to North Dakota. VE7AG/VE4 was at the St. Cloud picnic and met several of the Teuth Regional NTS operators. W0ZOB and his XYL attended the ARRL Convention in Oregon and the World's Fair in Seattle. W0SII, who is with the Air Force, left for a three-year stay in Germany. Contrary to a bulletin which stated that two Minnesota hams were last to hear Oscar II, W0RGY, of Cloquet, tape-recorded its "hi" later. This was brought to my attention by W0-JHS, one of our many avid trackers of the two Oscars. W0N0DHV applied for AREC membership. He worked 23 states in two months with his DX-100 transmitter and SX-99 receiver. K0SRK is using a Viking Ranger transmitter and an HQ-145 receiver. OOs W0KLG and K0ORK reported a total of ten violations. K0CRP returned from a two-month cruise aboard the USS Ifasp. Congrats to the following NCSs who did a fine job this summer: W0S ALW, HEN, UMX, GCR, KLG, RQJ, K0S: EPT, SBB, ZKK, VPI, LWK, UBA, GPI, UXQ, JFI, QBI, W0AS ABU, ADX. Traffic: K0OTH 333. W0BIV 311. W0A0BU 304. K0CXQ 259. K0WPK 218. W0KJZ 150. W0ATO 139. W0A0AM 108. K0JFJ 104. W0HEN 97. K0ZKK 66. W0THY 57. K0GPI 56. W0RLG 53. K0VPI 51. W0GCR 50. K0GCI 50. W0-UAX 42. W0ALW 34. W0WMA 34. K0JHJ 28. W0A0-BYO 26. K0EPT 26. K0RDA 22. K0ADI 19. K0MGT 18. K0UBA 14. W0BUO 6. K0FLT 4. K0LWK 4. K0-ZRD 4. W0A0AK 3. K0CNI 2. W00PX 1.

(Continued on page 108)

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Start today with the purchase of the inexpensive Model TA-31, and in three additional steps you can have the famous MOSLEY TA-33 TRAPMASTER BEAM plus the New TA-40K to add 40 Meters.  
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NEXT purchase the Kit to convert the TA-31 to a TA-32. Kit consists of reflector element, seven foot boom and all necessary hardware.  
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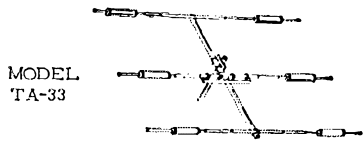
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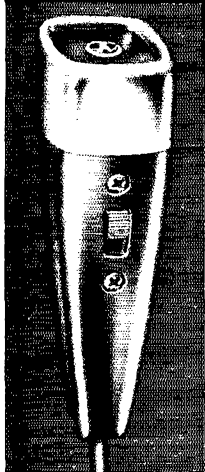


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**DELTA DIVISION**

**ARKANSAS**—SCM, Orla L. Musgrove, K5CIR—SEC; W5KRO. PAM: W5DYL. RM: K5TYW. The Southeast Arkansas Radio Club had its annual election. W5YHR was elected president and W5CAM was elected vice-president. Code classes have been changed to Mon. and Thurs. nights. So far there are six new Novices with six more about ready to take the exam. K5ELW spent two weeks in Kansas City. Activity on all the nets was up in August with lots of traffic passed. The c.w. nets could use more operators in the southern part of the state. K5QYH has a new Heathkit Shawnee and a two-over-six-meter beam. The Arkansas Emergency Phone Net met 27 times with 1029 checking in. Traffic: W9-PHR/5 799. K5GTN 128, W5DTR 45, K51PS 19. K5SGG 19. K5CIR 2. K5DLV 2.

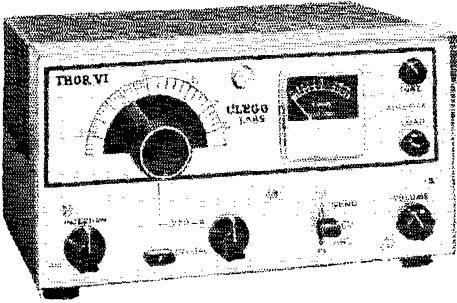
**LOUISIANA**—SCM, Thomas J. Morgavi, W5FMO—The amateurs of Southwest Louisiana covered themselves with glory again by providing emergency communications after the devastating tornado hit Cameron on Aug. 23. Especially active were ECs W5SKW and W5DPH, along with W5UG, W5DEQ, K5ARR, W5HNS, K5HQT, K5YJX, W5ARV, K5VJT, K5SGY, K5UYL and K5DML. Emergency Coordinators would do well to check their AREC memberships and bring them up to date; also see that appointments are up to date. If you can't hold down the job, say so and another will be appointed in your place. We need good emergency communications and it is up to the ECs to organize their areas. Contact your SEC and SCM. W5KRX's NYI won the SX-115 at Corpus and I understand W5KRX picked up a 3-400Z besides. The Delta Division Convention at New Orleans was a great success. Although the men had a fine time it seemed the ladies had a better one, with luncheon at Antoine's, breakfast at Brennan's and a whirl of events topped with a gala banquet and dance. K5QXV wants to know why his traffic wasn't listed in Sept. QST. Form I listing traffic and activities must be received during the first five days of the month otherwise it will be too late for inclusion in that month's report. Have your report in the mail by the first of the month. Recent endorsements: ECs—K5DPH, W5SKV, K5VYN; new EC—W5SRM; OPS—W5WYN, W5BJJ, W5DNL, W5HHA, W5RU; ORS—W5KC, W5HHA; OPS/OO Class I—W5FMO. Traffic: W5CEZ 311, K5QXV 30, K5CZY 15, W5NDV 6, K5FYI 3.

**MISSISSIPPI**—SCM, Floyd C. Teelson, W5MUG—WA5ALL made 528 points in the recent Post Office Net Contest. WN5ALM hopes to have his General soon. K5MDX reports he made 52 contacts in the Worked All Europe Contest. He has worked 195 countries so far this year. Good going, Dave. The Delta Convention put on this year by the New Orleans gang was a real fine affair. The program was excellent and everyone seemed to enjoy himself thoroughly. Congratulations are in order to K5USO and the gang. Yours truly even came up with a prize for a change. New appointments in the section are K5MPL, K5MDX and K5HHV as ECs; W5AMZ as ORS. Please send in your certificates for renewal. They expire at the end of one year. WA5AIY is now on the air from Baldwin. Traffic: WA5ALL 5.

**TENNESSEE**—SCM, David C. Goggio, W4OGG—SEC: W4WBK. PAMS: W4LLJ, K4WWQ, RAJ: W4OQG. Section net reports: TN-QTC 85, ETPN-QTC 68, TPN-QTC 57, TSSN-QTC 10. All nets meet on 3980 kc. except TN, frequency 3635 kc. Let's all get out and support your state nets. New appointments: W4HPN, Oak Ridge ARC pres.; as ORS; W4RIX and W4ZNV as OESS. Coming events: Sweepstakes Contest Nov. 10-12 and Nov. 17-19. For new hams this is a golden opportunity to work new states and old-timers can improve their operating ability during a few hours. Don't miss this one. The new manager of ETPN is W4LLJ. This net meets at 1140 GMT Mon. through Sat. on 3980 kc. Bob has improved conditions on the net frequency by chasing s.s.b. competition down the band. K4WUG has left for college and will be sorely missed on the TN Net. New officers of the Crossville ARC are K4APJ, pres.; W4WBV, vice-pres.; W4SAW, secy. The Roane County ARC reports recently completed classes in code and theory giving Novice exams to 25 and Tech. Class exams to 16 students. W4NGK, Montgomery County EC, reports an AREC setup at the County Fair in conjunction with the civil defense exercise. Assisting operators were W4APHY, K4KYV, K4OND and K4SSD. W4PL celebrated his 78th birthday. W4JVM, Hamilton County EC, reports AREC organization was used to full advantage in the Governor's election Aug. 2. See you all in the Sweepstakes. Traffic: W4PL 977, K4AKP 503, W4OQG 126, W4JVM 87, W4QPQ 71, W4MXF 61, K4-WWQ 52, K4WUG 48, W4OQG 46, K4QAQ 41, W4LLJ 33, W4PFP 20, W4VST/4 19, W4TZG 15, W4SJI 12, K4-LTA 10, W4UJO 10, W4VNU 10, W4ZJY 9, W4A4TS 7, W4PJV 7, W4FLW 6, W4TYV 6, W4PSN 5, W4WUH 4, K4VOP 3, K4EWI 2, K4KYL 2, W4UVU 2.

(Continued on page 112)

Here's the rig you've been waiting for —  
**Clegg's new THOR VI Transceiver**  
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Fixed station or mobile, this little power package reflects all the advanced engineering and design features that have made CLEGG the "most wanted" gear in the VHF field.

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A low noise double conversion super-heterodyne receiver complete with BFO and ANL provides maximum selectivity and sensitivity with stability equal to the exacting requirements of SSB and CW; separate power supply modulator for 115V AC operation. A fully transistorized power supply modulator for 12V DC available soon.

And best of all, this rig is priced at a level that every ham can afford. Place your order with your distributor today. Deliveries start late in November.

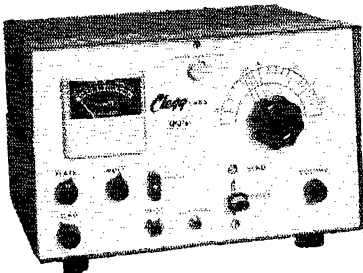
**And here's one for you VHF sidebanders!**

It's the new CLEGG VENUS six meter transceiver for SSB, AM or CW! Once you've used or heard this rig you'll appreciate the engineering and design "Know-how" that made it possible.

Here's what you can expect: A superbly engineered crystal lattice filter, SSB transmitter of greater than 120 watts PEP input; amazing frequency stability, VFO controlled by the receiver's tuneable oscillator; full power input on CW and a substantial signal on AM phone. There is also output provision to drive a KW linear final.

In the receiver section a double conversion, low noise super-het of extreme sensitivity and selectivity, with crystal lattice filter and product detector provides flawless reception of sideband, AM phone or CW. A 115V AC power supply of adequate capacity is a separately mounted unit which can be installed at any convenient distance from the transmitter.

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The 99'er offers operating features unequalled in far more costly gear. The double conversion super-het receiver provides extreme selectivity, sensitivity and freedom from images and cross modulation. The transmitter section employs an ultra-stable crystal oscillator which may also be controlled by an external VFO. An efficient high level modulated 8 watt final works into a flexible PI network tank circuit. A large S meter also serves for transmitter tune-up procedure.

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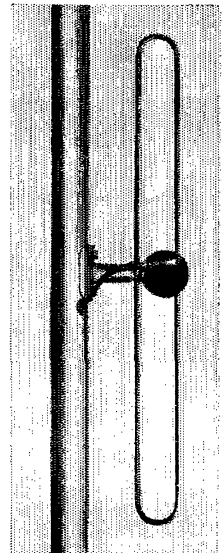
# ***BROADBAND***

**BASE STATION ANTENNAS**

- ① CAT. NO. 340-509: 148-162 Mc 6 db Omnidirectional Pattern
- ② CAT. NO. 341-509: 160-174 Mc 6 db Omnidirectional Pattern
- ③ CAT. NO. 342-509: 148-162 Mc 9 db Offset Pattern
- ④ CAT. NO. 343-509: 160-174 Mc 9 db Offset Pattern

C-P proudly presents four new **BROADBAND** Base Station Antennas. Each Antenna consists of an array of four radiating elements mounted on a 2 $\frac{3}{8}$ " O.D. by  $\frac{5}{32}$ " wall 6061T6 Aluminum Support Pipe fed by a sealed Binary Phasing and Matching Harness, factory installed inside the support pipe.

The folded dipole radiating elements are made of solid aluminum rod mounted on hi-strength pressure cast aluminum alloy bases. The radiating element assemblies are attached to the support pipe with  $\frac{5}{16}$ " stainless steel hex head machine screws. The Binary Harness is installed completely inside the support pipe with the dipole feed lines brought out through grommets at each dipole. Thus, this antenna presents the cleanest aerodynamic structure possible for an antenna of its type. Ninety-five percent of the solid dielectric cable in the feed harness is completely shielded from the weather. Also, the cable is not present on the outside of the support pipe to distort the pattern and impedance characteristics of the array.





### Electrical Specifications:

Nominal Input Impedance.....	50 ohms
VSWR .....	1.5:1 maximum
Bandwidth .....	14 Mc
Maximum Power Input.....	500 watts
Flexible Terminal Extension.....	18" of RG-8 A/U
Termination .....	Type N Male
Gain .....	*
Vertical Beam Width (½ power points).....	16°
Lightning Protection.....	Direct ground through support pipe

\*6 db Omnidirectional pattern for Cat. Nos. 340-509 and 341-509.

\*9 db Offset Pattern for Cat. Nos. 342-509 and 343-509.

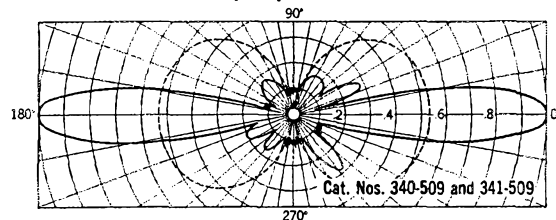
All antennas are equipped with a special teflon insulated UHF female connector at the base of the support pipe. An 18" flexible terminal extension cable, with a Type N male connector and neoprene weathershield, is supplied as part of the antenna assembly.

The use of a one-piece, large diameter support pipe extending throughout the entire length of the antenna provides maximum lightning protection. Possible lightning damage to the feed harness is greatly reduced by virtue of its installation inside support pipe.

### Mechanical Specifications:

Support Pipe.....	6061T6 Aluminum Pipe 2-3/8" O.D. by 5/32" wall
Radiating Element Material.....	6061T6 Solid Aluminum Rod 3/8" diameter
Feed Point Insulators.....	Molded Epoxy Resin
Rated Wind Velocity.....	100 M.P.H.
Lateral Thrust at Rated Wind:	
Cat. Nos. 340-509 and 342-509.....	118 lbs.
Cat. Nos. 341-509 and 343-509.....	110 lbs.
Bending Moment 6" Below Bottom Element:	
Cat. Nos. 340-509 and 342-509.....	1180 ft. lbs.
Cat. Nos. 341-509 and 343-509.....	990 ft. lbs.
Weight:	
Cat. Nos. 340-509 and 342-509.....	40 lbs.
Cat. Nos. 341-509 and 343-509.....	37 lbs.

Vertical field strength pattern of new **BROADBAND** Base Station Antennas. A dipole pattern is shown for reference.



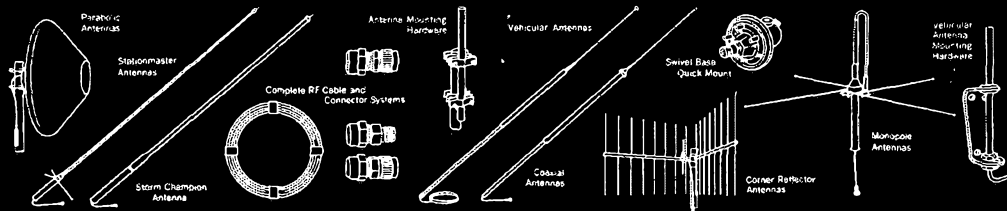
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All 23 channels in stock: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.235.

Matched crystal sets for ALL CB units (Specify equipment make and model numbers) .....\$5.90 per set

### CRYSTALS IN HC6/U HOLDERS

**SEALED OVERTONE** .486 pin spacing — .050 diameter — .005% tolerance  
15 to 30 MC .....\$3.85 ea.  
30 to 45 MC .....\$4.10 ea.  
45 to 60 MC .....\$4.50 ea.

**FUNDAMENTAL FREQ. SEALED** From 1400 KC to 2000 KC  
.005% tolerance .....\$5.00 ea.  
From 2000 KC to 10,000 KC. any frequency, .005% tolerance .....\$3.50 ea.

**RADIO CONTROL** Specify frequency. .05 pins spaced 1/2" (Add 15c for .093 pins). .....\$2.95 ea.



### QUARTZ CRYSTALS FOR EVERY SERVICE

All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

**FT-243 holders** MC-7 holders  
Pin spacing 1/2" Pin spacing 3/4"  
Pin diameter .093 Pin diameter .125  
**CRIA/AR holders** FT-171 holders  
Pin spacing 1/2" Pin spacing 3/4"  
Pin diameter .125 Banana pins

**MADE TO ORDER CRYSTALS . . . Specify holder wanted**  
1001 KC to 1600 KC: .005% tolerance .....\$4.50 ea.  
1601 KC to 2500 KC: .005% tolerance .....\$2.75 ea.  
2501 KC to 9000 KC: .005% tolerance .....\$2.50 ea.  
9001 KC to 11,000 KC: .005% tolerance .....\$3.00 ea.

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.01% Tolerance . . . \$1.50 ea. — 80 meters (3701-3749 KC)  
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FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (oil except 455 KC and 500 KC) .....50c ea.  
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Matched pairs — 15 cycles \$2.50 per pair  
200 KC Crystals, \$2.00 ea.; 455 KC Crystals, \$1.25 ea.; 500 KC Crystals, \$1.25 ea.; 100 KC Frequency Standard Crystals in HC6/U holders \$4.50 ea.; Socket for FT-243 Crystal 15c ea.; Dual Socket for FT-243 Crystals, 15c ea.; Sockets for MC-7 and FT-171 Crystals 25c ea.; Ceramic Socket for HC6/U Crystals 20c ea.

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## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Elmer G. Leachman, W4BFW SEC; W4BAZ, PAM: W4SZB, RM: W4CDA, V.H.F. PAM: K4LOA. *Important Notice:* The Owensboro Amateur Radio Club has established an Awards Program offering four certificates for different achievements. Contact Daniel F. Onley, K4ZRA, 2539 Christie Place, Owensboro, Ky., for information on this valuable contribution to amateur radio. W4SZB reports for MKPN: 31 sessions, 510 call-ins, 38 messages, 14 stations reporting 50 per cent, 2 stations reporting 100 per cent. K4-KJQ, net manager for Central Ky. 6 Meters, held an alert in August with 4 mobiles and 2 fixed stations with good results. W4AUR reports the Bowling Green Club has 8 regulars on 6 meters, 6 stations on 2 meters and 11 have applied for Air Force MARS. Daviess County has received 6-meter RACES frequency assignments. AREC applications are coming from all directions. K4-HSB made WAC in 12 hours. K4SWE, EC Ashland Area EC, has a new HT-37 and an SX-115, also a new shack. A father-and-son team handles traffic for MKPN. W4A4PU, father, takes the early session (6:30 A.M.) and K4NGO, son, connects with the regular session at 8:30. W4CDA, the RM for KYN, needs more NCSs; also has net manuals and county maps of Kentucky. Traffic: K4KWQ 306, K4CSH 71, K4HOE 42, W4A4PU 28, W4SZB 28, K4LOA 27, W4BAZ 26, K4NGO 26, W4BFW 13, K4ZRA 8, W4ADH 7, W4KJP 6, W4CDA 5, K4HSB 5, W4YY1 4, W4KKG 3, W4ACQG 2.

**MICHIGAN**—SCM, Ralph P. Thetren, W8FX, SEC: W8LOX, RMs: W8EG1, W8QQO, W8FWQ, K8KMQ, PAMs: K8ZQU, K8LQA, V.H.F. PAM: W8PT. Appointments: W8IBB, W8LLP, K8QKY as ORSs; W8-AHV as OPS and OBS; K8QKY as OBS; W8EMD and W8MBH as OESs; K8PNX and W8GQQ as ECs. All ECs are expected to renew their appointments promptly each year, and to send in their monthly Form 5 reports to the SEC each month by the first. This is very important. K8KVP/5 now lives in Athens, Tex. Sorry to lose him. K8QVP is coming along fine after stroke. Old friend W8GLW is a Silent Key. New officers of the Copper Country RAA are W8GOW, pres.; W8FWG, vice-pres.; K8VDT, secy.; WN8AQI, treas.; K8UYX, net. mgr.; W8JUU reports over 200 attended the Michigan V.H.F. Picnic. Also W8RWK has a good 6-meter net in Van Buren County. The FARL is becoming interested in RTTY, but since when are RTTY machines cheaper than typewriters? At the Buick Open Golf Tournament, 27 Genesee County RC members handled communications on 2 and 10 meters. W8EMD reports good weak signal reception at "Aurora Acres." K8NYT and K8-UGG are new reporters on Form 1. The GCR covered the Kiwanis Air Show, Flint, with 8 operators and no accidents. W8NOH/6 wishes he was back in Michigan. W8ZIB built a new transmitter. W8ALG has a group on 145.2 mc. in the Grand Traverse Area, W8EGI had his antenna "shot" down. W8DSW has a Gonsel G76 for sending Official Bulletins on 6 meters. W8AFV is back in school in Florida for 9 months. W8DCN and W8JYJ got the Meritorious Certificate for county e.d. work. K8KBN made General. The Lake Huron ARC got its ARRL Charter. K8JED got back from K7USA. K8GJD built a TO kover. K8MKG sent in his first report. W8-JTQ/4 now lives at 24 French Ave., Winchester, Ky. W8PT now has 39 states on 2 meters. K8IEL/W8EFT again will be active this season on 2 meters, on Tower Mountain, near Ironwood. Traffic: Aug. W8JXJ 230, K8KAO 147, K8HLR 140, W8FWQ 70, W8BEZ 60, W8-RTN 58, K8TFE 42, K8QKY 38, W8EU 37, W8HKT 37, W8DSW 35, W8AFV 30, W8JUU 29, K8GOU 28, K8-EPZ 27, K8MKG 24, W8FX 20, K8KQV 20, W8AHV 17, W8AUD 16, K8JED 16, K8YDA 16, K8ZZV 15, K8UGG 14, W8EG1 11, W8TRF 11, W8IBB 10, W8ALG 9, K8GJD 9, K8PYW 8, W8EMD 4, W8MAI 2, K8NYT 2. (July) W8DSW 46, W8FWQ 40.

**OHIO**—SCM, Wilson E. Weckel, W8AL, Asst. SCM: J. C. Erickson, W8DAE, SEC; W8HNP, RMs: W8RZX, W8DAE, W8VTP and K8ONQ, PAMs: W8VZ, K8KSN and K8UBK. New appointments: W8CJN and K8JJI as Ocs; K8PUI as OPS; K8RXD as EC. The newly-organized Ohio S.S.B. Net meets daily on 3975 kc, starting at 2330 GMT. W8LUS and W8RCC are Silent Keys. K8WFM is in hospital suffering from burns. W8EZW received his General Class license. Two groups of amateurs went into two hard-to-get counties. First, W8-IBX/8 and K8MTY/8 went into Vinton with W8IBX making 62 QSOs and K8MTY making 58 QSOs. K8ITH, K8VLU and K8YLK operated portable from Morrow County and gave more than 60 that county. Those who don't have Crawford County, look for WN8EGU on 3728 kc, after 3 P.M. EST. K8BXT passes this news along: K8ORG is planning to go kw. mobile. K8CAS vacationed in Mexico. K8JUZ moved to a new QTH and K8BXT has a new 2-meter beam and received CHC and Twin Cities Class A awards. WN8EGN is a new Novice (Continued on page 114)

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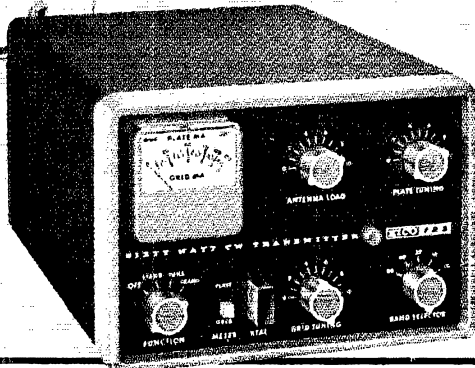


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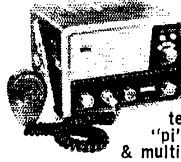
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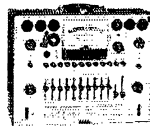


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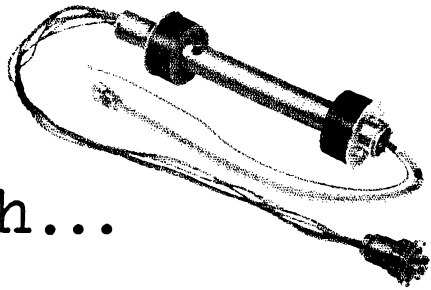
and K8PXE is attending college. WN4FBD/8 has a new HQ-170. W8NAF/7's QTH is now 7333 E. Sheridan St., Scottsdale, Ariz. K8PYD received R-6K, WHD and W-Conn Awards. The Butler County V.H.F. Association's *Vibrator Hash* tells us the club held a picnic. The new bulletin of the Six-Meter Nomads, *The Amateur Extra*, informs us the net meets every Mon. on 50.4 Mc. at 7 P.M. EST. Columbus ARA's *Carascope* states that 110 registered at the club's picnic with W1BBD/8 winning the 20A and v.t.o. and K8LVW falling from a ladder and breaking his leg. Your SCM attended the Warren Hamfest. Those who won prizes were: HX-50 by W8QAZ. Poly Comm 6N2 by W8UDG. P&H analyzer by W3KPI. TO keyer by K8YCZ. National 6N2 & YFO by K8PKS. Johnson-Courier kit by K8BXT. Canton ARC's *Feedline* has on its cover page a picture of W8RNL, who is confined to bed with multiple sclerosis, and states that K8BWR won a Johnson Navigator at FD, the club held its Annual Picnic, K8UKH moved to Steubenville, K8-1111 moved to Pennsylvania, K8NIB has a new HQ-145N. K8BZI has a new Ranger 2 and a TA33 Jr. K8-DQW received his General Class license, K8DGG and K8DGT received their Technician Class licenses. K8-MBP received his Master's degree. Toledo's *Ham Shark Gossip* names W8PCS as its Ham of the Month. W8YNS visited in Missouri. Boy Scout Post 191 RC has WA8-BBJ as its club call. K8TYW's and K8TVX's home was struck by lightning. K8CJS and K8WEH vacationed in Michigan. Findlay's *W8FT News* states W8OTK and W8WE spent their vacation in Eastern Ohio. Parma RC's *P.R.C. Bulletin* says that K8YEV has a new baby boy. There were 4293 Ohio call letter auto plates issued in 1962. W8CZV is on 10 mc. and wants to QSO any others on that frequency in the Akron Area. K8OEX was home on a short visit. W8IBX received W-VT. WFRG and QRP-WAC Awards. W8ESN visited in Alaska. Greater Cincinnati ARA's *The Mike & Key* tells us pictures of early ham gear were shown by W8JDV. Springfield ARA's *The Q-5* informs us that W8KKU received his old call and Dick Smith spoke on Receiver Sensitivity and Noise Figure. The Amateur Radio Editors Assn. is now one year old. W8CEA is home from the hospital. W8LUZ was in Europe. Winners of the Armed Forces Day Test with perfect copies were W8BKM, W8DAE, K8EQN, W8FFK, K8HKU, K8JIC, W8IFX, W8ANP, W8QLJ, W8SQU, W8SZU and W8ZEP. W8DAE made the BPL in August. Traffic: (Aug.) W8DAE 845. K8SQK 381, K8LBU 274, W8BZX 215, K8UBK 198, K8-MTT 52, K8MZZ 50, K8JZQ 49, K8ONQ 46, W8AL 33, W8HZJ 29, K8BYT 20, W8QCQ 19, K8PCL 17, W8IRX 15, K8DDG 10, K8WLP 9, W8AJD 8, K8KLA 8, K8-KXS 6, K8RNL 5, W8LZE 5, W8WVY 4, K8ZGF 4, K8-AGN 2, W8RBYC 1. (July) K8UBK 70, K8BXT 17, W8JTX 15, W8CY5 13, K8PCL 11, W8ILC 7, K8LGA 5, K8DDB 1, W8RBYC 1. (June) W8AEB 5.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy. W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Interclub on 28,690 kc. Mon. at 1030 GMT. Appointments: W2FQL, K2YVE, WA2QAO and WA2TIA as ECs; WA2LYP as ORS and ORS. Endorsements: W2EUC as OO and WA2MID as OPS. K2UTC reports WAS on 10 and 15 meters using a.m. phone only. WA2HGB won the most valuable station and most active station awards on NYS for 1961 traffic handling. New high school calls include Bishop Gibbons, WA2TDK; Niskayuna, WB2-AFV; Scotia-Glenville Senior, WA2ZZE; Scotia-Glenville Junior, WB2BIV. Among those handling the Northeast Glider Meet in Ballston Spa on 6 meters were W2-DAG, W2ODC, K2QFN, K2PEF, K2QLI, K2VZQ, K2-RDS, WA2AIY, WA2GIM, WA2OCV, WA2JHJ, WA2-RQH, WA2VSV, W8ZRY/2 and K1GFT. Relay stations reported arrivals at distant airports as part of the contest for two days. WB2AIJ is a new station in Albany. Down in New Rochelle, the "Cross the Sound" swim meet was handled by K2IES, WA2QMP, WA2NRB, WA2OMT and W2VHH—excellent public service in both ends of our section. K2ZDJ is back from Europe and WA2NRJ is back from two years at school. WA2-DST has a Pawnee on 2 meters. Among those away at school are K2RRR, WA2DEK, WA2USL, WA2DSO, K2-ZDJ and K2IRR. Instructors for Novice and General classes at New Rochelle are WA2JZH and K2SJM. Traffic: (Aug.) WA2HGB 227, WA2UZK 184, W2THE 140, W2DQW 114, W2EFU 111, WA2LYP 65, W2PKY 52, WA2MID 48, K2SJM 26, WA2YHA 16, W2URP 15, WA2-TX 6, WA2VVS 6, K2DEM 5. (July) WA2LYP 28, W2VJV 5.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke, jr., W2OBU—SEC: K2OVN. RM: W2WFL. PAM: K2HCU. V.H.F. PAM: W2EWF. Section nets: NLI, 3630 kc. at 0015 GMT nightly; NYCLIPN. (Continued on page 116)

# Outshining the heliograph...



In the old days, the U.S. army did the Indians one better by using the sun's rays for line-of-sight communication. The instrument, with a mirror and movable shutters, was called a heliograph.

If there's anything new under the sun today, it's the laser, which works fine whether the sun is shining or not.

In fact this man-made source of coherent light outshines the sun.

So, communications by light may be coming back into its own, but in a form heretofore undreamed of.

For instance, Sylvania has developed a gas laser (Type GL-6211) that generates continuous waves and is easily pumped by an r-f generator operating around 27 megacycles. Energy is concentrated in a narrow band of the infrared region, yet the bandwidth is sufficient to accommodate as much information as all radio channels combined...including unlimited Ham operation! And the laser signal can be keyed or modulated.

So much for transmission...but how about reception? Well, Sylvania has also developed a Microwave Phototube (Type SYD-4302) that can be used as a broadband optical receiver or an optical superheterodyne.

The Microwave Phototube (illustrated) is a combination photosensitive element and traveling-wave tube. The photosensitive surface responds to light in much the same way as a diode does to a radio signal. The "traveling-wave" section provides amplification. By adding a laser to the circuit as a "local oscillator," the Microwave Phototube acts as the mixer and i-f section, to detect and demodulate coherent light signals over a bandwidth from 1.5 Gc to 4.5 Gc.

The Sylvania Gas Laser and Microwave Phototube make up, we believe, the first complete light communications package in the field.

Both devices are expensive, and are intended principally for commercial and laboratory use...but we can't escape the conviction that, one day, communication by continuous light waves will play an important part in Amateur activities. And we'll work to promote that day.

73

*Bob Lynch*

K2RMN

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**A**s you can see, when you carry this business of getting things free to an extreme—it becomes pretty ridiculous. If anyone ever offers to give you anything free—watch out. If it has any value at all, someone, some place, is going to pay for it. And don't be surprised if that someone is you.

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**A**round here, the only thing free is something of greater value than any of these: our reputation, our integrity and our determination to give you a five-square deal every time.

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*Ward J. Hinkle W2FEU*

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3908 kc. at 2230 GMT nightly; V.H.F. Net, Tue.-Wed.-Thurs. 145.8 Mc. at 0100 GMT and Fri. through Mon. on 145.25 Mc. at 0000 GMT; Mike Farad Net on 7238 kc. at 1700 GMT; All Service Net at 1800 GMT Sun. on 7270 kc.; The Q5 Net on 3935 kc. at 2100 GMT daily with WA2QJU and WA2OBG as Controls. Traffic has been showing an upgrade and for exceptional work in participating in net and traffic circles WA2RUE, a newcomer in the golden circle. WA2RAIP, WA2GPT, WA2-TQT, WA2QJU and W2EW, in that order of totals, received BPL certificates for the month of August. W2-SEU corrects his v.h.f. 220-Mc. standing to 9 states worked, 3 call areas and maximum distance about 225 miles and has a new 432-Mc. eleven-element beam up now. WB2CVK has a new 6-meter station fixed and a mobile on the same band with a new Halo permanently fixed on the car. K2QVH now is located in a new QTH in Sayville. WA2VLK received an RCC certificate and has a new kw. linear and a Tribander going for him. WA2EXP received a well-earned 35-w.p.m. certificate. WA2QAT moved from the Bronx to New Hyde Park and celebrated with the arrival of a new loud-squawker—a boy. WA2GPT put up a new LRL-70 antenna to work into the "HOWDY" and "YLA" Contests. WA2-YLI finally received his General. WA2YGC and WA2-HNU homebrewed two 420-Mc. transmitters, featured in May QST, and they are working perfectly. As all will note from the headline of this report, K2OVN has accepted the post of Section Emergency Coordinator for our section and has a large amount of work ahead of him in setting up the AREC in our area on a strong working basis. Our sincere thanks are conveyed to W2-ADO for his long devoted service in our emergency group and may he always cherish the appreciation we show for his contributions to the AREC here. K2OVN starts off with an AREC membership of 122 members, of which 1037 are full and 255 are supporting. In the entire AREC membership in our section 225 are mobile. WA2-TQT put up a new Telrex with an AR-22 rotator and worked what is believed to be a first—a QSO from the top of the Empire State Building to ground using 6-meter walkie-talkies. W2GKZ has enough confirmations for DXCC now and also received WAS. W2DBQ has changed his QTH from Brooklyn to Garden City. WA2-IUQ received a W-Conn Award and was appointed ORS. WA2EFN is now a CHC member. W2IVA, the son of W2PF, has been released from 18 months of Army duty and has located in Brooklyn. WB2BGS has completed his new Shawnee. WA2IQD acquired a Gonset 3357 v.f.o. and is operating NFM into a Gonset III and a linear. WA2KSD has a new HQ-170. W2MDM has been appointed Assistant Zone Director for the 2nd Eastern Region. MARS. Amateurs in the Queens Area interested in v.h.f. propagation, construction or mobile operation on 6 meters should contact WA2GFP about the Sunburst V.H.F. Society's elaborate fall and winter program. K2CNJ and K2DNY, a husband-and-wife team, are doing a masterful job in net controlling the 2-meter V.H.F. Traffic Net several times a week and are to be commended for their exceptional handling of this busy net. Traffic: (Aug.) WA2RUE 1504, WA2RAIP 761, WA2GPT 507, WA2TQT 461, K2VBG 377, WA2QJU 350, W2FW 313, W2GKZ 98, W2DBQ 87, WA2LJS 65, W2WFL 64, WA2IUQ 52, K2KYS 43, WA2GAB 26, K2HY 22, WA2-QHT 21, WA2VLK 19, WA2EXP 18, W2OME 18, WA2-EFN 16, WA2IFQ 15, W2LGY 12, W2EG 11, W2IAG 9, K2SPG 9, WA2PUE 8, K2PHF 6, WA2FIT 4, W2PF 4, WA2IAH 3, WA2ODA 3, WA2HHY 2, K2POY 2, WA2-MTB 1, K2YQK 1. (July) W2GKZ 75, W2WFL 61, WA2-WFW 18, K2PHF 6, WA2ODA 1.

**NORTHERN NEW JERSEY—SCM.** Daniel H. Earley, WA2APY—SEC: K2ZFL RM: W2QNL. PAM: K2SLG. V.H.F. PAM: K2VNL. Names, times and frequencies of the New Jersey NTS nets: NJN, 2300Z 3695 kc. daily; NJPN, 2200Z 3900 kc. daily except Sun. at 1200Z; NJ 6&2, 0300Z Thurs. and Sun. on 51.15 Mc., 2200Z Tue. and Sat. on 146.70 Mc. Net reports, sessions, attendance and traffic: NJN, 31-556-384; NJPN, 31-488-91; NJ 6&2, 21-100-33. Appointment renewals: WA2-CCF as OPS; K2SLG as OPS; W2COT as EC. Many appointments will soon be dropped if not renewed. W2NKD turned in all the mobile gear and is really enjoying himself with a Valiant on all bands. The beam is up and the receiver tuned and W2CWK is all ready for the winter. WA2OQP got a new rig and is looking for traffic skeds. W2SCP just put a rig in the car. W2LQP is back from VE-Land and working on an 80-meter antenna. WA2EDG says he's busier than a bug on FD. W2NIY's XYL was in the hospital with a broken leg. K2AGJ says 20 meters is getting better; she ought to know. WA2OVK has been appointed Asst. EC. WA2-ZQH has 36 states. WA2SRK is an asst. EC and says the North East Teen Net is now the Eastern Region Traffic Net and meets daily at 2325Z. WA2CCF made BPL as WA2CCF/1 for July and Aug. while in Connecticut. He also got a new Johnson Viking. W2CFB says

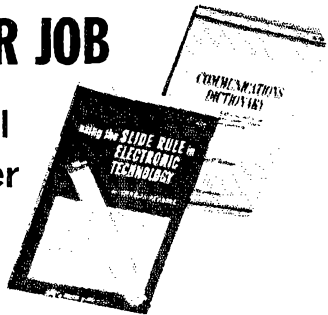
(Continued on page 118)

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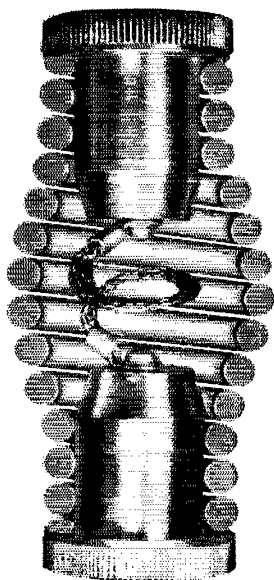
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all the time he has spent in design and building. W2EAW visited K2VVL. K2UCY thinks congrats are in order for the daughter of W2EKM; she skipped the Novice exam and got WB2BID. W2CVW has been on the air actively for the past 13 years. W2QNL has a p.p. 100TH final. We want to welcome W2QNL as the new Rote Manager for NJN. WA2GQZ, who did such a swell job, was stolen by 2RN. WA2JCQ says the v.h.f. DX is dying off. K2SBS is moving to a new house in the same town. K2QQA has gotten his DXCC and is leaving for a 2-year hitch in the Navy in November. There is something new on 6 meters, the Monmouth County MCW Net. It is different, you ought to check in and see. It meets every Mon. and Fri. at 10 p.m. local time on 50.5 Mc. I understand it's good practice for those who want to get the code speed up. WA2GQK is the man to see for details. WA2YXH is a new General. WN2CRX and WN2DHN are new Novices. WA2KIY says he had a little TVI complaining before the new V-4-6. WA2NWR, W2NEZ and K2KUC are said to have put the Clifton c.d. truck in fine shape. How's the AREC making out up there? W2GKE is on 40 meters with a full-size vertical and a buried ground system. K2VZJ will try to operate home on week ends from Wagner College. WA2SRK made the BPL in August the hard way. WA2APY is putting an addition on the home-stead with room for the 5th harmonic and a ham shack. Traffic: (Aug.) WA2SRK 610, K2UCY 282, WA-2J1Z 278, K2VNL 211, WA2OVK 129, W2QNL 100, WA2APY 95, WA2WSB 63, WA2GQZ 53, WA2FDG 39, K2ITU 30, W2ABI 26, W2CVW 21, WA2CCF 15, W2QNL 14, WA2JCQ 13, WA2OQP 10, K2SBS 10, W2DRY 8, W2NKD 8, K2SLG 8, WA2ZQH 8, W2TFM 6, W2CFB 4. (July) K2UCY 548, WA2EDG 70, W2DRY 10.

## MIDWEST DIVISION

**IOWA**—SCM, Dennis Burke, W0NTB—SEC: K0. EXN, OES: W0BAN, W0DRE, W0PEP, O0S: K0-AKQ, K0AZJ, W0QVZ, K0WVO. OBS: K0HGH, W0JDV, O0PS: K0AHZ, W0BTG, W0EEG, K0-EXN, K0GXP, K0HC, W0NEL, W0NGS, W0PP, W0SLC, W0VWF, W0YDV, W0NDF is new at Jamaica. The 75-Meter Picnic at Cedar Falls was the pleasant get-together it always is: 200 licensed amateurs with their XYs and harmonics made it the picnic of the year for this section. The 160-Meter Net meets daily at 0100Z on 1815 kc. and reports for Aug.: QNI 622, QTC 63, sessions 31. The 75-Meter Phone Net meets daily Mon. through Sat. at 1815Z on 3970 kc. and reports for Aug.: QNI 1330, QTC 147, sessions 27. The S.S.B. Net meets daily Mon. through Sat. at 0030Z on 3970 kc. The Tallman Net, with W0LGG as RA, will meet daily at 0030Z on 3560 kc. The Hawkeye Net meets every Sun. at 1400Z on 3930 kc. There are many other important nets with regular meetings; also AREC and RACES nets, too. Traffic: (Aug.) W0LGG 1511, W0NTB 95, K0MMS 64, K0UA 56, K0AFG 47, W0VWF 31, W0VXO 0, 27, W0PZO 21, W0GQ 17, K0HGH 17, W0FMZ 13, W0BTX 11, W0YDV 11, K0QKD 9, W0BLE 4, W0NGS 4, K0JMA 3, W0QVZ 2. (July) W0DUA 188.

**KANSAS**—SCM, Raymond E. Baker, W0FNS, passed away at the Concordia Hamfest Aug. 19, 1962. Our sincere sympathy, together with that of all the amateurs in the state, is expressed to his XYL, Leah, and the loved ones left behind. SEC: K0BNF is filling in until an election for a new SCM is held. Asst. SEC: K0EMB, RM: W0SAF, PAM: K0EFL, V.H.F. PAM: W0HAJ. Nets: KPN, 3920 kc. Mon.-Wed.-Fri. 1245Z, Sun. 1400Z; 17 sessions; QNS 350, high 43, low 12, average 20.6; QTC 72, high 16, low 0; average 4.2. QKS: daily 3610 kc.; 0030Z; 31 sessions, high 15, low 3, total 292 QNI; average 6.5. QTC 92, high 9, low 0, average 2.6. KSWN, 3920 kc. Sun. 1330Z. KSWN (July) 340 kc. Mon. through Sat. 0010Z; 25 regular sessions, 461 stations answering. KSWN (Aug.) 26 regular sessions, 1 emergency session, 495 stations answering. The Kansas-Nebraska Amateur Radio Club S.S.B. Dinner Aug. 18 found 28 present. The Hamfest Aug. 19 registered 117 with 250 present. KOIRL and others worked in the V.H.F. Contest with a 2-meter antenna on a 550-ft. tower at a local TV station under the call W0ROY. W0HAJ reports the v.h.f. band is open intermittently to the East with stations working Illinois, Indiana and Wisconsin, also the K.C. Area. 2 2-meter gang is missing the St. Louis regulars. The AREC Zone 16 (Wichita) held an exhibit and judging contest with complete news coverage and real nice prizes. EC W0ALA reports the next drill will be held in November. Dot K0GIC, vacationed in Portland. Ron, K0JDC and OM Harold, K0JDD, moved to Dodge City. The JARS in Kansas City started Novice and Advanced code and theory classes Sept. 10. W0ALA reports a change in his OBS schedule and now is on 143, 150 kc. Tue., Thurs. and Sun. at 0100Z (GMT). O0 KORNZ reported; OES K0GIC reported; Traffic:

(Continued on page 120)



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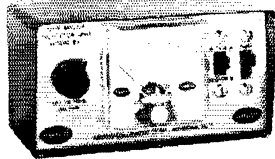
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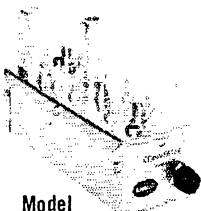
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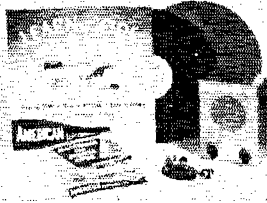
**CB-2W**—2 meters wired and tested. \$33.95

**Model PS-1**—Matching Power Supply—plugs directly into CB-6, CB-2 and all CN units. **PS-1K**—Kit.....only \$10.50  
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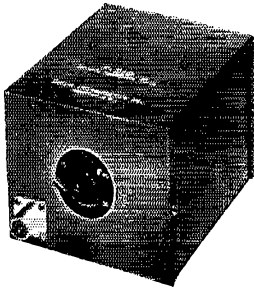
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(Aug.) WOSAF 143, KOYTA 80, WOABJ 32, KOBXF 29, WOTOL 22, WOORB 19, KOGH 18, KOEMB 13, WOFR 12, KOLHE 12, WOALA 9, KOQKS 9, KOPSD 5, KOZHO 5, KOLPE 3, WOFDJ 1. (July) KOBXF 52, WOALA 7.

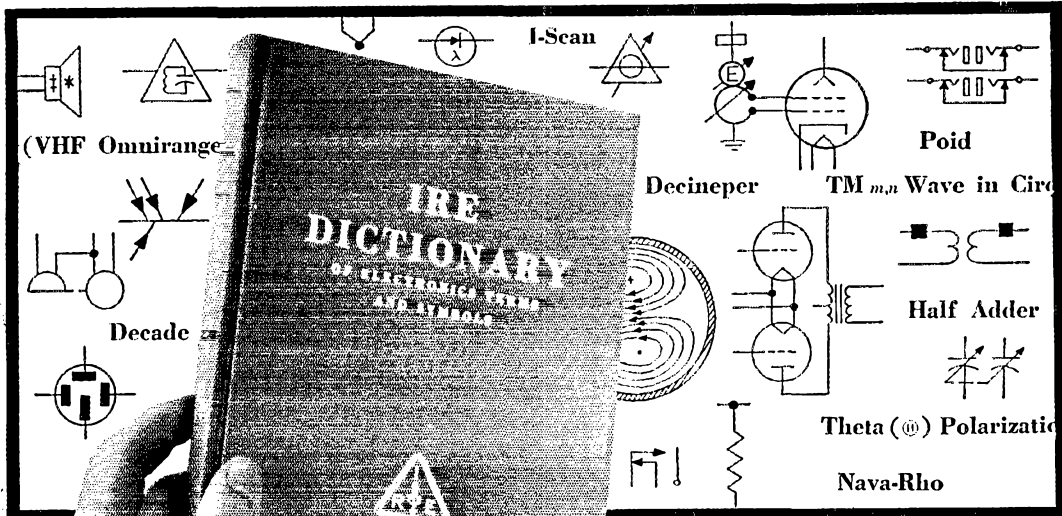
**MISSOURI**—SCM, C. O. Gosch, WOBUL—SEC: KOWNZ, RMs: WOUD, KOONK, PAMs: WOBVL, WOTPK, WOLFE (v.h.f.). Net reports (Aug.): MSN (3517 kc., 2200 GMT M-F; 1400 GMT S) 21 sessions; QNI 67; QTS 42; NCSs: KOONK 9, KOVPH 5, KOPFC 6, KOGFA 4, MEN (3885 kc., 2400 GMT M-F) 14 sessions; QNI 366; QTC 166; NCSs: KOONK 5, KOVPH 4, KOWNZ 1, WOTPK 4, Mo. S.S.B. (3963 kc., 2400 GMT Tu.-Th.) 9 sessions; QNI 152; QTC 68; NCSs: WOECA 1, WOPXE 4, WOOMM 4, MION (3580 kc., 0100 GMT Tu-S) 27 sessions; QNI 195; QTC 156; NCSs WOUD 11, KOPFC 5, KOVPH 5, WOKIK 4, KOGFA 1, KOVMZ 1, SMN (3580 kc., 2200 GMT Su) 4 sessions; QNI 20; QTC 8; NCSs WOUD 3, WOKIK 1, PON (Mo.) (3810 kc., 2100 GMT M-F) 23 sessions; QNI 268; QTC 126; NCSs: KOHVJ 17, KOPIQ 4, KOBWE 2. Endorsements: WOKAM as ORS; WOCWT as EC; WORTW as ORS. Officers of the Greene Co. ARS (Springfield) are KOVHL, pres.; WOICW, vice-pres.; WOAH, secy.-treas.; KOHUU, act. mgr. Custodian of club station (WOFHM) is KOWYJ. Officers of the Lees Summit RC are KOTCB, pres.; WOPDR, vice-pres.; KOTGW, secy.; WOJXI, treas.; KOLNMI, act. mgr. The SCM expresses his thanks to the host clubs at the picnics/hamfests attended this past summer, those involved, namely, the Sedalia ARC, host for the Missouri Picnic; WOLFE, host for the V.H.F. Picnic at Bowling Green; Springfield (SWMARC, Inc.) host for its annual picnic. KOIPD was on active duty with the Natl. Guard. The SCM regrets to report that because of a change in employment, he has requested relief from these duties—he will be on the road continuously. Traffic: KOONK 1330, KOVPH 701, KOPFC 309, WOTPK 175, KOGFA 146, WOAYB 130, WOOMM 84, KOVBT 82, WOKIK 78, WOUD 54, WOBUL 50, KOVMZ 35, WOPXE 23, WOEPJ 19, KOPRH 19, WOBZ/O 11, KOWNZ 10, WOBVL 5, WOGBJ 3, KOIPD 3.

**NEBRASKA**—SCM, Charles E. McNeel, WOEXP—SEC: KOTSU. Please send all AREC applications and EC reports to KOTSU. Western Nebraska Net. WOKIK NC reports QNI 549, QTC 112. 100 per cent reporting WAOAES and KOBIQ. The New Nebraska Storm Net has started operation on 3983 kc. daily at 1930 CST and KOJKN NC reports 22 sessions, QNI 180, QTC 2. Nebraska Morning Phone Net, KODGW NC reports QNI 582, QTC 121. Nebraska Emergency Phone Net, WOHXB NC reports QNI 561, QTC 39. Nebraska Section Net "C.W.", WOOKO RM, has resumed operation on 3525 kc. at 0100 GMT daily. WONYU will be back on the air soon after moving to a new QTH. KOWFG suffered a heart attack while on vacation in Colorado but is doing nicely in a Greeley Colorado hospital. Traffic: WOAFG 125, WOOKO 119, KOYDS 113, KOGAT 65, KODGW 64, WOLOD 42, KOZEO 32, WOKIK 27, WOEGQ 22, WAOBS 17, KOUWK 16, WOYFR 12, WOZFR 9, WOTH 8, WOBQO 7, WOFGF 6, WOLOJ 5, WOKFY 4, WGNOW 4, KOYZP 4, WOVEA 3, WOAHB 2, WOKDW 2, WOPQP 2, WOSWP 2, WOKWP 2.

## NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Henry B. Sprague, jr., W1CHR—SEC: W1EOR, RM: W1KYQ, PAM: W1YBH, V.H.F. PAM: W1FHP. Traffic nets: CN, daily 1845 and 2200 on 3640 kc.; CPN, Mon.-Sat., 1800, Sun. 1000 on 3840 kc.; CTN, Sun. 0900-3640; CVN, Tue., Thurs., Sat. 2030-145.45 Mc. W1KUO is enjoying his return to CN along with K1QCR. The latter is busy working on v.h.f. gear and has a DX-100 almost finished. Newly-active on CPN are K1s NKT, NTR and QVX. K1JAD is back in Norwalk after summer school work in Pittsburgh. K1s GMF and PUG had fun operating portable from Bear Mt., Conn., on 2 meters. The Waterbury Wireless Assn. enjoyed WHDQ's visit. K1RTS has acquired an all-band rig but has no power supply yet. K1MIX worked No. and So. Carolina on 2 meters using a stacked ten-element beam and a 522. K1PQR is trying to get his eleven-element stacked array tamed. K1PQR's chronic rig troubles have raised havoc with his traffic operation. W1APA is going mobile on 40 meters with s.s.b. W1OJR reports poor conditions for DX but still managed to increase totals to 272/266. K1HZJ got his Conditional Class license. W1FRN has all new equipment for 6 meters. K1PTV is using a converted BC-603 on 6. W1s MEO and NYL MEK are on 2 and 6 meters with a Johnson 6N2, an HQ-170-C and a sixteen-element beam. They work Delaware and Vermont regularly. W1LIG built a tiny power supply for his BC-221

(Continued on page 122)



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**PART II** of this 225 page volume is a Dictionary of Symbols, made up of five IRE Standards: Letter Symbols for Electron Tubes; Letter Symbols for Semiconductor Devices; Graphical and Letter Symbols for Feedback Control Systems; Graphical Symbols for Semiconductor Devices; and Graphical Symbols for Electrical Diagrams. A four-page index to graphical symbols is included.

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and has been made a member of the MARS P.I. Team. KIs WTB and RVL are planning a 6-meter net. K1LAL is in the service. K1QAL is now a WA2 on Long Island. K1VVK used a borrowed 10-meter mobile rig from W1LIG on his vacation but could only make local contacts. WA2CCF/1 enjoyed his stay in Connecticut visiting W1AW and taking part in the Torrington e.d. drill. K1QVX and WA2CCF/1 made BPL. Reports received: SEC from W1EOR; OO from W1: OJR and EOY; OES from KIs RTS and PCR. Traffic: (Aug.) K1QVX 523, K1PQS 281, W1KYQ 195, K1EIR 185, W1RZG 158, K1VVI 149, W1OHR 141, K1PGQ 123, W1NJI 100, W1YBI 106, WA2CCF/1 105, K1EFC 100, W1AW 82, W1EFW 82, K1DGG 73, K1LFW 59, K1PUG 51, K1JAD 45, W1LTI 37, K1QPN 29, W1KUO 27, K1ONW 25, W1C7I 22, W1FNS 22, W1BDI 20, K1MBA 15, W1APA 11, K1OJZ 11, K1HTY 10, W1BNB 4, WA21ZII/1 4, (July) W1KYQ 163, K1QCR 6.

## NEW ENGLAND QSO PARTY

December 8-9, 1962

sponsored by  
The Connecticut Wireless Association

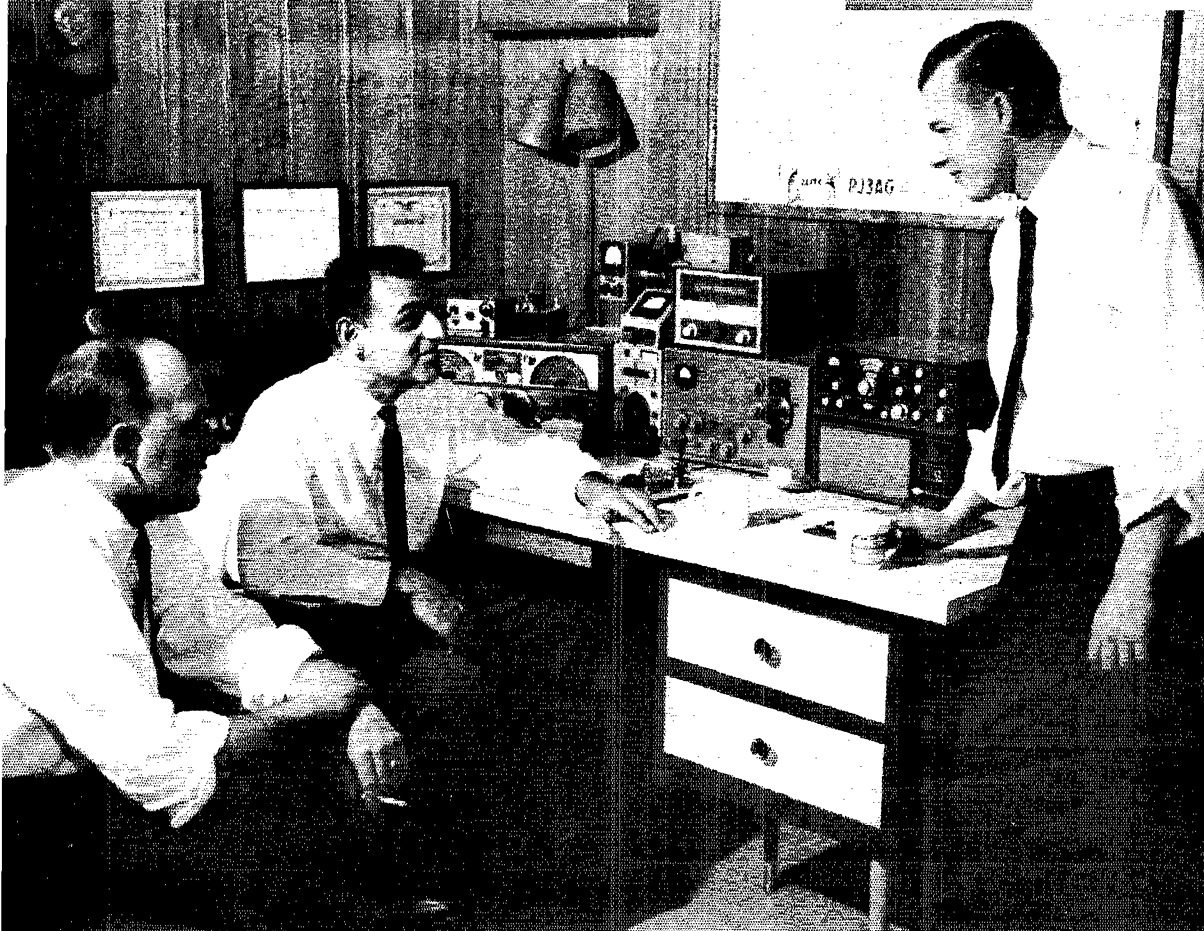
ALL AMATEURS IN THE SIX STATE AREA are invited to take part. The Conn. Wireless Assn. calls this its SEVEN-ELEVEN PARTY because the three operating periods are from 7 P.M. to 11 P.M. EST Saturday night, 7 A.M. to 11 A.M. Sunday morning, and 7 P.M. to 11 P.M. EST Sunday night, 7-11 are lucky numbers. . . . Try your luck!

**Eligibility:** All licensed amateurs in New England are eligible and invited to participate. Only single-operator entries will be considered for awards. CWA members are not eligible for awards. **Times:** Three operating periods during the week end of December 8-9 will be utilized: 0000Z to 0400Z Sunday (Dec. 9), 1200Z to 1600Z Sunday (Dec. 10), and 0000Z to 0400Z Monday (Dec. 10). See above for SEVEN-ELEVEN EST times.

**Frequencies:** All amateur bands may be used. A station may be worked twice per band, once on phone and once on c.w. It is suggested that the 25 kc. on the low edge of each band and sub-band be used. **Exchanges:** Call "CQ New England" on phone and "CQ NE" on c.w. The exchange will consist of QSO number, RST(T) report, name (or abbreviation) of county and state. For example W1NXX might send: "NR 7 589 CUMBERLAND, MAINE." **Scoring:** Count one (1) point for each contact. Multiply total contact points by number of different counties worked. Multiply again by number of states worked. For example, W1NXX works 50 stations, 35 different counties and 6 states. His score would be  $50 \times 35 \times 6 = 10,500$ . Maximum possible county multiplier is 67. Maximum possible state multiplier is 6. **Awards:** A handsome plaque, engraved with the winner's name and call, will be awarded to the highest scoring station. A certificate will be awarded to the 1st and 2nd high scorers in each state; to the high scoring Novice in New England; and to the high scoring Technician in each New England state. **Logs:** Logs must show date and time of each contact, complete exchange information, call and address of operator and final score calculations. Mark each new county and state as worked. Mail copy or carbon of logs to: Conn. Wireless Assn., c/o John Lindholm, W1DGL, 59 Redwood Drive, Bristol, Conn., no later than January 14, 1963.

MAINE—SCM, Albert C. Hodson, W1BCB—SEC; W1GRG, PAM; K1ADY, RM; K1KSG. August showed some fine 2-meter openings to the south and also to VE1 and VE2-land. The new officers of the Ellsworth Amateur Radio Club are W1TU, pres. (re-elected); W1DAS, vice-pres.; Janet Perry, secy.-treas. In recognition of fifty years as an amateur W1ATS was presented with a 24-hour clock by the club. The club had a lobster picnic Aug. 19 at the QTH of K1HGX with 60 guests including K1REB Commander of Winter Harbor Naval Radio Station, Group Commander Frank Soares, U.S. Coast Guard Base, Southwest Harbor, WA2LWV, W7-ZUX and many local hams. The York County group is starting a club so anyone interested should listen for particulars. K1KSG has CHC No. 453 and K1ADY has CHC No. 450. Sorry to report W1EUK and K1OVQ as Silent Keys. Five mobile units and the bus of the

(Continued on page 124)



George Lucas, W1ZYS, "Pops" Karentz, W1YLB, and Ray Churchill, W1VBI, enjoy an infrequent eyeball QSO at "Pops'" Millis, Mass., QTH.

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Ray Churchill, W1VBI, specializes in high speed bombing radar aboard B-52's. He may be at Loring AFB, Maine one day, Edwards AFB, California the next.

Pops is the Field Project Supervisor of Air Force Programs for Raytheon's Electronic Services Operation. Pops served in a wide range of field engineering assignments prior to his promotion to Project Supervisor and is currently responsible for field programs requiring the services of a large group of field engineers. George Lucas and Ray

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Cumberland County Emergency Communications Not assisted in the search for a lost man in Cornish Aug. 30. K1ANN acted as control station. With the fall and winter club activities under way please send in any special events, awards, etc. W1LWV is on with a KWS-1. W1NDC and K1HOI have Murauaders. K1KSG has an 813 homebrew. Traffic: (Aug.) K1GUP 183, K1IMI 47. (July) K1GUP 236.

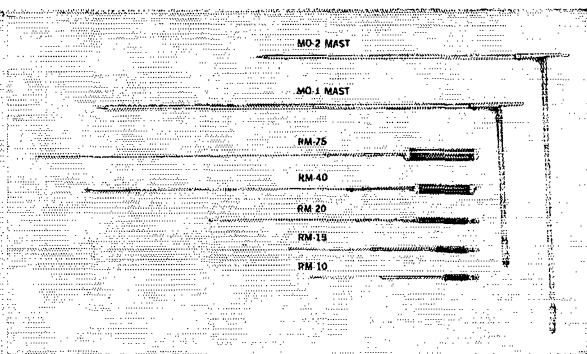
**EASTERN MASSACHUSETTS**—SCM, Frank L. Baker, jr. W1ALP—Please note my new QTH: 85 Solar Ave., Braintree 85, Mass. W1AOG is our SEC. K1RHY is a new ORS. Appointments endorsed: W1S BGW and AYG as OOs; W1DDN as OES; W1S HLQ Stow. IAU Whitman, LVK Medford, DOP Revere, AWA No. Reading as ECs; W1S DOP, NJL, AWA and PEX as OPSs; W1S AWA and AQV as OBSs; W1NJL as ORS. W1PEX made BPL again. W1DOM is on 75 meters. K7OTR got married and is back home. Silent Keys: W1BKE, W1VX and K1ATF. K1NYLD is new in Westwood. K2RIR is living in Needham. K1SOD is on 2 and 6 meters. W1S STX, AAU, LVK and K1OLN sent reports to W1AOG. K1STS is back in Sudbury. K1DYA is building an antenna coupler and a v.f.o. for 6 meters. K1AII is on c.w. The FM2MN had 23 sessions. 248 check-ins. 184 traffic. K1S GTX and GYM are home from the hospital. W1LES is on the 2-meter net. Welcome, Marv. W1VUE is going to Florida. W1QFO is moving to Braintree. W1UR is active in MARS. W1EAE worked P-town on 2 meters. K1TSD is on 2 meters. K1QNZ has an HT-40. W1BGW has a WAA certificate. W1AQF inspected the antenna on top of the Empire State Bldg. W1OHA is home and DXing. KP4BEA is ex-W1EXY. W1BA has a new SX-101A. Some Dim Light Boys have been water skiing. W1ALP is sorry to leave the Quincy gang but he has more room and a new QTH. W1NF worked TG9AD. K1OJQ has a Valiant. W1AYG is working on an s.s.b. for mobile. W1RHN tracked Oscar 2. K1OPQ has an Apache. K1UNL has a Twoer, a beam and a halo. W1TZ is all set up in his new shack with a 75A-4 and a 32S-1 s.s.b. transmitter, two new towers and is on all bands. K1DRB has a power supply modulator control unit and is back on 2 meters. W1GVY is rebuilding the 300-watt home-brew rig. K1RZN is up in Sunapee. N.H. W1HE is building a keyer. K1JBL is building a rig for 220 Mc. K1SXP, Sanborn RAC, monitored Oscar 2 signals before official announcement of the launch was given. W1CUW has a new tower with a TH4 on top. K1LXA has his General, has been on 40-meter c.w. and needs Alaska. W1AVY gets on 80-meter c.w. some. His son is W1WGN and they have a B&W 5100S and a 75-A2. As most of you know by now, our license plate bill was killed. W1EKG has been in the hospital but is coming along OK. Ex-W1GYZ was around on his vacation. W1JTG is getting the bug again. The Mass. V.H.F. Society met at W1PZT's QTH. W1PSL has retired and is at home now. W1AQV is very busy with various things. The T-9 Club met at W1IB's QTH. K1ICJ, Sharon, has been endorsed as EC. New officers of the Whitman Radio Club are W1TAU, pres.; K1CHC, secy.; K1TZC, treas. Meetings are held each Mon. at 7 p.m. at the Central Fire Station. The call K1WRG is used for contests. K1WYS is W1LS's nephew and W1PSW's cousin. K1WRG is on 2 meters with a halo. K1NYAI is on 2 and 80 meters. K1WYS is on 2 meters. K1TZC is on 6 meters, his son K1NYJE on 2. K1NUP passed his General. K1S WJN and VWJ are on 2. W1DWD is on 2 and 15. W3HB/1 is on 2, also K1WVY. Mobiles heard on 2: W1S JSM, LIN, K1S ICJ, CEZ, DSU, HNP, HPG. K1YMN is new Dedham. K1MGP is active on 6 meters. Traffic: (Aug.) W1PEX 995, W1OPK 190, W1EMG 177, W1ZSS 133, W1DOM 73, W1SIV 39, W1LES 35, W1AUQ 28, K1QNZ 21, W1VYS 16, W1AOG 13, K1OJQ 3. (July) K1TSD 73.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BYR—SEC: W1BYH/K1APR. RM: K1IJV. PAM: K1RYT. WAIN operates nightly on 3560 kc. at 7:00 p.m. local time. Regular attendance not only trains you in operating in a controlled net but also will increase your speed rapidly. RM K1IJV reports that 16 different stations reported into WAIN during the month with K1SSH, K1PES, K1IJV and W1BYR being the tops in attendance in that order. K1LBB received his 35-w.p.m. sticker from ARRL. New Quinebaug RC officers are W1EFC, pres.; K1NVSC, vice-pres.; W1-  
BFB, secy.-treas.; K1JNS, act. mgr. Lightning got K1LNC's HQ-145. SEC W1RYH reports a total of 150 AREC members in West. Mass. K1TLY and K1WGN expect to have their 420-Mc. TV rig on the air by Thanksgiving. New officers of the HCRA are: W1MDM, pres.; W1WLE, vice-pres.; W1IC, secy.; W1LRE, treas. W1HYO has a new mobile rig. K1IJV and K1IJU have a new tri-bander up and working. K1PES has a new Drake 2B. W1WF and W1DPY are doing serious experimenting on 21,000 Mc. K1DJC has moved to Scranton, Pa. W1KQK is building a new s.s.b. rig. W1UUK is  
(Continued on page 126)

# GOOD MOBILES GO...



## 10-15-20-40-75 METERS NEW-TRONICS MOBILE ANTENNA



### ● Now, Get Fixed Station Reports with the "HUSTLER"

Buy only the mast and resonators for the bands you operate. No need for matching devices, no feed line length problems. Use any length of 52 ohm cable. This is a new, efficient concept of center loading. Each of the five resonators has a coil specially designed for maximum radiation for a particular band. Center frequency tuning is by means of an adjustable stainless steel rod in the resonator.

The 54-inch fold-over, heat treated, 1/2-inch aluminum mast permits instantaneous interchange of resonators. Mast folds over for garage storage. When opened to full height, the two sections of the permanently hinged mast are held rigidly in position by a shake proof sleeve arrangement. Mast has 3/8-24 base stud to fit all standard mobile mounts. Power rating is 75 watts dc input A.M. — 250 watts PEP input for SSB.

#### ANTENNA ASSEMBLY CONSISTS OF 1 MAST and 1 RESONATOR

Part No.	Description	Total Height of Antenna	Amateur Net
MO-1	54" Mast folds at 15" from base	(For Rear Deck or Fender Mount)	\$ 7.95
MO-2	54" Mast folds at 27" from base	(For Bumper Mount)	7.95
RM-10	10 Meter Resonator	Maximum 80" — Minimum 75"	5.95
RM-15	15 Meter Resonator	Maximum 81" — Minimum 76"	6.95
RM-20	20 Meter Resonator	Maximum 83" — Minimum 78"	7.95
RM-40	40 Meter Resonator	Maximum 92" — Minimum 87"	9.95
RM-75	75 Meter Resonator	Maximum 97" — Minimum 91"	11.95

ANY MAST OR RESONATOR MAY BE PURCHASED SEPARATELY

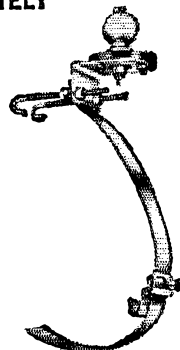
### FITS MORE CARS THAN ANY OTHER BUMPER MOUNT!

**MODEL BM-1** Flat alloy steel strap fits tightly against any shape bumper yet is inconspicuous. Length of strap permits its attachment to both large and small bumpers.

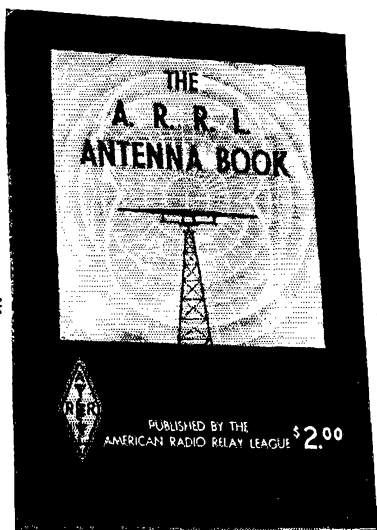
Assembly is held in place by two "J" bolts at the top of the bumper and strap clamp at the bottom. "J" bolts may be inserted between top of bumper and car body where clearance is as low as 1/4".

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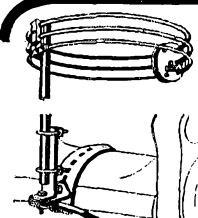


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working plenty of DX. W2WTS (ex-W1ADF) has joined the Silent Keys. W1BVR and K1PES both have new Heath HG-10 v.f.o.s to go with their DX-60's. Traffic: K1RYT 717. K1SSH 168. W1BVR 123. K1IJV 99. K1PES 86. K1LBB 21. W1OSK 8. W1FFC 2. W1DWW 1.

**NEW HAMPSHIRE**—SCM, Ellis F. Miller, W1HQ—SEC: K1GQK. PAM: K1NXV. GSPN meets Mon. through Fri. at 2400 and Sun. at 1430 on 3842 kc. CNEN meets Mon. through Sat. at 1130 on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330 on 3685 kc. K1JDN is now in Germany and operating under the call DL1SD. Several contacts have been made with him on the 20-meter band. Any of the gang can find Bart on c.w. at or near 14,030 kc. The v.h.f. gang of the Midstate Amateur Radio Club supplied the communications for the Annual Winnepesaukee Fifty-Mile Water Ski Marathon on Sept. 2. Three frequencies in the 144-Mc. band were employed. There were seven marine portables and four land based units used. Despite rough water, ignition noise and other disconnecting problems, communications were conducted without a hitch. W1BYS is rebuilding and hopes soon to be on the air with more power. W1YHI has been elected your new SCM. Congrats. Al. May your term be a most successful one. Again my sincere thanks to all who contributed their support during the past two years. Traffic: W1TA 57. K1DQM 27. W1AGM 8. K1IKK 8.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1SMU. PAM: W1TXJ. RISP reports 31 sessions, 590 QNI, 109 traffic. Appointments: W1YNE, as SEC. K1WHV as OES. The RIN now meets at 1900 EDST daily on 3610 kc. K1NES has been appointed net manager. R.I. hams who wish to join the AREC, please contact the new SEC. The SEC has applications available and his address is, Gordon F. Fox, W1YNE, 151 Whipple Road, Esmond 17. R.I. Let's give W1YNE all our support to make R.I. one of the best AREC groups in the country. The W1AQ Club has purchased a new 6- and 2-meter antenna and an 80-10 matchbox for the club shack. W1MUL has been working 1250 Mc. with an APX/6. He contacts W2HYN/1 daily and would like other hams to join them. All RISP members attended the wedding of K1PNI and his new NYL W1CFT. Our best to two of the happiest hams in R.I. The R.I. Mobiliers, along with the Mass. Mobiliers, assisted in locating the daughter of K1TPK. The NCR of Newport lost one of its hard-working members with the death of W1ETM. Art was a past-president of the club and was a leader on Field Day. The W1DDD Club of Woonsocket reports that K1LZW has entered the service. Traffic: K1NEF 741. W1TXJ 522. K1DZX 35. K1PZY 31. K1TPK 23. K1NJT 14. K1GRC 13. K1GRA 8. W1WED 5.

**VERMONT**—SCM, Miss Harriet Proctor, W1EIB—SEC: K1DOB. PAM: W1HRG. RM: W1KRV. K1YID is now permanently located in Marlboro. W1EKU and W1HCJ, of Chelsea, have been working in Addison County. W1ZWB, of Mt. Hermon, visited in Middlebury. W1PNY, of Connecticut, was at his camp in Ripton. W1HFS, of Vergennes, is doubling the size of his shack. K1QZ, of Ludlow, has been helping a group of amateurs and would-be amateurs in that area. K1UZG has just passed her General Class exam. K1NIW has left Chester for Massachusetts. K1CEG, of Huntington, has been getting excellent results with his grounded grid 813 linear. Traffic: K1YID 8.

**NORTHWESTERN DIVISION**

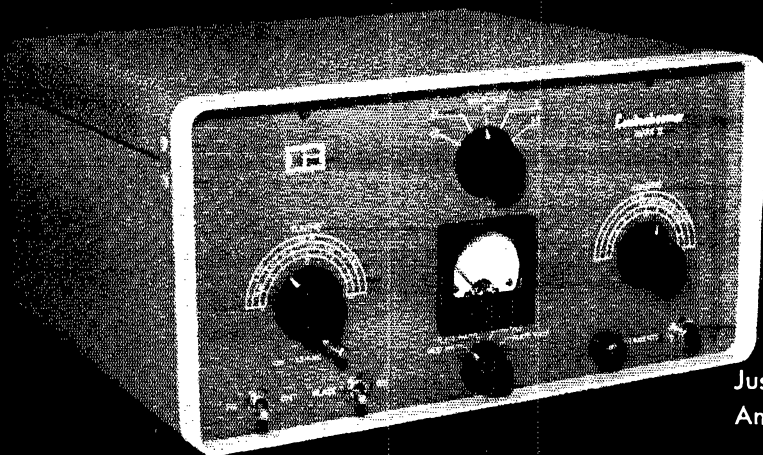
**IDAHO**—SCM, Mrs. Helen M. Maillet, W7GGV—The FARM Net meets at 0200Z on 3935 kc. M-F. The Gem State Traffic Net meets at 0300Z on 3580 kc. M-F. Your vote is needed in the election for Northwestern Division Director and Vice-Director. The recent earthquake in Cache Valley, Utah, was felt in Eastern Idaho and sent AREC members rushing to their rigs at 0645 to offer assistance. The ARRL Convention in Portland was a huge success. About a dozen Idaho amateurs attended group and general meetings. The XYLS were entertained extensively by the Portland Roses YL Club. K7MRX was elected secretary of the YLRL for '63 and is the 3rd Idahoan to join CHC. W7GAS is promoting 2-meter activity between neighboring states. K7ULJ is a new ham on the air. K7BCE is hobbling around with his leg in a cast. FARM Net traffic: 78. Gem State Net traffic: 46. Traffic: K7KBY 61. K7HLR 38. W7FBL 29. K7OAB 25. W7VQC 19. W7GGV 19. W7JFA 10. W7MJZ 4.

**MONTANA**—SCM, Ray Woods, W7SFK—SEC: W7RZY. PAM: W7YHS. RM: K7AEZ. The MPN meets on 3910 kc. at 1800 hours M-W-F. The MSN meets on 3550 kc. at 1830 hours T-T-S. The TSN meets M through F at 1200 hours on 7230 kc. Montana amateurs will regret the passing of W7YUM, of Billings. The ARRL National Convention at Portland was well attended and

(Continued on page 128)



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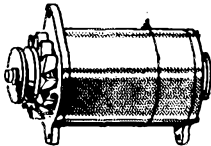
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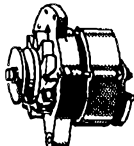
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very well handled. Your writer got along very fine, especially after it was discovered that he was the OM of W7TGG. Vera, I wish to express my sincere thanks to the amateurs of Montana for their very fine support and cooperation in my two years as their SCM. I consider it a privilege and an honor. New calls in Billings are K7TZU and K7TZV. W7YTG has a new 8-lb. jr. operator with W7SZB as grandpa. The Billings Picnic was reported as a real success with 68 in attendance. People seen at Portland: W7JVN and daughter, W7JFR. W7RZY. K7CHA with mother and father, K7AJQ. W7UPR. K7AUM. W7CPY. W7CBY. W7TGG (me too). W7GBI. W7EEO. K7MYH and possibly some others that I missed. KN7JIR is a new call in Livingston. K7EWZ is remodeling his QTH and will be off the air for a while. Traffic: K7EWZ 69, K7OGF 16.

**OREGON**—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7AITW. Appointees certificate endorsements: W7UQI and K7BEV as ECs, W7BVII as ORS. W7GCH as OO. Net reports: QSN, sessions 23, QNS 236, QTC 133, BRAT Awards: W7BVH, W7MTW, W7ZFH, K7IWD. OAREC, sessions 10, QNS by counties—Multnomah 30, Columbia 9, Clackamas 3, Lane 9, Washington section 10, total 61. On Aug. 11, a woman and her 3-year-old son became lost in the Mt. Jefferson Area. Amateur radio communications were the main source of communications for the following groups: Mountain Rescue Council, the Air Force, Explorers Clubs, Sheriff's Office, State Police, newspapers and radio stations. Coordinators were W7PJO, K7OWF and W7RVN. Mobiles on the mountain were W7AFQ, K7PQF, K7HFW and W7IGI. Others who handled traffic were W7BID, W7UFR, W7BVV and W7GCK. Mother and son were found by a helicopter and were in good condition. Again the Oregon AREC can chalk up a job well done. K7KBK now has a new SB-10 s.s.b. adapter and complete 2-meter rig. K7MH now has 1-kw. s.s.b. and c.w. on 6 meters with a pair of 4X150As. K7IWD is going after RPL. Your SCM welcomes news and traffic reports; also would like to hear from clubs as to their activities. Join the AREC. Contact your county Emergency Coordinator, or your SCM can give you information upon request. Traffic: K7IWD 441, W7ZFH 156, W7AITW 91, K7KBK 35, W7MAO 20, W7AJN 17, W7DEM 12, W7BVH 9, K7QZF 5.

**WASHINGTON**—SCM, Robert B. Thurston, W7PGY —The new officers of the Washington Amateur Radio Traffic System (WARTS) are ZFH, mgr.; K7AJT, asst. mgr.; K7DCJ, secy.-treas.; W7OWJ, W7UYZ, W7YLW, W7ZDQ and K7MGA, directors. K7CWO reports he and the new XYL will be moving to Pullman to attend Washington State University. W7YTE is using a Valiant and an SX-100 and states that a group in the south end of Seattle is getting ready to go on 420 Mc. Those interested may contact W7YTE or W7JJI. W7ISC, Lewis County EC, has a real fine AREC group, W7HMQ, W7WHV, K7s ASY, MBV and PIV were initiated into the Wouffl Hong at the Convention in Portland. The Washington section was well represented at the National Convention in Portland. K7PIY's mobile converter was lost through sticky fingers. W7JEY now is located in Royal City in Columbia Basin and expects to have a class in code and theory in Junior High. K7JRE worked WAC with 75 watts and is one-quarter past the DXCC mark. W7IEU completed the history on the beginning of the NSN Northwest Slow Speed Net, which meets on 3700 kc. at 2100 PDST. W7AMC turns in a good traffic count. W7JGT joined the ranks of Silent Keys as a result of a private plane accident in Canada. W7OEB got in on the JARL Test and QSOed 45 JAs, 2UAO and 1 KR-6 with the half-gallon jug. K7DFS has a sick Johnson 500. K7OPW has the Heath Maunderer click free and the KW final working FB. The newest call in the Walla Walla Valley is K7UKS, 7106.667 kc. has been officially selected as the 40-meter calling frequency in the Walla Walla Area. KN7TCC is QRL studies for his Conditional. K7JYN was a World's Fair visitor in Seattle recently. KN7SN is heard on 40-meter cw. K7DWP works 75 meters. W7DQC is going back to college at Pullman. W7FMJ still is plugging 160 meters KN7TRC is QRL building new gear. W7HDQ was principal speaker at the 50 and Up Society in Seattle Sept. 5. W7RGL smoke tested the new homebrew c.w. KW. W7ZVY is suffering from a foot injury caused by well-digging. W7HNV acquired an 75-S1 receiver and is looking for a matching transmitter. A new certificate award called the "Atom Snappers" from the Richland Club now is being issued. Contact five Richland Club members for this award. The NSN had 459 QNTs and 101 QTCs during 27 sessions. The net also gained three new members: KN7TYT, KN7TYH and WA6BFT. KN7RSD is waiting for his General Class license. W7KZ renewed his ORS appointment. Traffic: K7JHA 1294, W7BA 1013, W7DZX 907, W7PGY 332, W7GIP 287, W7OEB 226, W7AMC 205, W7APS 185.

(Continued on page 130)

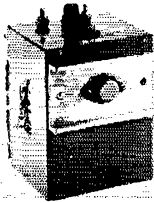
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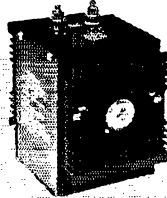
New concepts in power supply circuitry\* enable Topaz Power Supplies to deliver more watts per dollar than any comparable unit, and every unit is unconditionally guaranteed for six months.

TOPAZ MANUFACTURES POWER SUPPLIES  
TO FIT PRACTICALLY EVERY TRANSCEIVER,  
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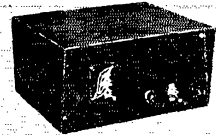
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### HUSTLER-AC C10XDG-AC BUILT-IN SPEAKER

Offers 800 VDC @ .44A, 280 VDC @ .21A, —50 to —90 VDC, adj. bias, LC filter. This unit designed for Collins, Sonar, Swan, Drake and other transceivers. General Specs. and features: 117 VAC 60 CPS input, wt. 30 lbs., Size 10 1/4" x 10" x 5 1/2". Fused, attractive cabinet. **\$104.95**

**ECHO-AC model C10WG-AC**  
Offers 600 VDC @ .58A, 300 VDC @ .6A, 0-120 VDC, adj. bias. Has space available for speaker installation. Other features and genl. specs. same as above. For Swan, Collins, Sonar, Drake and others. **\$94.95**

**DEACON-AC, C10WDD-AC BUILT-IN SPEAKER**  
Offers 650 VDC @ .54A, 270 VDC @ .13A. Other features and genl. specs. same as above. For Gonset transceivers and others. **\$104.95**

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OTHER MODELS AVAILABLE

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\*Patent pending.

**6 VOLT MOBILE POWER SUPPLIES FOR VW's PORSCHEs, OTHERS. 6 V CARS**

**CYGNET-6 model C10WDG-6**  
Offers 600 VDC @ .415A, 300 VDC @ .5A, 0-120 VDC, adj. bias and primary power relay. This unit designed for Swan and adaptable to Collins, Sonar and other transceivers. General specs. and features: 6 —7.5 VDC input, 75% efficient, wt. 9 lbs., only 4 1/4" x 6 3/4" x 5 1/2". momentary short circuit protection. Epoxy fiberglass printed circuit board, fused, regulated drive. Unit is transistorized and "floating." **\$124.95**

**SNOOPER-6 model C10W-6**  
Offers 600 VDC @ .415A, 300 VDC @ .5A, 115 VAC, 400 CPS & 50 VA sq. wave. Other features and genl. specs. same as above. For Johnson Viking Mobile and Eimac. **\$114.95**

**HONKER-6 C10XL-6 260 watts**  
Offers 800 VDC @ .325A, 280 VDC @ .210A, —50 to —90 VDC, adj. bias and primary power relay. Other features and genl. specs. same as above. For Swan, Collins KWM-1 & KWM-2, Sonar and other transceivers. **\$138.95**

**DEACON-6 model C10WDD-6**  
Offers 650 VDC @ .385A, 270 VDC @ .13A, primary power relay and hi B+ relay. Other features and genl. specs. same as above. For Gonset G-76 and others. **\$138.95**

**HUSTLER-6 C10XDG-6 260 w**  
Offers 800 VDC @ .325A, 280 VDC @ .210A, —50 to —90, adj. bias and primary power relay. Other features and genl. specs. same as above. For Collins KWM-1 & KWM-2, Sonar, Swan and other transceivers. **\$154.95**

**12 V POWER SUPPLIES**

**CYGNET-12 model C10WDG**  
Offers 600 VDC @ .415 A, 300 VDC @ .5A, 0-120 VDC adj. bias and primary power relay. This unit designed for Swan and adaptable to Collins, Sonar and other transceivers. General Specs. and features: 11-15 VDC input, 85% efficient, wt. 7 lbs., only 3 15/16" x 4 3/4" x 6 3/4", momentary short circuit protection, epoxy fiberglass printed circuit board, fused regulated drive. Unit is transistorized and "floating." **\$99.50**

**SNOOPER-12 model C10W**  
Offers 600 VDC @ .415 A, 300 VDC @ .5A, 120 VAC at 400 CPS & 50 VA sq. wave; other features and genl. specs. same as above. For Swan, Collins and Sonar Transceivers. **\$79.50**

**DEACON-12 model C10WDD**  
Offers 650 VDC @ .385 A, 270 VDC @ .13A, primary power relay, hi B+ relay, LC filter. Other features and genl. specs. same as above. For Gonset G-76 and others. **\$119.95**

**HONKER-12 model C10XL 260 watts**  
Offers 800 VDC @ .415A, 280 VDC @ .21A, —50 to —90 VDC, adj. bias and primary power relay. Other features and genl. specs. same as above. For Swan, Collins, Sonar and other transceivers. **\$119.95**

**HUSTLER-12 C10XDG 260 w**  
Offers 800 VDC @ .325A, 280 VDC @ .210A, —50 to —90 VDC, adj. bias and primary power relay, LC filter. Other features and genl. specs. same as above. For Collins KWM-1 & KWM-2, Sonar, Swan and others. **\$134.95**

**ECHO-12 model C10WG**  
Offers 600 VDC @ .415A, 300 VDC @ .5A, 0-120 VDC, adjustable bias. Other features and genl. specs. same as above. For Swan, Collins, Sonar and other transceivers. **\$89.50**

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 56, K7JRE 20, K7QMF 12, W7JC 6, W7JEY 1.

## PACIFIC DIVISION

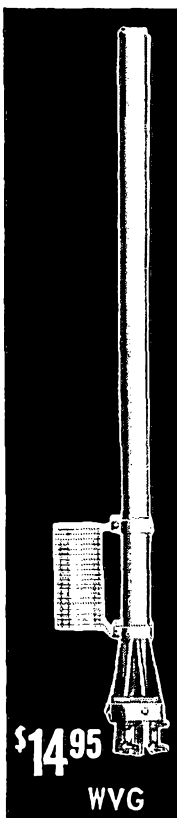
**HAWAII**—SCM, John E. Montague, KH6DVG—Acting  
 SCM: Mike Fern, KH6ARL, SEC: KH6COV, RM: KH6DVG,  
 KH6EGL, KH6DVG left for Virginia Poly Sept. 3. He may be back next summer. Monte has  
 really built up the section. Send your reports to KH6-  
 ARL. As of Sept. 1, KH6UK had worked W1BU seven  
 times on 1296 Mc. The Radio Club of Kauai, under  
 KH6LG, has notified more ex-Oahu police gear for  
 e.s.d. and mobile use. KH6 DLV, DLV, DLV and DRT  
 pitched in. W6ZDF/KM6 has become a mainstay of the  
 Poi Net. PAJUM stops over on Oahu between Philip-  
 pine Air Lines flights. KH6EGL added a one-ke multi-  
 vibrator to his frequency measuring gear. KH6ELE  
 passed the Conditional Class exam and graduated to an  
 807. KH6DVG has a BC-640 on 147 Mc. WA4CLK is  
 now KH6EWD and Asst. Mgr. of the Poi Net, which  
 meets at 6500Z on 3750 kc. Daily except Mon. Traffic:  
 KH6DVG 137, KH6EWD 47, W6ZDF/KM6 60, KH6EGL  
 19, WH6EOT 16, KH6BZF 2.

**NEVADA**—SCM, Charles A. Rhinds, W7YIU—W7FJN  
 is running for JP in North Las Vegas. He and W7PBV  
 make up the new Las Vegas TVI committee. K7TDQ  
 moved to a new five-element beam. He vacationed at Zion  
 National Park. K7NYU, of Nellis AFB, is on 6 and 2  
 meters. K7RLX and XYL, K7RLW went to the Seattle  
 Fair and attended the National Convention at Portland.  
 W7SNP has a new Corvair. W7NPS moved to Utah.  
 W7OYQ, W7VYC and K7NVC have new Swans on 40-  
 meter mobile. K7ADD (94X4N) is due back from  
 4X4-Land with a new XYL, W7VYC and K7RLX have  
 new Drake 2Bs. W7HPO is off because of TVI. The new  
 Las Vegas Amateur Radio Club held a picnic at Mt.  
 Charleston with about 50 present. Officers are K7RLX,  
 pres.; W7YQW, vice-pres.; W7VYC, secy.-treas. W7JPC  
 is debugging a Marauder. K7KBN made the BPL.  
 K7CJZ has returned to Sparks. W7MWF moved to  
 Boulder City. K7RNM received "Worked 25 Nevada"  
 certificate No. 81. W7VII and his XYL vacationed in  
 Jasper, Lake Louise and Seattle. Traffic: K7KBN 563,  
 W7PBV 16.

**SANTA CLARA VALLEY**—SCM, W. Conley Smith,  
 K8DYX—The Monterey Bay RC activated W8UCS/8  
 for a booth operating at the Monterey County Fair.  
 WA6BZE and K6VQK, both OPS, were in general  
 charge. They had an RTTY installation which was an  
 attention-getter. The SCCARA will operate W6UW/8 at  
 the Santa Clara County Fair. WA6HVN, EC, and K6-  
 YKG, ORS, are in general charge. The San Mateo RC  
 held a successful auction at its August meeting. Both  
 the SCCARA and SCARS enjoyed a visit by F. E.  
 Handy, WIBDI, during his trip to the West Coast for  
 the Portland Convention. W6ZRJ, SCM-elect, reports  
 much better operation after overhauling the DX-100.  
 WA6LSS, ORS, is back with the traffic gang with a  
 revamped rig. K6GID, ORS, enjoys working through  
 the 2-meter repeater with his 1.m. mobile gang. The  
 SARO also has a repeater on 2 meters. W6CBX, OO,  
 reports 15 stations responding to a call-up from E. Bay.  
 S.F., Sac. V. and our own Section. WA6MGZ, ORS,  
 reports 2-meter openings as far south as the L.A. Area  
 with the better-equipped stations making two-way  
 contacts on s.s.b. and c.w. K6YEH, OBS, is developing  
 an RTTY station. WA6AUC, ORS OPS, is active on  
 phone. WA6HRS, OBS, is DX-chasing. W6YBV, ORS,  
 has a new job with Lockheed. K6ZCR, OO/ORS/OBS  
 has been sworn in as 1st. Lt. in the Air Force Nurse  
 Corps. K6LFZ, EC for Hollister, is now married.  
 Traffic: (Aug.) K6KCK 553, K6GZ 320, W6AIT 156,  
 W6YBV 90, W6AUC 81, WA6EIC 73, K6DYX 53,  
 W6DEF 45, K6GID 22, WA6TNY 22, W6ASH 14, K6-  
 VQK 14, K6EQE 10, W6UVP 9, K6ZCR 8, K6HBF 7,  
 K6MTX 1. (July) W6ZRJ 22, WA6LSS 12, K6ZCR 6.

**EAST BAY**—SCM, B. W. Southwell, W6OJW—SEC:  
 WA6MIE, P.O. Box 1122, Concord, Calif. W6LGV is OK  
 again and going on a short vacation. Next month we  
 will list all East Bay appointees. K6PJY is the new  
 EC for Eastern Contra Costa County. K6OSO will  
 remain as Metro Contra Costa County EC. WA6RGD  
 turned in a nice traffic count. K6GK's traffic count will  
 be sorely missed by UTL while he is in Malaya on a  
 Peace Corp Mission. WA6WLE has a new QTH so will  
 be QRL, but is building a new mobile rig. W6JI still is  
 eyeing new commercial rigs for his QTH. WA6VAT  
 found his s.w.r. high on the new vertical, but his DX  
 and WAS scored still OK. WA6LGE received a QRP  
 certificate and he and his OM (WA6LGD) are getting  
 Heath mobile equipment with a new Gotham vertical.  
 WA6WNG/6 got his General and is building a 500-watt  
 linear. F. E. Handy, WIBDI, was a recent visitor in  
 the East Bay section and had an eyeball QSO with Ye

(Continued on page 132)



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## FULL ONE KILOWATT P.E.P. OUTPUT

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MODEL  
RF-101  
LINEAR  
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AMPLIFIER

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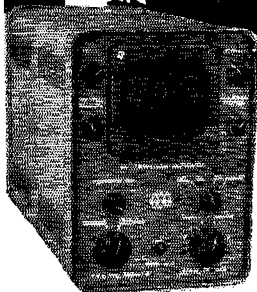
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- Trapezoid pattern compares detected envelope of exciter with RF envelope of amplifier or transmitting converter.
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- No modifications or internal attachments to exciter or amplifier required. Rear connections provided for 50-70 ohm coax lines.
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MODEL TT-1 . . . \$19.95

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SCM. The ORC had its picnic in Roberts Recreational Area and had a fine turnout. The MDARC also held a picnic at Lake Anza with a large group in attendance. The NCARTS (Northern California Amateur Radio TWX Society, Inc.) held its August meeting at the home of W6PYM. For information on joining the club, write Secy., 2816 Delaware St., Oakland 2, Calif. W6WXXM is attending Seattle Pacific College. W6-NXC also is attending college and WA6GIQ is going to Calif. Polytech in Pasadena. WA6HSL is mobile with the Early Worms Net. K6YQG has a new Benton Harbor 6-meter lunch-bucket rig. K6KLY is in first place in the HARC TVI complaint department. The Early Worms Net now has 11 members. Just had a newflash that Oscar III would be launched in early 1963, so that gives you lots of time to overhaul that 2-meter receiver and be ready. There are lots of rumors on what is to be contained in Oscar III, but no concrete information. Watch QST for details. Traffic: WA6RGD 335. WA6WLE 5.

**SAN FRANCISCO**—SCM, Wilbur E. Bachman, W6-BIP—Our SEC states, "Now that winter weather isn't far off, check over your portable rig and emergency power unit, keep a spare antenna coiled up in case a storm takes down your regular sky hook. Brush up on the ARRL message form so you will be ready in case a storm disaster puts you in the middle of an emergency. Take a word from the Boy Scouts, "Be Prepared." Keep in touch via "AREC Net" Sun, mornings at 10:30 a.m. on 3900 kc." Best wishes to our SWOP girl, W6BDE, who has been very ill. A speedy recovery, BAYLARC. The San Francisco Club has many good workers but none can top Art and Estelle Messineo, W6UDL and WA6ALE, who are always willing to do more than their share for the good of the club and ham radio in general. The CCRC held its last regular meeting in Alamo with the Mt. Diablo Club as host, at "Pete's in Upstairs Alamo." Good luck to W6FVK at his new QTH in Novato. Glad to get you back in the San Francisco section. Deepest sympathy to WA6JTP on the recent loss in the family. W6SEX and his XYL and YL have been enjoying the past few months on a trip to Ireland. W6KZF is back at his old job as editor of the Mission Trail Net paper, *Blazer*. W6BF, Passive Engineer of the Atomic Radiation Lab, at Hunter's Point, gave a wonderful talk on Atomic Radiation and Fire Control at a recent HAM's Club Meeting. W6AHH is having a fine time with his new RTTY setup. W6GCC expects to get his new ASR Teletype on the air soon. W6JWF has been busy fixing antennas at W6CXO. National Red Cross Station. Fellows have been helping him with this chore.

**SACRAMENTO VALLEY**—SCM, George R. Hudson, W6BTV—Asst. SCM/SEC: Antone F. Buzidas, K6IKV. County ECS: K6BNB Sacramento, W6LSW Placer, K4VFN/6 Yuba-Sutter, WA6OKS Shasta, K6BY8 Butte, K6GOT Yolo. The RAMS Mobile Net meets each Sat. at 1800Z on 3965 kc. The Sacto. Area C.D. Net meets with K6HHD, NCS, at 0300Z on 147.12 Mc. each Tue. NCN Traffic Net meets daily at 0200Z on 3635 kc. It's been proposed to move NCN to 160 meters because of propagation. Traffic mem. address your comments to NCN Mgr. WA6DAU! W6ZJW says the group in Willows is planning a Glen County RACES program with 20 units of 2-meter gear mobile. K6-HEZ reports the formation in the beginning stage of a new 2-meter emergency net for the Sacto. Area; name, time and frequency to be announced soon. W6SLI put up a new 60-ft. vertical, says that it works fine on 3.6 Mc. and that he sure enjoyed the recent ARRL-Aerojet meeting. The Aerojet-Fd Handy meeting in Sacto. was a highlight of the 1962 Valley activities. WA6GXK reports signals at a summer low but is looking for a great DX season ahead! W6AF spent a week at Eagle Lake and Susanville and had a nice visit with K6EDE and W6EXP in Lassen County. K6IHD transmits Official Bulletins on Sacto. RAMS Net each Sat. at 1800Z on 3965 kc. and skeds W6YKU, Chico, weekly. *DX Flash*: W6GDO worked W6NTZ in the L.A. Area on 2 meters with 5 by 9 signals on phone both ways! WA6-NAU has his tribander up 60 feet. W6PIV, reportedly the Valley's most active amateur experimenter and an OES, reports WA6GNB grafted an International Crystal Co. transistor converter to a 6 transistor BC set to make a good receiver for 152-Mc. municipal service. W6PIV has completed a 144-Mc. transceiver for special use by the handicapped; it features small size and weight about half that of a Communicator. Traffic: W6UUN 40, K6IEEZ 35. WA6NAU 21.

**SAN JOAQUIN VALLEY**—SCM, Ralph Savoyan, W6JPU—At the San Joaquin Valley Net Picnic, WA6-EHC won the AMECO transmitter and WA6KIU won a 522. The SJVN had 877 check-ins, 59 contacts, 52 traffic, 5 QST and 13 bulletins. A 6-meter net is con-

(Continued on page 134)

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Building, modifying, or buying a linear amplifier, look to Penta beam pentodes. They're your key to the ultimate in linear amplifier performance. Write today for your free copies of Penta beam pentode data sheets.

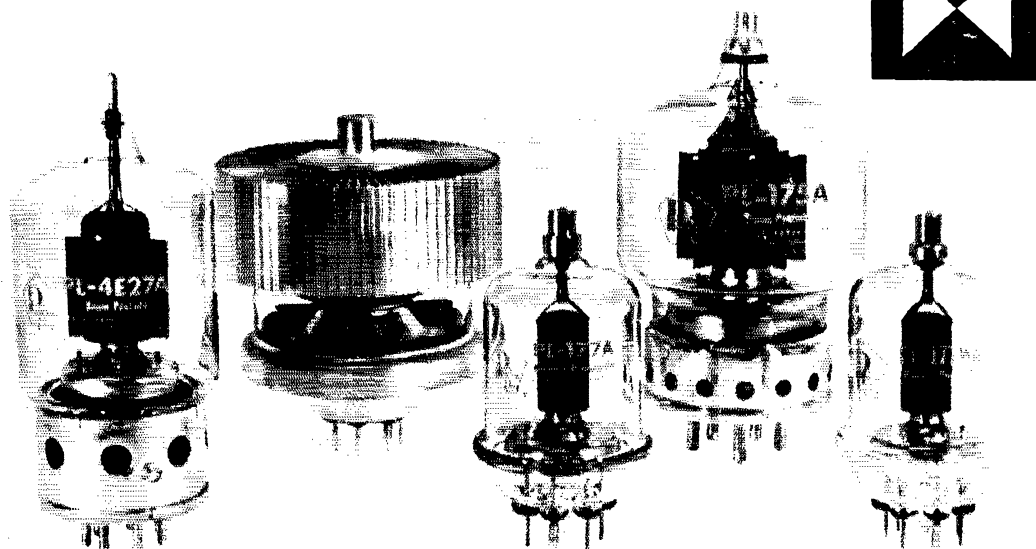
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PL-4E27A	5.0	7.5	125	—	—	220W	280W	—
PL-175A	5.0	14.5	400	—	—	445W	570W	680W
PL-8295	6.0	8.2	1000	—	—	1040W	1260W	1590W

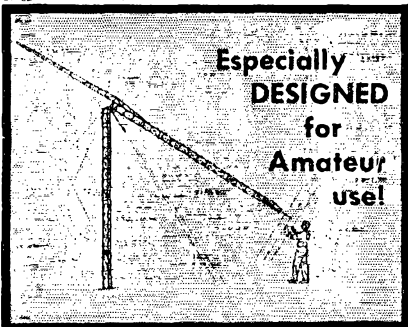
\*Actual power output delivered to load from typical amplifier.

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ducted by Net Control WA6DRH every Mon. at 8 p.m. on 50.250 Mc. All are welcomed to the net. The Delta Amateur Radio Club is changing its net frequency to 51 Mc. WA6FUF is now on active duty in the Navy. K6OLN is mobile with an ARC-5 and a Super Six converter on 75 meters. W6EFB lost his tower and hopes to have his 2-meter beam back up soon. W6PNP has a 75S-3 receiver. K6QOK has an SX-71 and a DX-100 transmitter. K6ODA went to the Seattle Fair, and so did W6XV. K6GVG got married and congratulations. W6MYU is back in town and located at 3515 E. Dayton, and has a Heath S.S.B. transmitter and receiver. W6LOS is now located in the Sacramento Area. K6LRW is heard on 75-meter s.s.b. The Fresno Radio Club meets every 2nd Fri. of each month on the 10th floor of the PGE building in Fresno. Traffic: W6EFB 15, K6AXV 5, K6OLN 3.

### ROANOKE DIVISION

**NORTH CAROLINA**—SCM, N. J. Bornel, W4CH—RM; K4CPX, V.H.F. FAM; W4ACY, W4BUZ submitted a very timely report on experimenting with *The Reverse Tropa* as effects 2- and 6-meter transmission. These tests were carried out on Mt. Mitchell with the assistance of W4BVW and WA4AET. W4HJZ sent in his initial OES report and has constructed a 50-Mc. nuvistor converter. Fine QO reports were received from W4FUI, W4AFJM and K4IEK. From our own RM, K4CPX, comes the good news that NCN ranked first in the 4RN division for sessions credited over a period of the last 12 months. W4OXZ now succeeds WA4FM as RACES Officer of the Buncombe County C.D. We regret to announce resignations of W4YMI as SEC, W4QC as EC and W4DGF as EC, and wish to extend sincere thanks to them for their past support. Anyone interested in emergency work and who desires EC appointments is asked to contact your SCM. The Hurricane Hunters Net meets nightly at 7:30 on 3895 (s.s.b.) to handle emergency traffic only. W4OAB informs us that there is an active 6-meter MARS net in and around Charlotte. WA4PD radioed that the Rebel Teenage Net is back on nightly at 2130Z on 3880 kc. Everyone enjoyed themselves at the big, big Shelby Hamfest. The following participated in the first drill of Davidson County RACES: W4s PZM, LPP, WAT, K4s HSK, LGP, EOF, JWR, CVJ, DGP, FMC, JZD, SWN, WA4ASK and JUN4s HAZ, GUT. The new emergency mobile communications unit, a converted school bus, was used. Traffic: (Aug.) K4CPX 140, W4PCN 103, W4PKS 93, K4QVF 51, WA4APD 38, WA4FJM 35, K4YCL 28, K4TPK 27, W4COJ 5, W4ACY 4, (July) W4PKS 63, K4MPE 11, W4COJ 9.

**SOUTH CAROLINA**—SCM, Lee F. Worthington, K4HDX—SEC; W4BCZ, PAM; K4KCO, RM; W4PED, Nets: C.w. 1900 and 2200 EST 3795 kc.; a.m. 1930 EST 3930 kc.; s.s.b. 2000 EST 3915 kc.; emergency s.s.b. Wed. 1900 EST 3935 kc. W4CE/RACES and W4BCZ/SEC attended the Camden ARC Picnic Aug. 26 and were very successful in recruiting ECs and AREG members. The ARRL South Carolina Section Meeting was held Oct. 13 in Rock Hill preceding the hamfest Oct. 14. Speakers were W4MWH, Director Roanoke Div.; W4AKC, Vice-Dir. Roanoke Div. and the present and outgoing SCMs, SECs, PAM and RM. New appointments: W4CJB, K4LNL, K4JVV, K4MXX, W4BYE, K4RMI, WA4AMM, WA4ECI, K4GVE, K4JOQ, W4JPK, W4SVE, K4PJE, K4ZLW as ECs, WA4KC/V. Dir. and K4HDX/SCM attended the Sept. meeting of the Aiken ARC and spoke on the merits and activities of ARRL. The Geer ARC was host to the Spartanburg ARC Sept. 4 for a combined club meeting and tour of a battery manufacturing plant. K4PNX now has his 1st-class radiotelephone license and is going on 6 meters. W4TLC worked 144-Mc. meteor scatter into Michigan Aug. 12 with W8PT. Traffic: K4OCU 98, WA4DGH 74, K4LND 41, K4W0I 34, W4ARC 32, WA4CSO 23, W4NTO 22, K4YFK 9, W4VTV 5.

**VIRGINIA**—SCM, Robert L. Follmar, W4QDY—Asst. SCM; H. J. Hopkins, W4SHJ, SEC; W4VAIA, RMs: W4LK, K4TV, W4IA, W4SHJ, W4QDY, PAMs: W4BGP, W4UFX, K4JQO. By the looks of the various station reports it seems that the boys have just about gotten the vacation bug out of their systems and are ready to go to work. W4BZE says things are looking up. W4OOL says the receiver blew up during the CD Party; also that he is building a t.r. switch. W4LRN got his 80-meter antenna back up. On the Eastern Shore W4OID reports 4 Novices under the wing. K4ALL had rig trouble. Old faithful K4AL put a 10-15-20 quad into the ozone. Newcomer WA4JFY made the BPI during August. K4RNH is going away to school. Thanks for a nice job, Gerry. Despite rig trouble and conditions W4DLA turned in an FB traffic count. We welcome back to the fold W4DVT, in Lynchburg. W4JUJ is looking forward to the coming Virginia QSO Party. W4REA

(Continued on page 136)



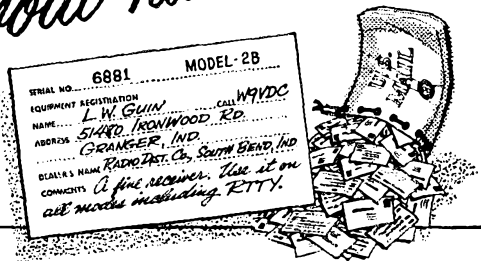


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still is trying for BPL. Had a nice visit from W4WDZ and many items were discussed. W4PTR is building a new 80-40-meter receiver and calls it the "Penultimate." All active stations are encouraged to send in their activity reports to the SCM. K4IXF had a cold Maine vacation but 75 watts into a 500-ft. longwave warmed up his enthusiasm at least. W4TE and W4ZM found time to attend the National Convention at Portland. K4HP "hammed" with K4LTx's DX-35 while on a 4-day vacation. Traffic: (Aug.) W4NTR 483, W4DLA 382, W4SIJ 381, W4RHA 311, W4JBY 283, W4FOR 238, W4LK 152, W4WDZ 143, K4RNI 120, W4ZM 108, W4PTR 83, K4PNY 71, W4DVT 56, K4ITV 53, K4PSS 47, W4NVX 29, K4FMJ 23, W4TA 23, W4MYA 23, W4QDY 18, K4HP 16, W4CFV 15, K4IAN 15, K4MXP 15, K4AL 14, W4DUW 14, W4JLE 13, W4BZE 13, W4DCN 7, W4OD 6, W4AEPH 5, K4SGQ 5, K4YDL 5, W4KC 3, W4OW 2, W4TE 2, K4ORQ 1. (July) W4OOL 40, K4YZT 25, K4JQO 10.

## VIRGINIA QSO PARTY

November 3-5, 1962

All Virginia amateurs are invited to participate in the annual Virginia QSO Party and Contest commencing at 1700 GMT November 3, 1962 and ending at 0500 GMT November 5, 1962. Amateurs outside Virginia who seek contacts for various awards may work Virginia stations during this period, however, no contest credit will be given for these contacts.

**Rules:** (1) Contest exchange will consist of RS(T) report plus the Virginia county. Fixed stations located in independent areas will identify themselves with a single adjacent county and retain use of this county throughout the contest, e.g.: use James City or York, not Hampton. (2) Any amateur band or mode may be used. Cross-mode contacts in the same band permitted, but cross-band contacts not allowed. Each fixed station may be worked only once in contest. Portable and mobile stations may be worked once for each county within which they operate. (3) Score 1 point for each 2 way exchange on all bands 160 through 15 meters, if neither station is a Novice. Score 2 points for each 2 way exchange when either or both stations are Novice. Score 2 points for any 2 way exchange on 2, 6 or 10 meters. (Maximum of 2 points per QSO). (4) Multiplier is the number of different Virginia counties worked (possible 98). Total score is the total number of QSO points times the number of counties worked. (5) Submit logs and claimed score to the SCM of Virginia postmarked no later than midnight November 30, 1962. Logs should show GMT date/time/band/mode and exchange sent and received.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: K8HID. PAM: K8CPT. WVN (c.w.) Net Mgr.: K8UQY. WVN C.W. meets on 3570 kc. at 000 GMT. M. to S. WVN Phone meets on 3890 kc. at 2330 GMT M-F. W8WHQ reports the W.Va. S.S.B. Net meets at 0000 GMT M-F on 3903 kc. The West Va. C.W. Net held 13 sessions with 90 stations and 91 messages handled. The Phone Net held 13 sessions with 178 stations and 34 messages handled. Congratulations to Alice Nelson, K8MQB, on being the first YL elected from West Va. as 8th District YLRL Chairman for 1963. She also was the first YL CMC member in West Va. W8PBO, K8CQY, K8TNX, W88AL and K8OHH operated on v.h.f. from Cooper's Rock during a 2-meter opening. Amateurs interested in Centennial QSL cards should contact T. D. Foster, K8HID, Tornado, West Va. Seven (7) counties worked on frequencies above 28 Mc. is the best report to date from a West Va. operator. The Award is planned during Centennial Year to the amateur working the most West Va. counties on 0 and 2 meters. Traffic: K8UQY 143, K8HID 24, W8JUE 21, K8LOU 17, K8TNY 15, K8OEQ 13, W8JM 9.

## ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Donald G. Middleton, W0NT SEC: W0SIN. PAMs: W0CNW, W0JJR and W0GNK. RMs: W0FEO and K0DTE. OBS: K0DCC. K0QGO reports that he will be attending Pueblo College this fall. W0FEO and K0DCW report that TWN and HNN had a rough summer. The summer slump and conditions were contributing factors. W0SIN, the originator of the Columbine Net, writes that he was on  
*(Continued on page 138)*

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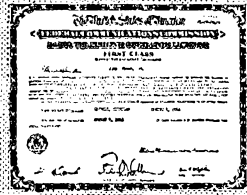
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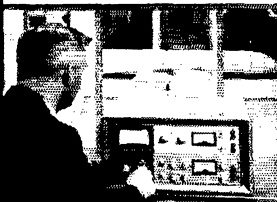
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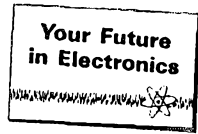
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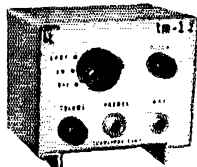
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s.s.b. for three weeks and hopes to be on permanently soon. WØETU is the proud owner of a new Heath mobile s.s.b. pair. Look for him on 20 and 40 meters. Welcome to W4UGI/Q, new in Denver. Pete was active on the East Coast and made BPL in August. KØZLI, the Denver Area training net manager, reports that during the last year there were 839 check-ins during 109 sessions. Allen further reports that 216 training messages were handled. This net meets on 29.640 Mc. Mon., Wed., and Sat. at 2100 MST. KØSJK and KØFNY provided communications for a soap box derby in Grand Junction. Sounds like a first of some kind. KØVCR is the spark plug behind a new El Paso County 2-meter AREC net. Traffic: W4UGI/Q 262, WØFEO 161, KØDCW 82, KØQGO 30, WØSIN 7.

**UTAH**—SCM, Thomas H. Miller, W7QWH Asst. SCM; John H. Sampson, W7OCX. SEC: K7BLR. Station activity reports were few and far between this month. The only stations reporting were the SEC and the Asst. SCM. The Utah Council of Amateur Radio Clubs had a hamfest at Lagoon with W7VEO taking home the grand prize, a Heath SB-10. The trophy for the annual Field Day competition was awarded to the Utah Amateur Radio Club in Salt Lake. Competition for the trophy probably will be stiffer next year. TWN moved to 3570 kc. effective Sept. 1 with 7060 as an alternate frequency. Band conditions were rough for BUN during the summer but are expected to improve. W7OCX, K7MPQ, W7VTD and K7DJM received BRAT Awards on BUN for August. Traffic: W7OCX 97.

**NEW MEXICO**—SCM, Carl W. Franz, W5ZHN—SEC: K5QIN. V.H.F. PAM: W5FPB. The Breakfast Club meets on 3838 kc. daily at 6:30 a.m., NMEPN on 3838 Sun. at 7 a.m. A new net called the 7290 Net is operating daily at 8 p.m. Net operations are listed once each three months. Because of an error I lost the list of N.M. nets so please send me your net times and frequencies. K5UYF received the Arne Trossnau Award, the 16th to receive it in the world, the 8th in the country. Congratulations, John. The Caravan Club/Los Alamos RC Picnic was very well attended at the Rio Grande Park. K5GOJ soon will be back on the air as an OBS. W5ZHN's mobile burned up but will be back on soon. Los Alamos RC members participated in the search for a missing atomic scientist who survived severe injury and exposure after his light plane crashed in the Truchas Mtn. Area. Chairman W5WZK reports that plans for the 1963 Division Convention are progressing satisfactorily. Headquarters will be at the Western Skies Motel, Albuquerque. Traffic: (Aug.) W5ZHN 291, W5WZK 82, W5UBW 31, K5ONE 8, K5LTD 2. (July) W5WZK 39.

**WYOMING**—SCM, Lial D. Branson, W7AMU SEC: W7HH. The Pony Express Net meets Sun. at 0800 MST on 3920 kc.; the YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc.; the Wyoming C.D. Net is on Wed. at 1900 MST on 3537.5 kc.; the TWN Net is on daily at 2000 MST on 7060 kc. W7AEC has a new 20-meter beam, W7HH has gone mobile with a new Swan, W7NY (of Hayden Lake, Ore.), an oldtimer from Casper, stopped off a day to say hello. The Pony Express Net has changed its time to 0830 for its winter schedule. Thirty-four amateurs and families attended the Sheridan Ham Picnic, W7IBU furnished hamburgers and trimmings. Traffic: W7CRL 88, W7ONK 23, W7AMU 16, W7HH 15, W7HDS 11, W7BHH 7.

## SOUTHEASTERN DIVISION

**ALABAMA**—Acting SCM, Walter W. Coleman, sr., W4OXU—SEC: W4FQQ. RM: K4YUD. PAMs: K4BTO, K4KJD, K4ZTT. S.S.B.: K4KJD, WA4AZJ and WA4BDW are now on 6 meters with a Scout Deluxe, a five-element home-brew beam and a converter. K4FZQ visited W1AW and ARRL Headquarters. K4WHV and K4WHV operate s.s.b., a.m., c.w., all bands through 6 meters. K4WOP has a new Apache. The University of Alabama ARC's address is Box 3007, University, Ala. K4KJD was presented a hospital bed with a stand and light by the members of the AENM and friends. K4ZTT was elected manager of AENP following the resignation of K4PFM. New appointments, K4ZTT as PAM. Traffic: (Aug.) K4AOZ 160, WA4BDW 114, K4WOP 112, K4YUD 103, K4WWP 40, K4PHI 39, K4FZQ 34, K4NKT 25, K4WHW 25, K4HJN 21, K4KJD 21, K4KDE 20, K4DJR 19, K4GNS 19, WA4BSE 17, K4ZTT 14, K4ZYO 13, K4WVD 12, K4BRZ 11, K4NUW 10, K4RIL 10, K4TDJ 10, K4BTO 8, K4WSK 6, W4OXU 5, K4UMD 5, W4CIU 4, WA4AVM 2, WA4EFC 2, WN4ITE 2. (July) K4YUD 105, K4NUW 8, K4WSH 8, K4PBY 6, WA4CPF 5, W4DS 5, K4NGD 3. (June) K4WSH 8.

**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4SJK—SEC: W4IYT. RM: K4KDN. RM RTTY: W4—  
 (Continued on page 140)

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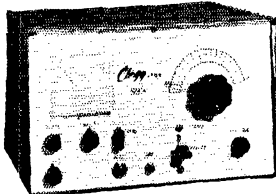


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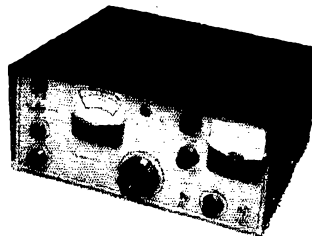


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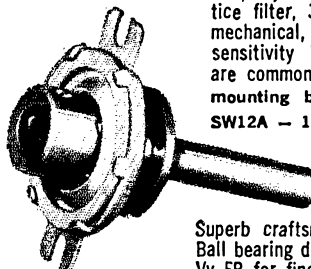
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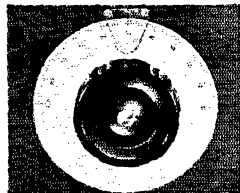
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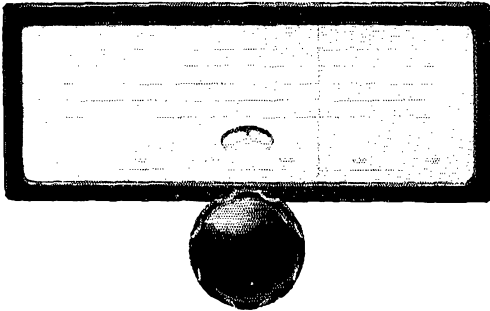
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FHU. PAMs: 40 W4SDR: 75 K4LCF; V.H.F. W4RMU; S.S.B. W4CNZ. Welcome to W4AJKS, ex-KIDEY. After messing around in VP5-Land W4JVV is back in business as an OO. W4RMU now is transmitting to the south from Jacksonville A1/A3 on 220.083 Mc. running 500 watts input with a thirteen-element yagi. Let's all listen and report. K4JWA lost his 80-meter antenna so was missing from his OBS sked. W4AAME now is sporting an 40-element array on 2 meters. W4EHU, our RM RTTY, was away at school, but made the SET okay. W4HLE suffered severe damage to his gear by lightning. Ruth, W4BWR, reports making the DXCC list. K4SJI was on 2 meters only for most of the month of August. His DX-100 burned up. Now that fall weather is here how about bringing our activity in all respects back up to our usual excellent level. Let's show them the way this year also. Traffic: (Aug.) W4KCG 632, W44BMC 132, W4TUB 321, W4AKB 305, W44CJ 289, K4SJI 257, W44HHH 253, K4BY 239, W44JHJ 237, W44BGW 174, W4NDL 166, W4KIS 145, K4CCO 125, W44APB 101, K4LLE 98, W44COR 89, W4CNZ 88, W4MIN 84, K4NTA 82, W4CWD 80, K4AEU 77, K4FMA 75, W4BHW 74, K4YSN 74, K4RNG 69, K4AX 57, K4DBT 44, W4YTT 44, K4YLA 42, K4YOQ 41, K4AKQ 39, W4LDM 39, W4BKC 34, W4AZZ 33, K4DAN 30, W44GBM 30, W4BEGE 27, K4FQP 25, K4NXW 25, W4VCY 25, W4YFX 25, K4ENW 24, W4ERM 24, W4ZAK 23, K4JZU 21, W4DFZ 18, K4GUE 18, K4MZR 18, W4BZ 16, W4NGR 16, W4EFA 14, K4ZIP 14, W44ESS 12, K4JOSQ 11, K4FPX 11, K4QQF 10, W44AMF 10, W44BGL 10, W4ESA 10, W4NTR 10, W44YQ 9, W44HSJ 9, W4BNE 8, W4EAT 8, K4JWM 8, K4MTP 8, K4IWT 7, W4SVI 7, W44DKG 6, W44IVC 6, K4REL 6, K4YBL 6, W4RMU 1 (July) K4DBT 44, W4SMK 15, W4YFX 9, W4BWR 8, W44IVC 6, W4TRU 6, W4CMK 4, W44DKG 4, W4DTS 4, W4HLE 4, K4VGD 4, W44II 3, K4MXH 2.

**WESTERN FLORIDA**—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE, PAM: W4WEB, RM: K4UBR, Tallahassee: K4YPT is now on s.s.b. K8NIX/4 is active on 6 and 2 meters with a Seneca and a ten-element beam. He has worked Panama City, W44PIJ, on both bands. W82DHO/mobile 4 is on 2 meters with 12 watts to a hulo. The Leon County RACES Plan has been submitted to State Hq. for approval. W4AZR left for duty with the USAF. Wewahitchka: W4CCA puts out an FB signal with his 10-watt homebrew s.s.b. rig. Port St. Joe: K4RZM/mobile checks into WFPN from all over the section on 75 meters. Panama City: W44JIM is a new Novice on 40 and 2 meters. W44GJO finished modifications to his DX-100. K4VLB is back on the air after a busy summer at color TV school. The recent auction of the PCARC was a big success. K4MZA is back on the air after big trouble. W44FIJ ranked high in the V.H.F. QSO Party. W44FJF handled traffic for several hours for Panama City from W8BB1/mm, aboard the USS Valor, Fort Walton: The AREC Picnic was well attended; K4QJF's barbecued chicken was the hit of the day. SEC W4MLE gave a rundown on the SET, and a general discussion on net procedures was held. Pensacola: The V.I.F. Club held its Annual Picnic at Ft. Pickens. Communications for the sports car races at Corry Field were provided during August. PARC members are sporting new-style membership cards. K44ZM is a new Novice using a DX-40. Traffic: (Aug.) K4VYF 276, K4KCH/4 108, W44FIJ 46, K4VND 31, W4GAA 26, K4BDF 17, W4WEB 12, W44BDF 7.

**GEORGIA**—SCM, James A. Giglio, W4LG—New officers of the Heart of Georgia Amateur Radio Club at Macon, Ga., are K4WYF, pres.; K4ODI vice-pres.; W4KXM, sec.; K4HDQ, treas.; W44AFP, act. mgr. The club has a club certificate for having worked 5 club members. K4BVD will be temporarily QRT because of attendance at M.I.T. He recently achieved his most coveted DX by working an FP8. K4NGI took a rig with him on vacation and operated /3. We have heard it said that W44AFP and K4WYF are feverishly working toward "s.s.b." operation of their stations. And K4MCL has completed his S-Line with a new 30LI linear. W4BZ continues to read ARRL Bulletins on a schedule that you can set your clock by. Congrats to K4ZY1 on his BPL medallion. K4MDC is the new activities manager for the Atlanta Radio Club. We overheard some gossip about OM K4WYV. Seems he had a birthday cake with 15 candles on it recently. W4LNG reports progress in his work on accurate frequency measurements and stable crystal oscillator circuits. And something we will always remember—the time spent with the Milledgeville hams at the Georgia Cracker Club Picnic. Congrats to W44CZN on becoming a General Class operator. New appointments: W4VW as SEC, K4MDC as EC, K4FRM as EC. Traffic: K4MCL 298, K4ZY1 230, W4FRM 213, K4WYV 200, W4DDY 161, KIKSH/4 108, K4FRM 94, K4QPL 63, W4HYW 59, K4NGI 42, K4YRL 17, K4BVD 3, W44ARE 2.

(Continued on page 142)

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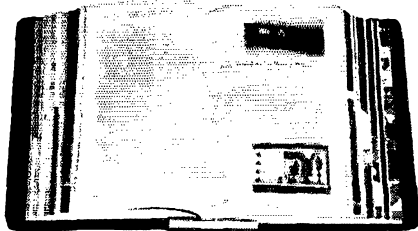
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**WEST INDIES**—SCM, William Werner, KP4DJ—C.D. Radio Officer: KP4MC, QSL Mgr.: KP4YT, P.O. Box 1061, San Juan 5, P.R. KP4BCA, the new EC for San Juan District, is organizing a net on 28.740 kc. meeting Thurs. at 2230 GMT. New AREC members in San Juan are KP4BDU and WP4BJL. A new AREC member at Guantanamo Bay, Cuba, is KG4AO/W5ZHI. KP4CGB/W4RUX NCS. of the Antilles Emergency Weather Net, which meets daily at 1100 GMT on 3820 kc., says stateside QRM troubles net weather reporting. VP4LP is filling in on the net for VP4NC, who is vacationing at Tobago. PG7XL and VP2DA vacationed in the States. VP2SQ has returned home to Holland after his stay in St. Vincent. The St. Vincent weather report now comes from VP2SY. VP2VA is back on the air from Tortola. KP4ASL is building a 40-meter quad! KP4ASK has a new QTH in the mountains near Aguas Buenas. VP2KP and company are planning an expedition to Anguilla. KP4HQ/nm is a regular on 15 and 40 meters from the SS *Florida State*. 41XN needs a station in P.R. to check for traffic. Contact your SCM for appointment as ORS, OPS, OBS, EC and especially OO Class 1 or II. KV4CQ/WA2DEW built multiband dipoles for 40/80 per Apr. 1961 QST. KP4AWH, at Aibonito, received his DXCC certificate, and his score on 75-meter phone is now 39 countries worked with less than 100 watts to a sloping zepp antenna. The MARS Net meets Mon. at 2200 GMT on 7305 kc. KP4AVB built a Heath Marander and is doing very well with 185 watts s.s.b. KP4AFL, Mayaguez, built a Heath Molican receiver. KP4WT's grandson is now WP4BCW. KP4BAU, Ramey AFB, added a Knight T-150 transmitter and a Gouset and schedules Detroit every Mon. at 1630 GMT. KP4BAU continues to give code classes every Fri. and Sat. night. WA2PAV/KP4 returned to New York after two months of vacation/hamming on 6 meters. KP4RK has a new house in Hato Rey and is installing an HT-37/Warrior and a Mosely tribander again. KP4DJ is experimenting with a 7-Mc. ground-plane antenna at various heights; the base and radials are now 1/4 wave above ground. KP4XQ received the WPR25 Award for 50-Mc. operation. KP4BBN now has an S-Line kw. and built a six-element beam for 50 Mc. KP4ALY moved to a new QTH in Bayamon. KP4DP and KP4ABD, pioneers on s.s.b. here, are back on c.w. occasionally. Traffic: (Aug.) KP4CGB 659, KP4WT 112, KP4BAU 19, (July) KP4BAU 20, KP4AFL 1.

### SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, Albert F. Hill, jr., W6JQB—Asst. SCM: W6KGC. SEC: K6YCX. RM: W6BHG. PAMS: W6ORS, K6PZM. The following stations earned HPL in August: K6EPT, W6WPF, K6MDD, W6GYH and W6QAE. Congrats, fellows! The section sure is sorry to lose WA6ROF, who has moved to the San Diego section. K6COP graduated from the Naval Officers Candidate School at Newport, R.I. Congrats, Howard! W6VUZ has a new SB-10 on the air. WB6ARL has a Heath Seneca and an HQ-110 on the air. WA6ODF has moved to Houston, Tex., and will be signing a W5 call soon. WA6ORS and WA6KAW received the Arizona Semi-Centennial certificate. W6UGA is getting set for the SS and DX Tests. K6EPT has settled down in a new QTH. W6ORG took a nice vacation in KH6-Land. W6WPF assisted in the big Newhall Fire. W6ORS took a trip to Catalina and is building 220-Mc. gear. W6AM broke his leg. A speedy recovery, Don! WA6ORJ has a new XYL. K6MDD reports the Salvation Army Net will have a booth at the L.A. County Fair. W6GYH attended the National Convention in Portland. WA6DJB has a new 75A-4 receiver and needs liaison stations from SoCal 6 to SCN and RN6. WA6GRG is back from a nice vacation. W6VOZ vacationed in San Diego and Newport Beach. WA6UVW reports the great success of the Desert RATS in Palm Springs goes to the excellent cooperation of Police Chief Kettmann and the entire Police Dept. Support your section nets. On c.w., the Southern California Net (SCN) meeting nightly on 3600 kc. at 0300 GMT; on phone, the Southern California Six Net (SoCal 6) meeting at 0330 GMT on 50.4 Mc. daily. Traffic: (Aug.) K6EPT 1050, W6WPF 905, K6MDD 614, W6GYH 487, W6QAE 408, WA6DJB 294, K6YYN 275, WA6ROF 193, K6OZJ 155, W6BHG 140, K6SIX 65, WA6KAW 24, WA6CKR 20, W6USY 16, W6UGA 11, WA6ORS 5, W6NKR 3, W6VOZ 3, (July) WA6OUK 107, W6FNE 31, K6SIX 19, WA6TWS 12, WA6SLF 4, W6SRE 2, (June) W6FNE 303.

**ARIZONA**—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: K7NIY. PAM: W7OIF. RM: W7LND. The Copper State Net meets at 1930 MST Mon. through Fri. on 3880 kc.; the Grand Canyon Net Sun. at 0800 MST on 3880 kc.; the Tucson AREC Net Wed. at 1900 MST on 3880 kc.; the Cochise County AREC Net each Sun. at 1400 MST on 7260 kc.; the Tucson 2-Meter Net at 1000 MST on 145.35 Mc.; the Arizona Interstate Net.

(Continued on page 144)



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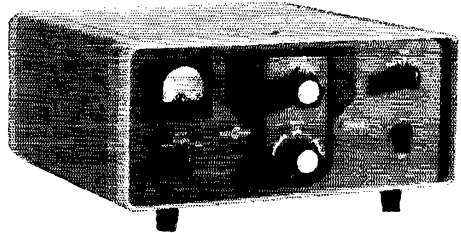
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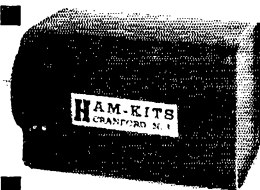
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C.W., Mon. through Fri. at 1900 MST on 3555 kc. The new Maricopa County AREC Net will meet each Mon. at 0200 GMT (7 p.m. MST) on 28,020 kc. Net manager and NCS will be K7RUR. The net extends an invitation to all interested amateurs. On Thurs. at 0200 GMT Army MARS is opening a net on 148.01 Mc. Net Control will be K7AWI. All amateurs interested in working the net on the higher frequencies and obtaining a membership in Army MARS should contact K7AWI. The amateurs in the valley extend a welcome to W8NAF/7, who recently moved to Scottsdale from Dayton, Ohio. He already is a member of the Copperstate Roadrunners and the Scottsdale Amateur Radio Club. Another amateur who returned after a long absence is W7FIC. He can be heard almost every night on 40-meter phone or c.w. The first annual Cochise County AREC Picnic was held at Golden Bell Park, St. David, Ariz. G5YH and his wife, on a tour of the United States, stopped overnight in Phoenix. A tour of the Valley was conducted by K7AWI and your SCM, WOWHE/7 made BPL again. Traffic: WOWHE/7 275, W7AMM 24, K7RUR 2.

**SAN DIEGO**—SCM, Don Stansifer, W6LRU—Appointments in force on November include the following in this section: Asst. SCM: W6EWU, SEC: K6JPI. ECs: W6EWU, San Diego; W6KSI, Imperial Beach; K6RYI, North San Diego County; W6VAA, Orange County. OPSs: K6BPI, W6CHV, RM: W6EOT, ORSs: K6BPI, W6EOT, K6LKD, WA6ATB, WA6CDD, WA6ZOW, ORSs: K6BHM, WA6BUX, K6BPI, W6LRU, K6TFT, OESs: K6BTO, W6LEY, K6RCK, OOs: K6BHM, W6CAE, K6EC, K6GJM, W6LRU, WA6SBO, W6SK, K6STZ, W6UWL, W6WNN. Amateurs are reminded that to get and hold an appointment you must be an ARRL member, report to your SCM in a regular manner, have special abilities or equipment for some jobs, and prove your proficiency for such jobs as ORS and OO, W6KSE and K6BKZ visited Seattle, WA6SBO. Novice Roundup winner, is now up to 175 countries as a general. New members of the San Diego DX Club included W6ID, WA6OZL, K6UYC, W6KYG and WA6WYR, W6VAA, EC in Orange County, reports that 54 AREC members including 17 mobiles are now active. The Anaheim Club will hold its Annual Dinner Nov. 17. The Microwave Society of Long Beach is installing a 432-Mc. repeater on Saddleback Mountain, and would like to hear from those interested in this section willing to work on a similar project down here. The address is P. O. Box 3303, Long Beach 3. Clean up your bug or keyer and try your skill in the Sweepstakes, the contest for all. Traffic: K6BPI 3308, W6IAB 3218, K6IME 14, K6LKD 16, K6GJM 2.

## WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG—Asst. SCM: E.C. Pool, W5NFO, SEC: K5AEX, PAM: W5AYX, RM: W5LR. Members of the Waco ARC held their Annual Hamfest Sept. 2 in the air-conditioned mall of the Lake Air Shopping Center and it was a big success with 116 preregistered and the total attendance 225. The management of the mall extended an invitation to the club to hold its meeting there next year and needless to say it was accepted. The transmitter hunt was won by K5MTS. I think this the first time an XYI has won a transmitter hunt. K5SXX won a mobile s.s.b. transmitter. W5FLL has returned to Ft. Worth after an absence of 2 years and is going to teach at ASC. New officers of the Panhandle ARC are K5YXAI, pres.; WA5AMZ, vice-pres.; K5RSK, treas.; WA5AGB secy. and news reporter. The PARC has started a Novice class which meets each Thurs. 7 to 9 p.m. The Arlington ARC also has started a new class for the Novice and General Class licensees. W5ACK is back home after a 12-month tour with the 49th Armoured Division training period. W5IPH has a complete new rig, the Collins S/Line including the linear and recently received his WAC certificate. Walter also is president of the Midland ARC. Hams in the Ft. Worth Area were called on to help in checking on the damage done by the flooding condition in the Richland Hills Area of Ft. Worth. I need more active Official Observers in the Northern Texas section. Can you qualify? Traffic: W5BKH 178, W5LR 38.

**OKLAHOMA**—SCM, Adrian V. Rea, W5DRZ—Our personal appreciation to K5JGZ and K5OCX, retiring RMs, for their fine work on the CW nets, which meet each evening on 3682.5 kc.; OJZ at 1900 CST and SZZ at 2130 CST. The new RMs will be W5JXM and K5AUX. W5FKL also is retiring as PAM for 40 meters. Dutch did a good job and we will miss him. New stations heard are K5HAP, Okmulgee; K5VYC, Tahlequah; WA5DZB, Altus; WA5AQH, Antlers; WA5BYP, Walters. The new locations of K5CWR and W5CJV are Woodward and Hugo, respectively. The SCM visited the v.h.f. group at Oklahoma City and also the Shawnee Radio Club. Both groups are outstanding in their contribution.

(Continued on page 146)

# Here's your chance to **STEP UP** to greater operating pleasure with a better receiver **AT A PROFIT!!**

That's right. I will allow you a lot more for your present receiver than it is worth — in most cases even more than you paid for it!

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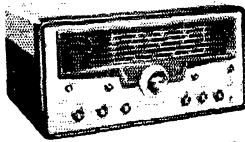
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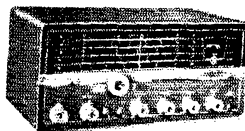


### SX-101A

70 pounds of solid stability!  
Cold rolled .089 steel chassis  
— heaviest in the industry.

• Better than 1 microvolt sensitivity on all bands. •

Amplified S-meter • Fast-slow AVC. • 30.5-34.5 band (for UHF converters) with full direct dial calibration for 6 and 2. • 13 tubes plus rectifier and regulator.  
Plus many more features that make this SX-101A the new standard of comparison. **\$445<sup>00</sup>**



### SX-111

Sensitivity of 1 micro-volt on all bands • 12 tubes plus rectifier and regulator • The nearest thing to SX-101A performance, for a lot less money! **\$279<sup>50</sup>**

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Toward a new SX-101A, I will give you for your:

Collins	SX 101 ....	\$285.	HQ 170 ....	\$327.
75A3 .....	Mark III ..	305.	HQ 180 ....	360.
75A4 .....	SX 110 ....	225.	National	
75S1 .....	SX 111 ....	278.	HRO 5 .....	\$210.
Drake	SX 140 ....	205.	HRO 7 .....	232.
2A .....	Hammarlund		HRO 50 ....	270.
Hallicrafters	HQ 110 ....	\$270.	HRO 60 ....	355.
SX 28 .....	HQ 129 ....	215.	NC 183 ....	250.
SX 43 .....	HQ 140 ....	260.	NC 183D ..	285.
SX 71 .....	HQ 145 ....	285.	NC 270 ....	270.
SX 96 .....	HQ 150 ....	270.	NC 300 ....	285.
SX 100 ....	HQ 160 ....	300.	NC 303 ....	355.

## LOOK AT THESE GUARANTEED ALLOWANCES\*

Toward a new SX-111, I will give you for your:

Collins	Hallicrafters	National
75A1 ....	S 40 ....	NC 88 ..
\$220.	\$115.	\$130.
75A2 ....	S 53A ..	NC 98 ..
255.	122.	145.
Drake	S 76 ..	NC 109 ..
1A .....	S 85 ....	155.
\$205.	S 107 ...	NC 125 ..
Hammarlund	S 108 ...	140.
HQ100 ..	SX 24 ...	NC 173 ..
\$170.	115.	155.
	SX 25 ...	NC 188 ..
	120.	135.
	SX 99 ...	
	150.	

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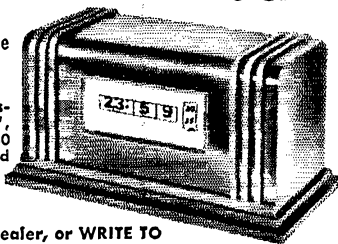
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to amateur radio. We also learned that W5LXH's NYL is an outstanding cook. We regret to learn that W5RST, past SCM, is in the hospital at Muskogee. Hope you are well soon, Doc. The Electron Benders of Tulsa is now an ARRL affiliated Club. The Northeastern Amateur Radio Club furnished communications on 10 meters for the Rodeo at Vinita. W5LOW and the ACARC have formed a c.w. net on 2 meters—purpose to acquire code speed and learn c.w. net procedure. Good work, fellows. Who has the best mobile signal, W5PML, W5JUW or K5CBG? Let us in on the secret, fellows. Traffic: K5TEY 103, W5JMQ 86, K5IBZ 84, W5DRZ 58, K5JOA 44, K5OCK 36, K5AUX 28, K5ZCJ 23, W5CCK 16, K5CBG 12, K5VNJ 12, W5JXM 11, K5RWL 10, W5FKL 8, K5OOV 6, W5UYQ 6, W5PNG 2.

### CANADIAN DIVISION

**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and H. C. Hillyard, VO1CZ. New appointments include VE1ADF, VE1AJT and VE1AZ as ECs. Your correspondent recently visited with amateurs in the Annapolis Valley, Yarmouth, Halifax, Sydney, Teuro and Charlottetown Areas. Sincere thanks to all for their kindness and interest. I had the pleasure of visiting with VE1LG, Canada's oldest active amateur, and VE1GB, who recently became interested in the hobby and passed his amateur exam at the age of 77 years. Mr. Bird also successfully assembled a DX-60 kit in two evenings without assistance! VE1UA has volunteered to provide amateurs working for WAVE and WACAN with P.E.I. contacts on any band but requests that sincere efforts be made by interested persons to keep prearranged schedules. New calls include VE1AHE. Congratulations and best wishes to VE1ABL and his bride on their recent wedding. VE1IB (Dartmouth) worked VE1YN/1 (near Summerside) on 6 meters for what is believed to be a section record for ground-wave operation. VE1WB had an early morning caller in the form of a huge bull moose who stopped at the front door! Traffic: VE1AEB 8.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—SEC: VE3AML, PAM: VE3CFR. Two meter activity is opening up in the Toronto Area. VE3AIB and VE3DRF are the ECs. The 4th S.S.B. Dinner will be held in Toronto Nov. 10. VE3EAW is in charge. VE3AR is at Varsity in Toronto and will be a VE3. VE3DN is active again with a DX-60. VE3FAV skeds his brother PA0DN. VE's AD, AUW, OD, GG and EK have a Rag Chewers Club on 3.6-Mc. c.w. VE3EAF is in Japan. The Belleville & District ARC and the Kingston ARC combine their news bulletins in one. The Cornwall gang held a very successful hamfest. Visitors from across the line and from Quebec were present. VE3DUU is PAM for 2-meter activity in the Metro-Toronto Area. VE3DXO has moved to Montreal. VE3CEB was badly burned. Noel Eaton, VE3CJ, is recovering from an operation. VE3XL also has had an operation. VO1PP is living in Ottawa. VE3DQM was in VE4- and VE5-Land while VE3GGP and VE3AK were in VE1-Land, all on vacations. VE3BJR is now in Sarnia. We hear of a new club in Stratford with VE3CH, pres.: VE3AHY, secy.: treas. Your SCM would like to hear from you. VE3FHL busted both her heels and is in a wheel chair. VE3ETM is a new QBS for the Windsor Area. VE3s FHE, FIO, F1L, F1K, F1J, F1H, F1F, F1H, F1Y and F1P are all new calls in the Windsor District. VE3AVB was a visitor to Toronto. VE3BQI/SU has returned from Egypt. K7AEJ/VE3 reports from Kenora. VE3BVB is the most westerly located VE3 ham. VE3EDM has moved to Saskatchewan. VE3BEO, VE3BBW, VE3DDV, VE3CJA and VE3NF are all on 2 meters from Kingston Tue., Thurs. and Sun. on 145.44 Mc. VE3CYD will join them soon. Traffic: VE3CFR 171, VE3FES 153, VE3NG 149, VE3CYR 146, VE3EHL 85, VE3DPO 82, VE3GI 84, VE3GP 37, VE3BAQ 33, VE3BUR 32, VE3AML 31, VE3BD 28, VE3EAM 27, VE3RN 16, VE3DRF 15, VE3DUU 13, VE3DWN 12, VE3APK 10, VE3SG 7, VE3AUU 5, VE3DZA 3, VE3EUZ 3, VE3BWL 1.

**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Jean P. Achim, VE2ATL. Best news is the return of DXer VE2LU from his new QTH in Westmount. His Marauder transmitter performs nicely. VE2ABJ uses a "hiliptian" transistorized 2-meter converter of his own design. VE2BME is doing fine work on 3.7 and 144.1 Mc. On 144.1 Mc. Mrs. AIM, "Uncle Edmond," still is the leader. In the Sept. column we reported VE2SH's new QTH as Timmons, Ont. Now ex-VE3RM informs that he has held this call since Feb. and is living Montreal. Our apologies. New ORS VE2AJD is having transmitter trouble. The Cornwall Hamfest was attended by VE2SH, VE2JL, VE2AKL, VE2LS and VE2RLR. Old VE2GS (Bennett) was there; he now signs VE3FDB. VE2CI spent his vacation visiting ham friends in Ontario. Sorry to hear that VE2AV is in the hospital.

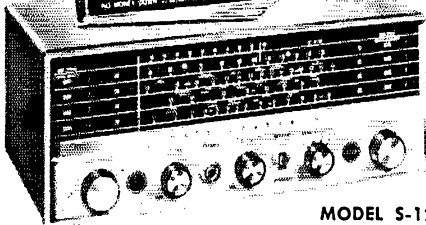
(Continued on page 148)

# for a dependable spare receiver... hallicrafters 'GENERAL COVERAGE'



**JUST OUT!** RADIO SHACK'S  
BIG '63 CATALOG

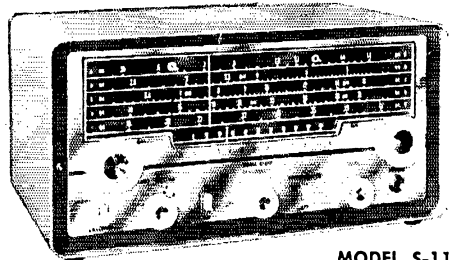
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MODEL S-120

### PRECISION-BUILT 4-BAND RECEIVER

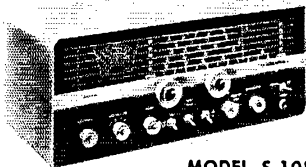
Handsome — thrifty! 3-antenna receiver covers broadcast band and SW from 1600 kc to 30 mc. Ideal for novice, SWL! 13 1/2 x 5 7/8 x 8 3/4".  
20K44DX805, Model S-120 .....\$69.95



MODEL S-118

### GENERAL COVERAGE 5-BAND RECEIVER

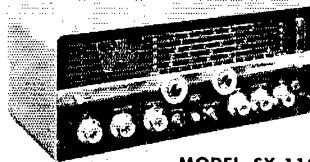
Feature-packed leader in low-priced communications! Full 5-band coverage from 185 kc to 31 mc. Big slide-rule dial, electrical bandspread! 14 1/2 x 5 1/4 x 8 1/2".  
20K44DX799, Model S-118 .....\$99.95



MODEL S-108

### SLIDE-RULE DIAL RECEIVER

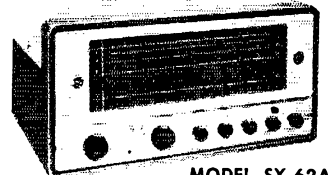
Advanced features! Expanded dial covers 80 to 10 meter ham bands plus broadcast and 11 meter CB! 1 RF, 2 IF stages; separate band-spread tuning condenser! Has 7 tubes, 1 rectifier. 18 3/4 x 8 x 10 1/4".  
20K45DX323, S-108 .....\$139.95



MODEL SX-110

### CRYSTAL FILTER RECEIVER

Precision performance; edge-reading "S" meter; slide-rule band-spread dial! Covers 80 thru 10 meter amateur bands. First choice of serious amateurs. Has 7 tubes plus rectifier. 18 1/2 x 8 1/2 x 11".  
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Remarkably wide coverage of AM broadcast, FM and SW bands! Tunes continuously from 540 kc to 109 mc! Features 60:1 tuning ratio; 500 kc calibrating crystal; slide-rule dial! 20 x 10 1/2 x 16".  
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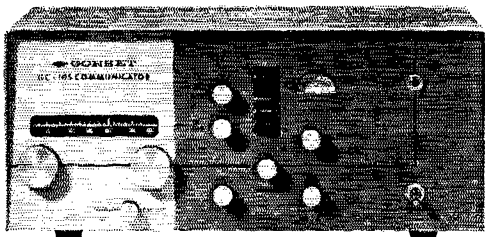
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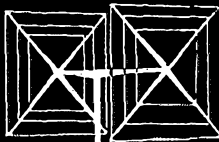
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VE2AGQ is becoming an adept traffic man but will have to QRT for university work. VE2SD and VE2BFT also are reliable c.w. traffic men. VE2PS was reelected president of the RAQL. From our Asst. SCM: VE2AWK is selling gear and is QRL studies. VE2BFP joined Bell Tel. Co. VE2WT skeds VE2WU. VE2AJC, VE2AZF and VE2AWR were at Farnham Army Camp during the summer. VE2ADA operated from Mt. Orford on 2 meters during August. VE2BCL is QRT temporarily. VE2PY and VE2AWR ont reçu leur certificat de GHO. VE2BKL a une cédule avec son beau-frère VE2ABM, en Gaspésie. VE2AOS a visité VE2PX. VE2ATE est démenagé au Mont Saint-Bruno, d'où il opère sur 2 m. VE2SO a eut un QSO de 9 heures avec VE2AIK/W. Traffic: VE2AGQ 77, VE2SF 70, VE2DR 50, VE2FY 40, VE2BG 29, VE2EC 16, VE2BDV 14, VE2AJD 11, VE2ALE 10, VE2BAC 6, VE2AZK 2, VE2BFB 1, VE2CP 1.

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FS, PAM: VE6PV, RM: VE6AEN, ECs: VE6FK, VE6SS, VE6ABS, OPS: VE6CA, OOS: VE6HM, VE6NX, VE6PL, OBS: VE6HM, ORS: VE6BR, VE6WG, OESs: VE6DB, VE6HO. VE6PV reports traffic has been way down, the band has been very poor but the winter sked of 1930 hours MST is now in force. VE6DB and VE6HO now have sixteen element beams for 2 meters. I would like to see more of you fellows take an interest in some of the appointments. How about some remarks from the clubs in Lethbridge, Vulcan, Calgary, Red Deer and Edmonton? Do we have any more in the province? Thanks to the fellows who turned out for the picnic in the rain. VE6PV had better get that transmitter working or we will miss him at net time. VE6CA is laid up with a bad back and it will be a while before he can boss the XYL (BC) around. VE6NF is burning up lots of gas between Calgary and Edmonton with his mobile. Some of you fellows who hold certificates are requested to send in reports more regularly. Traffic: VE6HM 115, VE6MA 74, VE6TG 11, VE6PL 7, VE6SS 7, VE6ABS 4, VE6AEN 4, VE6BA 3, VE6FK 3, VE6UH 3, VE6WN 3.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB—From a campsite in Washington we report that the evening spent with Mr. Myerson and his films on submarine polar adventure was well attended at CJOR Playhouse. The BCARA's Annual Picnic was a great success and many took home a worthwhile prize. A sad note—VE7IM became a Silent Key. I have been requested by many W7s to mention how much he will be missed by them. The ARRL Convention was sure a great show. Many VE7s were there. VE7BDR took home an r.t. amplifier. VE7ALE a card index file for QSL cards. VE7FB and VE7SH also won a meter. We had a very nice chat with Ed Hanly and asked when ARRL will be visiting British Columbia. During the same meeting, we talked with other SCMs and compared problems. B.C. is doing OK so let's keep our AREC moving by your Form 7.

**MANITOBA**—SCM, M. S. Watson, VE4JY—On Aug. 29 a banquet sponsored by the Winnipeg clubs and attended by 60 prominent amateurs took place in honor of VE4LC, who had held the position of QSL Manager since 1947 and was for 8 years treasurer of the WARC, now the ARLM. It was a gathering mostly of old-timers who came to bring best wishes to Len on his retirement and move to Victoria, B.C. VE4MP acted as chairman and the head table was graced by VE4RO, VE4CE, VE4MP, VE4LC, VE4QR, and VE4JY. Speeches were made in honor of the occasion and a presentation was made to which Len made a suitable reply. The Manitoba Hamfest at Dauphin on Sept. 1 and 2 came up to all expectations in spite of unfavorable weather. VE4PA introduced the speakers in his usual good form. Congratulations to the Dauphin amateurs who are small in numbers but mighty in hospitality. The XYL of VE4XZ came away with the grand prize. VE4CF won the 6-meter hunt and VE4LS the 80-meter hunt. Traffic: VE4JY 20, VE4JA 19, VE4FX 16, VE4KV 12, VE4HF 7, VE4AN 6, VE4IW 6, VE4KR 1, VE4MK 1, VE4UC 1.

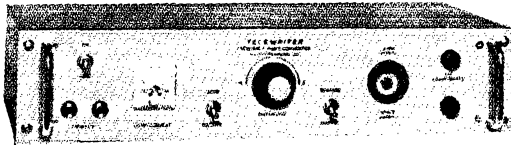
**SASKATCHEWAN**—SCM, Jack Robinson, VE5BL—The Regina and Moose Jaw Clubs held a ham picnic on Aug. 28, 1962, at Buffalo Pound with about 26 hams and their families taking part. Saskatoon. The holiday season saw VE5LM with VE5RP at Greenwater Lake, VE5DB mobiling at Chulivack, B.C., and VE5HR heading for Vancouver via mobile. VE5TH and VE5FR spent a few days fishing at La Ronge. While there they met VE5TM, VE5MC, VE5GX, VE5QD, VE5FX, VE5CL and W6WLL. Your SCM also was there for a couple of weeks on business. W4NTP was a visitor to Saskatoon. VE5OT has a new SX-111 receiver. Our thanks to VE5QL on the FB job he did as PAM and best wishes from the gang on his move to VE4-Land. Any takers for the PAM position? The Saskatchewan hams regret that they did not see our Director, Noel Eaton, this fall as planned and send best wishes for a speedy trip on the road to health.

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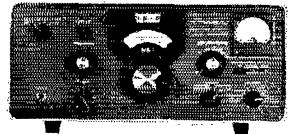
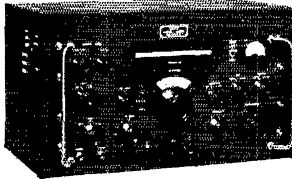
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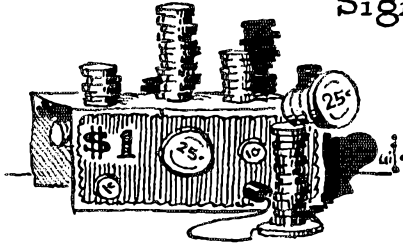


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## Amateur TV

(Continued from page 41)

For long-distance reception of amateur TV signals, a broadband converter with an r.f. stage is a must. The i.f. output from the converter can be designed to come out on a v.h.f. TV channel.

Antennas for TV transmission and reception can become a problem. For short-range cross-town work, a simple Yagi will get by, but a multielement collinear array with a screen reflector has higher gain and relatively good bandwidth. Of course, it is important that the receiving antenna at the other end of the circuit be of good design, and preferably have as much gain and bandwidth as possible.

After the project has been finished and a picture successfully transmitted (see Fig. 13), it would be ideal to have a partner also interested in completing a working station so that two-way television pictures can be exchanged. If you have any interest in photography, there are endless opportunities for experimenting with lighting, composition, and exposure, and you don't have to wait for the pictures to be developed! A good follow-up project to improve this TV transmitter would be a high-power (50 watts?) linear amplifier to boost the signal and overcome some of the disadvantages of poor television-receiver sensitivity. **QST**

## The World Above 50 Mc.

(Continued from page 78)

was off the air the first part of the month so isn't sure just what gave. Dick, W6IEY, is the only one to report the skip eyeball (?) QSO, which I'm sure many of the gang must have observed. The long-distance one with Sam, W4EGH, on the NBC "Today" TV Show, holding up his auto license plate during a street shot.

Texas reports with skip news from Don, W5DKP, who let us know that six meters opened again for him on the 27th of August and since then there have been sporadic openings into Florida, Ohio, Minnesota and Indiana. More than half of the signals were s.s.b. but Don managed to make contact in each case using 100 watts of a.m. On September 6 he worked KP4XC with signals averaging 5.9 and over. Dave, W4GVQ sez that August proved to be the change month when the number of break-throughs diminished noticeably. He noted openings on 6 different days during the month with XE1OE, K3RME, K0GIC, WA2YYD, K0REE, K0JHW, K0IHM, K0WOB, WA4GCT, K5YUY, K0FIK and nine other 0's in Missouri, Kansas and Iowa plus one in Texas were heard and worked. Dave reports that "it is interesting to note that the fellows on 6 and 2 meters seem far more QSL conscious than those on the lower frequencies. 35 (other than local) QSLs were mailed from this QTH during the past two months and response has been 100%. It is also gratifying to see that many of the fellows are operating rigs in the over-300-watt class."

To the south, Georgia is heard from through Walt, W4FWH, who also notes that sporadic E has fallen off considerably; however, he mentions that the openings were good to 5's, 8's and 9's, with good tropo all month to Alabama, Tennessee, Kentucky and South Carolina. K4LLI observed openings on August 18, 20, 21 and 26; with stations heard in Maine, Massachusetts, New York, Ohio, Pennsylvania, Texas and Puerto Rico.

K4KYL in Knoxville, Tennessee, also observed six different openings during the month. During the opening of August 15 Jim was hearing an unmodulated carrier on approximately 50.162 for more than two hours. "Anyone know what or who it is?" During the six days of openings heard by Warren, WA4EFA, he worked Ohio, Tennessee, Missouri, Pennsylvania, New York and Rhode Island. Florida seems to have had its share for this month, along with Michigan and W8MBH who also reported several openings and some good skip worked. **QST**



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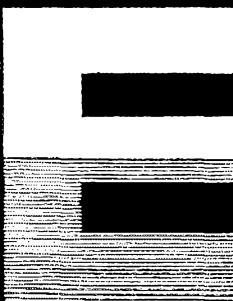
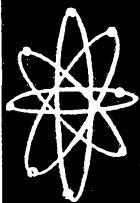
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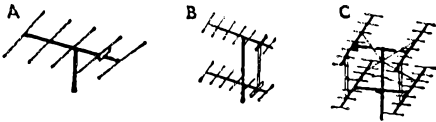
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1 1/4 Meter	11 element
2 Meter	7 element
2 Meter	11 element
6 Meter	3 element
6 Meter	5 element
6 Meter	6 element
6 Meter	10 element

Model No.	Ham Net
A430-11	\$ 7.75
A220-11	9.95
A144-7	8.85
A144-11	12.75
A50-3	13.95
A50-5	19.50
A50-6	32.50
A50-10	49.50

## DUAL STACKS (B)

3/4 Meter	22 element
1 1/4 Meter	22 element
2 Meter	14 element
2 Meter	22 element

A430-11 D	18.50
A220-11 D	22.90
A144-7 D	21.25
A144-11 D	29.00

## QUADS (C)

3/4 Meter	44 element
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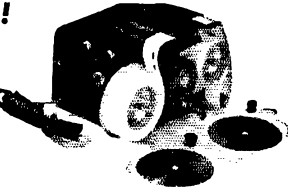
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## Correspondence From Members

(Continued from page 79)

building from drawing board through breadboard to finished product. They, themselves, simply follow a parts list and build from a *QST* article written by a real expert. In my case, and there are many beginners like me, I don't have a junk-box well stocked with surplus gear to ease the financial drain. Since I can only afford to build once in a blue moon, I wait for some kit design to prove itself and then build from a kit. Have you ever priced the individual components of a kit? You just can't match them for economy even after manufacturer's profit! Let 'em laugh or sneer as they will -- some of that QRN is really the extra change still jingling in my pocket. — *The Rev. J. Reginald Butt, K2NIVCP, Wiscasset, Maine.*

## QOSSQSSCQSS

(Continued from page 29)

(oh, next is 'time' . . . 504 pm . . . (ohhhhhh) . . . dit dit dit . . . 1704 PST . . . dit dit dit dit . . . (I want GMT . . . do I add or subtract 8. Nuts. Oh well, I'll try adding) . . . 2504 2504 GMT . . . (2504? Oh well, he won't know the difference) . . . date November 17 November 16 . . . (nuts) . . . dit dit dit . . . November 17 17 . . . (hold it, you went to 2504 GMT. That must make it November 18 already. Time flies.) . . . dit dit dit dit . . . November 18 November 18 18 18. . . Guess that's all. Nope . . . give him the handle) . . . handle Jack Jack Jack . . . (hope I'm not disqual . . . that's not in the 'explanation') . . . W1AW W1AW de W6ISQ W6ISQ AR AR KKKKK." "W6ISQ de W1AW QSL nr 489 (who ya kidding, fella) . . . 589 . . . (knew I should of popped in another 813) . . . NNONN . . . (what's that?) . . . 0106 Nov 18 AR BK." "W1AW de W6IVK . . . (slips) . . . W6ISQ QRX QRX few secs pse om . . . (get that darn 813 in there . . . ok . . . oooooops . . . 350 watts . . . just a little over . . . oh well, cut down on 144 Mc. . . it'll average out) . . . W1AW W1AW de W6ISQ W6ISQ . . . missed ur section . . . pse ur section? section section? also missed ur handle handle? handle? W1AW W1AW de W6IVK . . . (nuts) . . . W6IV . . . (%#&@) W6ISQ W6ISQ W6ISQ AR AR AR K K K K K."

"W6IVK/W6ISQ de W1AW — is ur el W6IVK or W6ISQ? BK."

"W1AW W1AW de W6IV . . . dit dit dit dit . . . W6ISQ W6ISQ W6ISQ W6ISQ (what kind of a lid we got back there — can't read good bug c.w.?) — K K K K K K K."

"W6ISQ de W1AW sri om we QSO last week. . . . (what makes ya think so, fella?) . . . Recognize ur fist es el . . . (flattery will get ya nowhere, bud) . . . ur nr 5 . . . wl ehg ur el in log of last wk fm W6IVK to W6ISQ 73 cu nxt yr . . . mebbe . . . W6ISQ de W1AW . . . QRZ SS de W1AW."

"How about that guy? Says my number 5. Look back here in the old log. Number 5 is K1AW . . . but he was in Conn section . . .

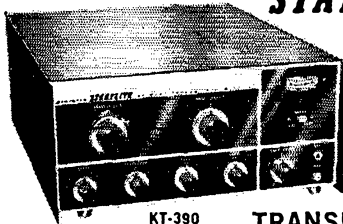
(Continued on page 154)

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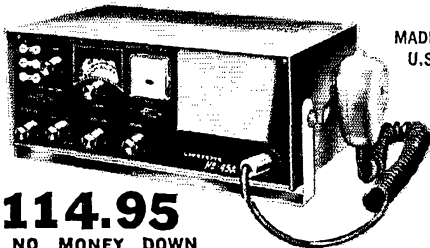
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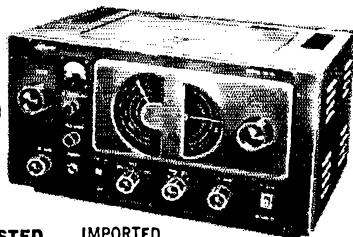
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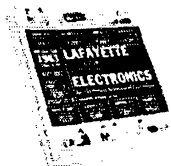
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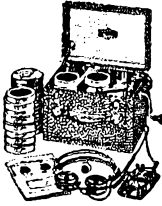
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Hmmmmmm . . . sloppy fist might of sent a NN for a C. Small matter. Concentrate on the big picture. Make it WIAW. Guy never gave me his handle . . . some of them ops . . . oh well, every little point counts . . ."

"Now, where's that Explanation 'cut out'? Keep the rules handy. 'High man in each section gets a certificate' . . . wonder what color? . . . And so it's back to the fray . . . and . . . 'Once again dear friends into the breach . . . God for Harry, Engluuaannnnnd and Saint Georrrierrge' . . . qqsseqss"



**Simple Three-Band Preselector**

(Continued from page 44)

check with  $C_1$ . If you cannot find a setting that causes the unit to oscillate, you'll have to change the setting of  $C_3$  by loosening the screw. Be sure to use an insulated screwdriver or else turn off the power before making this adjustment. Find a setting of  $C_3$  that causes the unit to oscillate with  $C_2$  set at minimum capacitance, plates fully open. Once you have this setting, slowly increase the capacitance of  $C_2$  until you reach the point where the unit stops oscillating. Now slowly tune  $C_1$  until the background noise peaks up. Tune in a signal with the receiver and then repeat  $C_1$  and  $C_2$ . Once you find the correct setting that gives the most gain you probably won't have to change the setting of  $C_2$  across the band. However, it will prove necessary to repeat  $C_1$  as you go across the band.

Switch your receiver to tune the 15-meter band and follow the same procedure in tuning up with the exception of the adjustment of  $C_3$ , which doesn't need to be changed once set properly on 14 Mc. The same procedure also holds for 10 meters.

You'll probably (and we hope) be pleasantly surprised how this little unit will put some snap into your receiver.



**25 Years Ago**  
this month

November, 1937

. . . This issue carried results of the 5th annual ARRL Field Day. It was a big success, as some 642 individuals had participated. The Egyptian (Illinois) Radio Club established a new Field Day record by making 204 QSOs.

. . . Technical articles included the description of a 10-watt speech amplifier by Grammer, a new i.f. amplifier system of high selectivity by Miles and McLaughlin, dope on re-winding an auto generator to make a 110-volt emergency generator, by W6JTV, a complete 100-watt deluxe phone-c.w. transmitter by W6DUW, and miscellaneous hints and kinks for the experimenter.

. . . Antennas were big in this issue. W6AM (hummum, that call sounds familiar) told how to make the most of directive antennas (ah, yes, he still is). W6AAR (J. N. A. Hawkins) discussed the problem of figuring how long is a quarter wavelength, taking into account the velocity of propagation on antennas and transmission lines. W2JOA covered that perennial problem, match and mismatch of antennas and transmission lines. And there were a couple of pages of notes on steatite insulation and its properties.

(Continued on page 156)

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SX62.....	189.50	NC183.....	139.50
GPR90.....	329.75	RANGER....	169.50
75A1.....	199.50	PACEMAKER	249.50
HQ115C.....	189.75	20A.....	139.50
DX100.....	159.50		

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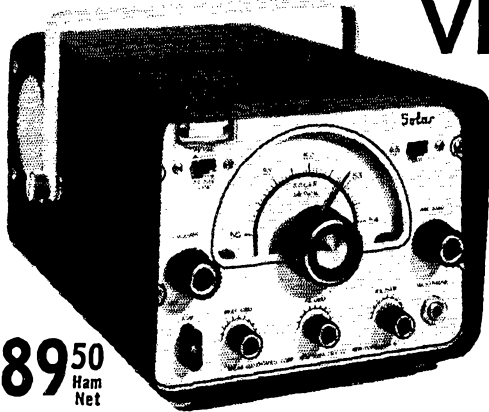


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... The 8th annual SS was announced ... In IARU News it was reported that over 5000 WAC certificates had been issued ... The very first members of the DXCC were — W8CRA, WIBUX, WITW, W6CXW, and G6WY.

... Some of you fellows with copies of the November, 1937, issue of QST ought to go back and look at pages 54-56. These pages listed some of the fellows who at that time had qualified for membership in the 20-year club. The interesting thing is how many are still active in ham radio — Bill Halligan, A. L. Budlong, Bob Eubank, Ed Redington, Lester Reiss, Howard Seefred, Ray Woodward, to name just a handful. Some of 'em still have the same call! ... Another 20-year club member was Stew Perry, W1BB, and then (as now) he was the guiding light in 160-meter DX tests.

... And look here! W1JMY was the leading traffic handler in Connecticut that month. 

## Silent Keys

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

W1BXE, Harold W. Haskell, South Weymouth, Mass.

W1ETM, Arthur F. Sweet, Newport, R. I.

ex-W1JAW, Donald W. Farquhar, Lawrence, Mass.

W1JEH, William Bradford, Salem Depot, N. H.

K1MFT, Joseph J. Oliveri, Wilmington, Mass.

W2VQ, Gilbert E. Mears, Garden City, N. Y.

W2YPP, Albert W. Parks, Seneca Falls, N. Y.

W4ARL, Nicholas Reinholz, Ft. Myers, Fla.

W4UWE, James L. Guest, Atlanta, Ga.

W5ASA, James W. McGuire, Gladewater, Tex.

W5FST, Victor C. Fusselman, Seguin, Tex.

W6GIWH, Earl Adams, Petaluma, Calif.

K6LND, Donald N. Fairgrieve, Burlingame, Calif.

W6NOK, William V. Mawson, Inglewood, Calif.

K6VLR, Charles P. Seiler, Tujunga, Calif.

W6WN, Robert B. Woolverton, San Francisco, Calif.

W7ILK, Robert T. Cox, Longview, Wash.

K7KUT, Roger L. Moore, Sandy, Ore.

W7UGW, Hiram J. Arnold, Butte Falls, Ore.

W7YUM/K7ACZ, Russell E. Skeen, Billings, Mont.

W8ILAS, Clifton B. Snyder, Eagle, Mich.

W8LUS, Robert E. Nichols, Akron, Ohio

W8RCC, John W. Boys, Harberton, Ohio

W8SEK, Earl N. Heaton, Germantown, Ohio

W9EXB, Walter H. Roop, Chicago Heights, Ill.

W9KNQ, Roy C. Syvertson, Chicago, Ill.

K9QAK, Charles L. Vales, Elmhurst, Ill.

W9RCD, Louis A. Hansen, Evansville, Ind.

K0AJW, Edwin P. Olson, Velva, N. Dak.

W0FNS, Raymond E. Baker, Neodesia, Kan.

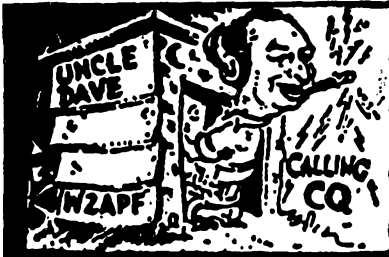
K0VQU, Eldon R. Froese, Butler, Kan.

## FEEDBACK

Oops, George Hipplesley's letter in the Correspondence column on page 85 of October QST should be signed K2KIR/1, rather than W2KIR/1. Our apologies to both OMs.

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TO SAFETY!**





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6S8GT (Bulk pack).....	2.75	.85	9.35
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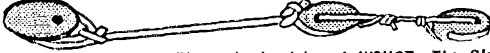
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**Radar Observes the Weather**, by Louis J. Battan. Published by Doubleday & Company, Inc., 575 Madison Ave., New York 22, N. Y. 158 pages, including index, paper cover, 4 1/4 by 7 1/8 inches. Price, \$9.95.

A discussion of the use of radar in weather forecasting and in storm warnings, along with data supporting the use of radar as a scientific tool in understanding of weather processes.

**GE Silicon Controlled Rectifier Manual**, second edition. Published by the Rectifier Components Department, General Electric Company, West Genesee St., Auburn, New York. 349 pages, 6 1/2 by 8 1/2 inches, paper cover. Price, \$1.50.

This second edition of the SCR manual contains 109 additional pages of information on the applications, characteristics and uses of the silicon controlled rectifier.

**Master Cartridge Substitution Guidebook**, by Jack Strong. Published by John F. Rider Publishing Co., Inc., 116 W. 14th St., New York 11, N. Y. 96 pages, 5 1/2 by 8 1/2 inches. Cat. No. 288, paper cover. Price, \$2.00.

A comprehensive guide showing the cartridges produced by major manufacturers since 1930. Included is information in both numerical and alphabetical sequence on all possible substitutes. One section of the book contains an alphabetical listing of manufacturers showing the model numbers of record players, as well as the part number of the cartridges used.

**Practical Television Servicing**, revised edition, by J. Richard Johnson. Published by Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York 17, N. Y. 423 pages, plus index, 6 1/4 by 9 1/2 inches, cloth cover. Price, \$7.95.

Complete TV servicing information with data on receiver operation, types of receiver troubles, troubleshooting, repair and replacement of components, alignment and adjustment.

**Basic Radio Course**, by John T. Frye, revised edition. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 224 pages, 5 1/2 by 8 1/2 inches, paper cover, Cat. No. 104. Price, \$4.10.

This revised edition contains new illustrations; chapters and chapter headings have been rearranged; review questions have been added at the end of each chapter; and the book has been set in new type which is much easier to read. It starts out with basic electron theory, moves through a discussion of resistance, current and voltage into the application of Ohm's law. After d.c. circuits, the author moves into a.c. covering capacitance, inductance, impedance, resonance and finally includes a discussion of the stages of a radio receiver. Chapters are also included on instruments, tools and servicing techniques.

(Continued on page 160)



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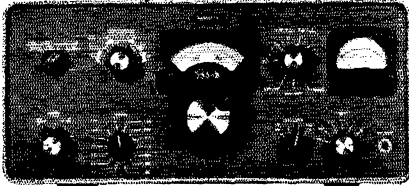
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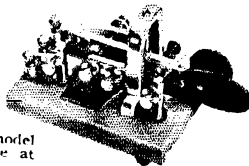
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**Amateur Radio Antenna Handbook**, by Harry D. Hooton, W6TYII. Published by Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Cat. No. AMA-1. 160 pages, including index, 5 1/2 by 8 1/2 inches, paper cover. Price, \$2.95.

This book covers amateur antenna systems, practical design applications for transmission lines, impedance matching and antenna supports and towers. Starting off with fundamentals of radio wave propagation and antennas, the text moves into data and construction information on practical high frequency antennas. The final chapter is on antenna tower and supporting structures and gives some hints on maintenance of steel towers along with EIA specifications for guyed towers.

**The Amateur Radio Handbook**, 3rd edition. Published by Radio Society of Great Britain, 28 Little Russell St., London, W.C. 1, England. 7 1/2 by 10 inches, 552 pages, including index. Cloth cover.

This third edition of the *RSGB Handbook* is the first edition to be published since World War II. In addition to being a comprehensive collection of amateur radio subjects, the book gives an interesting slant on amateur radio in Great Britain, once the technical colloquialisms have been mastered.

The contents of the *Handbook* deal with the entire technical aspects of amateur radio and most chapters contain practical construction projects.

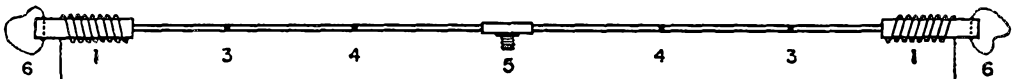
Starting off with electrical fundamentals, tubes and semiconductors, the *Handbook* follows generally the contents of the *ARRL Handbook*. There are chapters on keying and break-in, modulation, single-sideband, mobile equipment, measurements, operating techniques and station layouts, h.f., v.h.f. and u.h.f. transmitters, receivers and antennas. A general data chapter is filled with electronic formulas, tables, graphs, and charts. The advertising pages at the rear of the book reveals the names of several familiar U.S. firms with English addresses!

## Strays

On the 1st and 2nd of December the annual *RSGB21 28-Mc. Telephony Contest* comes off, beginning and ending at 0700 and 1900 GMT on those respective dates. DXers world wide are invited to harvest G GB GC GD GI GM and GW QSOs, exchanging the usual RS-plus-serial numbers (58001, 47002, etc.) with the U. K. Each completed contact with a British Isles station nets five points; in addition there's a bonus of 50 points to be gained for each numerical prefix contacted (G2 G3 G4 G5 (16 G8 GB GC2 GC3, etc.) and another 50 bonus points for every ten U.K. stations worked. Entries must (a) be clearly inscribed on one side of each submitted sheet; (b) show date, band, GMT, call of station worked, exchanges sent and received, QSO and bonus points for each contact; (c) be addressed to the Contests Committee, RSGB, New Ruskin House, Little Russell St., London, W.C.1, England, postmarked no later than December 17, 1962; and (d) be accompanied by the signed statement, "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was — watts." Certificates of performance will be available to country leaders and top scorers in W/K VE VK ZL and ZS call areas.

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5. Center insulator with female coax connector to take PL-259 plug
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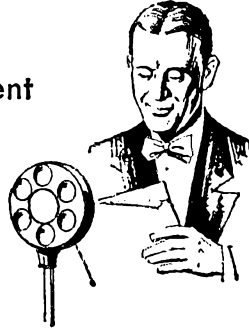
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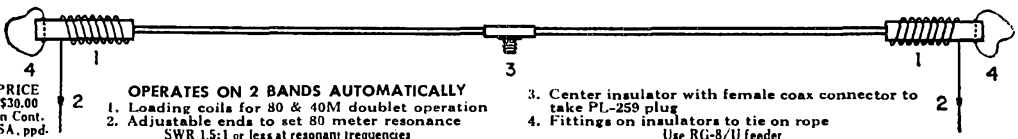
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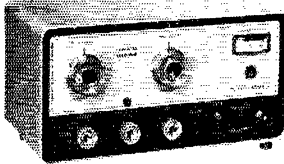
3. Center insulator with female coax connector to take PL-259 plug
4. Fittings on insulators to tie on rope  
Use RG-8/U feeder

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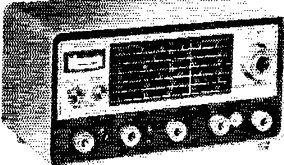
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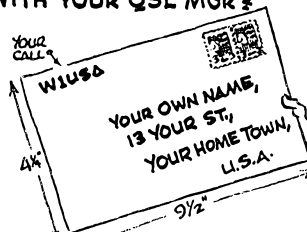
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**A.R.R.L. QSL BUREAU**

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
  - W2, K2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J.
  - W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
  - W4, K4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta 20, Ga.
  - W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
  - W6, K6 — San Diego DX Club, Box 6029, San Diego 6, Calif.
  - W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
  - W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
  - W9, K9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois.
  - W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
  - VE1 — L. J. Fuder, VE1FQ, P.O. Box 663, Halifax, N. S.
  - VE2 — George C. Goode, VE2YA, 188 Lakeview Avenue Point Claire, Montreal 33, Quebec.
  - VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent Hamilton, Ont.
  - VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
  - VE5 — Fred Ward, VE5OP, 899 Connaught Ave. Moose Jaw, Sask.
  - VE6 — W. R. Savage, VE6EO, 833 10th St., N., Lethbridge, Alta.
  - VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
  - VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 65, Fort Smith, N.W.T.
  - VO1 — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newf.
  - VO2 — Douglas B. Ritecy, Dept. of Transport, Goose Bay, Labrador.
  - KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P.R.
  - KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.
  - KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
  - KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
- (Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)

**IS YOURS ON FILE  
WITH YOUR QSL MGR?**



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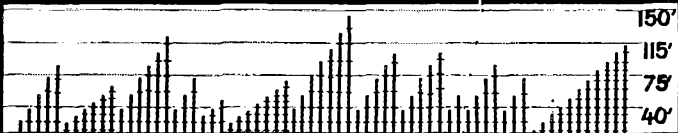
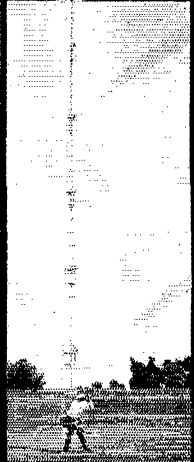
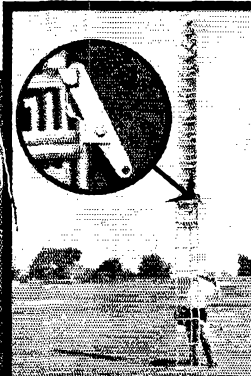
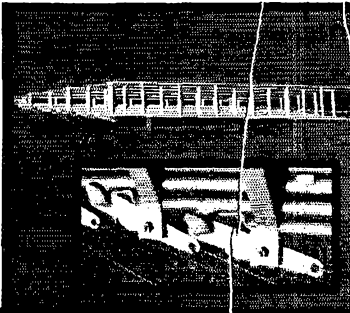
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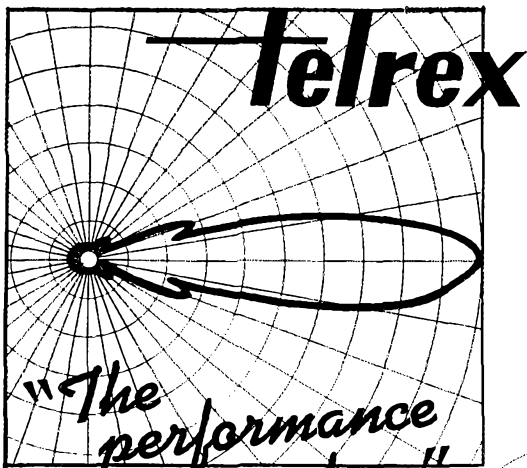
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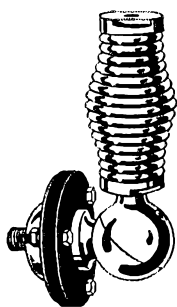
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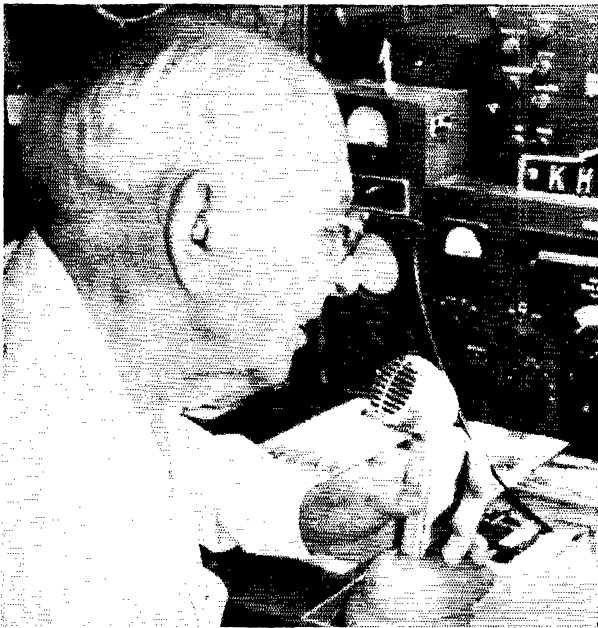
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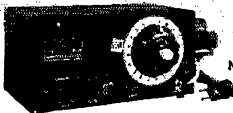


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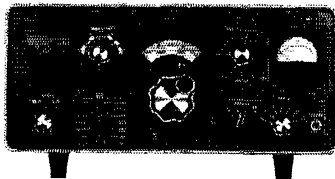


Jack, KH6AND

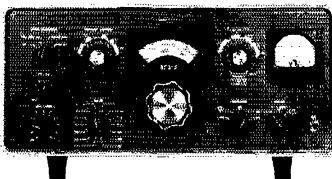
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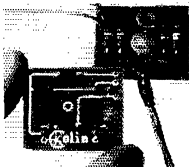
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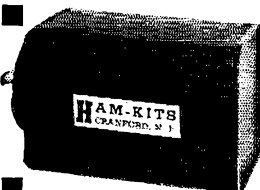
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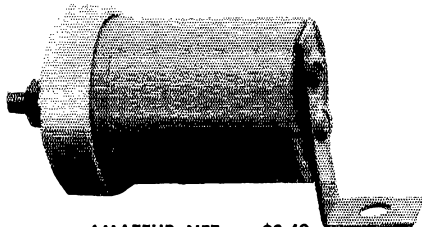
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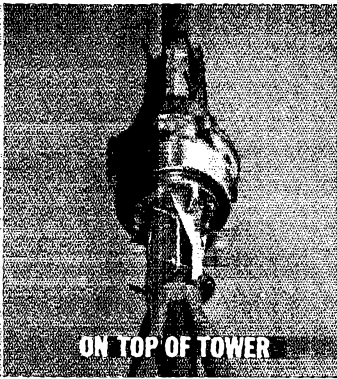
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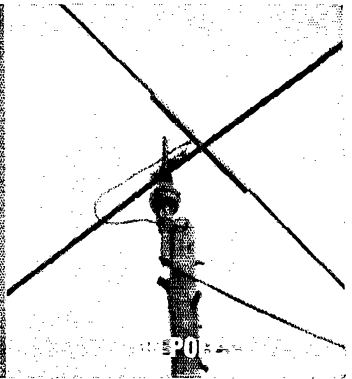




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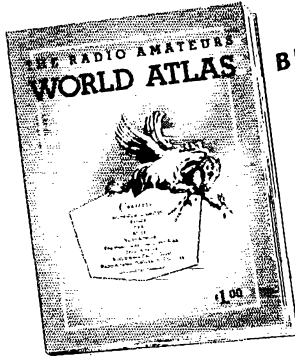
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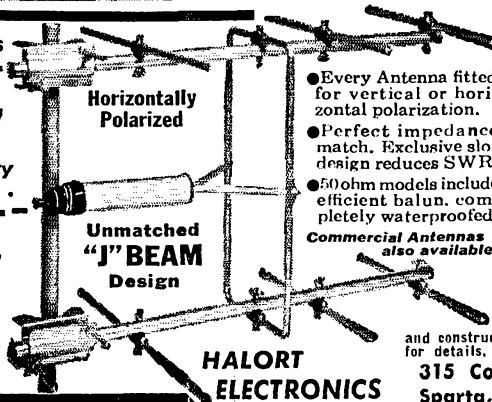
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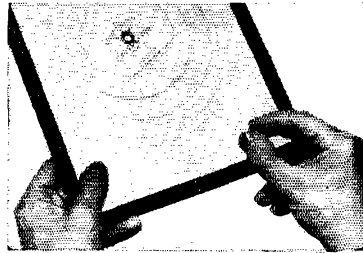
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**I** can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Big trades, easy terms. Used bargains.

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# HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

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(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

*Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

**WANTED:** Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

**MOTOROLA** used FM communications equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

**WE** Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

**RECEIVERS:** Repaired and aligned by competent engineers using factory standard instruments. Factory service at reasonable prices on Collins, Hallicrafters, Hammarlund, Gonset, National, Harvey-Wells. Our 26th year, 90 day guarantee. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

**TRIGGER.** Cash paid for ham equipment. 7361 W. North Ave., River Forest, Ill. PR 1-8616. Chicago #TU 9-6429.

**TOROIDS:** Uncoated 85 Mhy. like new. Dollar each. Five/\$4.00 P.P. DaPaul, 309 So. Ashton, Millbrae, Calif.

**SOUTHERN California:** Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KE10rg 8-0500.

**WANTED:** Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

**CASH** for your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

**WANTED:** Military or industrial laboratory test equipment. Electroncraft, Box 399, Mt. Kisco, N.Y.

**WANT** 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

**MICHIGAN** Hams! Amateur supplies, standard brands. Store hours 0830 to 130 Monday thru Saturday. P.O. J. Purchase W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

**CHICAGOLAND** Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Johnson, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKYline 5-4056.

**HAM TV** Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

**KWSI, \$900, W2ADD**

**QUITTING** Ham Radio. For sale F.o.b. Viking Ranger I, factory-wired, like new, \$150.00; NC-183D with prod. det., \$180; Viking II factory-wired, \$130.00; Johnson 6N2 with HB PS and mod. \$125.00; Dow-key ant. change-over relays, \$8.00 each; R&W ant. switch, \$8.00; Astatic D-104 with "C" stand, \$15.00; Collins crystal cal., \$12.00; speaker for 75A3, \$10; SX-28, \$30. Other items. Write Gerald Skeen, Staats Mill, W. Va., Tel. ES 2-6957.

**NEW** and used ham gear. Top trades, Norm. K9HRI at Dahn Electronic Supply, 14 Jayne St., Algonquin, Ill. Mail orders welcome!

**OSLS? WPE? America's Finest. What's your desire? Samples 20¢ (refundable), Sakers, W8JED, Holland, Michigan.**

**C. FRITZ OSLS** guarantee greater returns! Samples, 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Ill.).

**OSLS.** Twenty exclusive designs in 3 colors. Rush \$3.85 for 100 or \$6.90 for 200 and get surprise of your life, 5 days service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

**OSL-SWL-WPE.** Finest. Since 1946. Largest assortment, Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

**OSLS "Brownie."** W3CJ1, 3110 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

**OSLS-SWLS.** Samples 10¢. Malgo Press, Box 375 M.O., Toledo, 1, Ohio

**DELUXE OSLS.** Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

**OSL** Cards, Call-letter D-cals. Samples 10¢, or send 25¢ for extra large selection and free "Danger, High Voltage!" card. Dick, W8VXK, Rte. 4, Gladwin, Michigan.

**OSLS-SWLS.** 100 2-color glossy, \$3.00; OSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

**OSLS:** samples 25¢ (refundable), Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

**OSLS, SWLS, WPE.** Samples 5¢. Nicholas & Son Printery, P.O. Box 1184, Phoenix 17, Ariz.

**OSLS, SWLS, NYL-OMs** (sample assortment approximately 94¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazzy, unparagoned cards (Wow!), Rogers, K8AAB, 961 Arcade St., St. Paul 6, Minn.

**SUPERIOR OSLS,** samples 10¢. Ham Specialties, Box 823 Bellaire, Texas

**PICTURE OSLS.** Cards of your shack, home, etc.. Made from your photograph, 1000, \$13.00. Raun's, 4154 Fifth St., Philadelphia 40, Penna.

**OSLS,** 300 for \$4.35, Samples 10¢. W9SKR, "George" Vesely, Rte. # 1, 100 Wilson Road, Ingleside, Ill.

**OSLS-SWLS.** Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

**OSLS.** Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

**OSLS.** Samples dime. Rubber stamps; name, call and address \$1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

**OSLS.** Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

**OSLS, SWL's** that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamiltion, Ohio.

**CERTIFIED OSLS-SWLS,** unique designs, speedy service. Catalog 25¢ (refundable) Certified Printing, Box 1023, Whittier, Calif.

**OSLS, Kromekote 2 & 3 colors,** attractive, distinctive, different. Free ball point pen with order. Samples 10¢. Agents for Call-D-Cal decals, K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

**RUBBER STAMPS,** \$1.00. Call and Address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N. J.

**OSL-SWL** Samples 25¢. Spicer, 4615 Rosedale, Austin 5, Texas.

**OSLS.** Samples, dime. Printer, Corwith, Iowa.

**OSLS-SWLS,** 3-colors 100 \$2.00. Samples dime. Bob Garra, Leighton, Penna.

**HUNDRED OSLS:** 80¢. Samples, dime. Meininger, Jesup, Iowa.

**ATTRACTIVE OSLS:** Large variety of styles, cartoons, colors. Personal ham stationery. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

**OSLS,** 3-color glossy, 100-\$4.50. Rutgers Varityping Service, 7 Fairfield Rd., Somerset, N.J.

**DON'T** Buy OSLS until you see my free samples. Bolles, 7701 Tisdale, Austin, Texas.

**OSLS:** Eyecatching designs. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

**INSTANT** Eye-ball. Your present call-card becomes an Eye Ball OSL card instantly with these pressure sensitive eye ball OSL labels. \$1.00 per 100. Samples 10¢. Errol Engraving, Westfield, Mass.

**OSLS,** Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

**OSLS.** Write for samples. Blanton's, Box 7064, Akron 6, Ohio.

**QSL** Cards low prices Free samples. Debcler Printing, 1309-K North 38th St., Milwaukee 8, Wis.

**BEAUTIFUL OSLS,** Outstanding call letters. Samples 10¢. Gates Print Shop, 317-11th Ave., Juniata, Altoona, Penna.

**QUALITY OSLS.** New designs monthly. Samples 10¢. Giant 25¢. Savory, 172 Roosevelt, Weymouth, Mass.

**OSLS-SWLS.** Get immediate and 100% response from all contacts. Reasonable—unusual! Samples 10¢, refunded. Joe Harms, WA4FJE (W1GET, W2JME, W3COP), 905 Fernald, Edgewater, Fla.

**DELUXE** Rubber stamp, call in king-size type, name, address \$2.00. Compact stamp, \$1.00. Frey, Box 296, Schwunckville, Penna.

**CANADIANS:** HT-37 for sale \$495. VERRX, Box 65, Fort Smith, N.W.T., Canada.

**CANADA.** Central Electronics 200V, \$950; Hammarlund HO-180 with new accessory noise silencer, \$500; Heath Transistor Mohican receiver, \$120. Dr. G. A. Asche, Box 400, Hope, B.C., VETAOX.

**WANTED:** Recent NRI Communications Course lessons no. 35 to the end. State condx. year, price. Ernie Crumps, 64 Barrie St., Galt, Ont., Canada.

FROM Anyone driving to Mexico will buy good mobile rig. "Revmcx". Apartado 2807, Mexico City, D.F. I.

SELL: 755-3 with speaker. Want 511-A or 75A-4. Consider trade. Sell 32S-1, 516F-2, 30L-1. All new 1961. Excellent condx. W2AEB.

SSB Heath HX-20, professionally wired and tested, beautiful rig. \$298 F.o.b. W/term. Pocketscope S10A, \$40; Astatic 13, never used, \$10; D-104 mike, \$10. F. H. Garrahan, W3QZ, 1445 1/2 Wyoming Ave., Forty Fort, Penna.

SELLING Out: KWS-1, 75A4, station control, beam, Tel-rex rotor, miscellaneous. All in new condition. High serial numbers. All letters answered. Frank Lindsay, 1326 10th St., Holdrege, Nebraska. KØMVY.

WE Pay cash for used 2-way radio equipment. State model, price, quantity and condition. Communications Service, 3209 Canton, Dallas, Texas. Tel. RI 7-1852.

TUBES Wanted. All types, highest prices paid. Write or phone. Lou-Tronics, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. UL 5-2615.

FOR Sale: HO-129X spkr. in exclnt condx, realigned, updated, 15M band spread, new tubes, \$125.00; Scope Heath OM-1 Comp. W/ALL Poses \$28. Wanted: 2 meter Gonset Communicator, W/99, 500 1st power. Dick Marsino, W2UGM, 66 Columbus, Closter, N.J. PO 8-1884.

CUR-CORE Inductances, excellent for sharp or band-pass 50 to 100 Kc. I.F. or B.F.O. Very high Q. Unused, cased, adjustable; solder terminals, Type 1, 2.9 Mh., Type 17, 3.7 mh. Dollar each postpaid U.S. Circuit suggestions included, H. Woods, 2346 Clover Lane, Northfield, Ill.

MY Fifty-two fold-over tower built for less than fifty dollars. Send three dollars for specifications, drawings, instructions and photographs. Satisfaction guaranteed or money refunded. Jim Brigan, WA4EN, Norcross, Ga.

CHANGE X-tal frequency, including plated type. Safe method, ammonium bi-fluoride, containers, holders, instructions, complete, \$1.00. Deluxe model, \$2.00. Ham-Kits, Box 175, Cranford, N.J.

WANTED: Old wireless gear, tubes, magazines and catalogs before 1925. Amateur or ship equipment only. Please give complete information including prices. My purpose is to buy this equipment, put it in first-class shape and make it available either on a museum or demonstration basis to all amateurs who didn't live and operate during this era. W5VA, 1. Frank Smith, P.O. Box 840, Corpus Christi, Texas.

ATTENTION Mobiles! Heavy-duty Leece-Neville 6 volt 100 amp. system, \$30; 12 volt 50 amp system, \$50; 12 volt 60 amp system, \$60; 12 volt 100 amp. system, \$100. Built-in silicon rectifier alternators 12 volt 60 amps, \$100; 12 volt 100 amps, \$125.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEWEY 6-7388.

304TL tubes wanted. Also other xmtrs and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

PROCEEDINGS of the I.R.E., 1914 through 1949, 1923, 1928, 1931, 1932 complete. Will sell any copy or copies. Excellent price on entire lot. Mrs. Miriam Knapp, W3JIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. 521-2055.

WANTED: All types of aircraft or ground radios, 17L, 618F or S 388, 390, GRC, PKC, 511, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUR, 308 Hickory, Arlington, N.J.

HAM Discount House. Write us for lowest prices on ham equipment. Factory sealed cartons. H D H Sales Co., 327 Greenwich Ave., Stamford, Conn.

CASH promptly paid for your ham gear. Trigger, 7361 North, River Forest, Ill. PR-8616.

TOROIDS: 88 mby. with mounting hardware. Uncased; like new. Information sheet included. \$1 ea. \$5/\$4.00 postpaid. KCM, Box 88, Milwaukee 13, Wis.

TELEVISION Camera kit easy to build step-by-step instructions, suitable for Ham TV, Educational, Industrial, Medical uses. Cryogen Instrument Labs, Inc. 60-30 34th Ave., Woodside, L.I., N.Y.

FOR Sale: Millen Transceiver 90801, VFO 90711, modulator 90831; PMR7, AF68, Dow-Key relay, Shure 404C, with instructions, no modifications, exclnt. Neat homebrew KW final, vacuum variable metered, 2500 volt DC pwr., 1 amp. Best offer any or all. K51PK, 2224 47th, Los Alamos, N.M.

JOHNSON Valiant: HO-170 C: RCA mike and many extras. First \$450.00 takes all. Jack Siegal, 6 Princeton Place, Princeton Jct., N.J. Tel. SW 9-1486.

FACTORY Modified Pacemaker, \$200; Auto-transformers input 110 or 220 volt output 115 volt 16 amp. 1.8KVA only \$12.50. 1TB00C, \$35.00. William Baxter, 3702 No. 1st Ave., Tucson, Ariz.

HEATH HR-20 receiver, \$125.00; regulated pwr supply for HR-20 and HX-20, \$35. Both for \$150 F.o.b. J. L. Smith, 104 N. Weatherred, Richardson, Texas.

SELL: Viking 1, Factory TVI suppressed, with Viking VFO and spare 4D32, \$130. Hallcrafters S-40A, \$50. Jim Hubbard, Cedar Vale, Kansas.

VALIANT, W/T, best offer, McL, K2JWD, 62-60 99th St., Rego Park 74, N.Y. Tel. LI 9-3813.

SALE or swap: Collector's item: Western Electric radio receiver, Model 4-D. Serial No. 805, 1619 Camino Primavera, Bakersfield, Calif.

WANTED: For personal collection: QSTs January through August 1916; ARRL Handbooks: Editions 1 and 5. WICUT, Box 1, West Hartford 7, Conn.

KWM-1: AC power supply; Collins spkr. Console w/SWR meter, etc. Exc. condx. W9JKC, 634 Vernon Ave., Glencoe, Ill.

SX-100, is exc. condx. \$175. J. Lindholm, 59 Redwood Dr., Bristol, Conn.

HO-170-C and GSB-100 receiver and xmtr. complete with xtal mic, \$475. Free delivery within 100 miles. W2RUJ, 415 E. Union, Lockport, N.Y.

COLLINS Noise blaster for 75A4, No. 136C-1 and 75S1, No. 136A-1, both new, \$49.00 each. Collins VFO for 75A4, No. 70E-24; KWS-1, No. 70E-23 and 75S-1, No. 70K-2, new, \$39.00 each. Mobile Mount Collins 351D-1 new, complete with cables, \$39.00. Want 75A4, KWS-1, general coverage receiver Cash. W9NHP, Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

GUARANTEED Used equipment: Heath DX-20, \$25; DX-35, \$45; DX-40, \$55; Mohawk receiver and speaker, \$240; Hallcrafters S-85, \$89; S-89, \$95; SX-71, \$117.50; SX-101A, \$299; Globe 65A, \$59; 90 and modulator, \$60; Chief Deluxe, \$70; National NC-60, \$47.50; 240D, \$110; 270, \$195; Johnson Invader, \$495; Challenger \$80; Eico 720, \$80; RME 4350A, \$185. Terms Chemung Electronics, 403 E. Third St., Elmira, N.Y.

CENTRAL Electronics 100V, with manual, all mode transmitter, serial number 513. First put into operation 9-10-60. flawless, \$500. Carlton Strickland, 930 Windsor Ave., S.W., Roanoke, Va.

FOR Sale: NC-303, Challenger, TA-33, time payments. K4-CDF, 2725 Blau St., Columbus, Ga.

NO Room to operate! KWM-1, AC pwr. supply, mobile Mount (no D.C. pwr. supply), \$585; keyer and c.w. control unit on printed circuit boards. See OST Sept. 60 and July '62, \$59. E. B. Steward, D. Lyon, K5UIJ/7, 150 Albert Ave., Apt. 14, Las Vegas, Nev.

75A-1 Perfect, \$225. UL 1-9380. Richard Sonsire, 1441 53rd St., Bklyn. 19, N.Y.

HEATHKITS: Sixer, \$35.00; Tener, \$15.00; VPI-12, \$5.00; QF-1, \$8.00; B. S. Satlins, \$5.00; Mosley VPI JR, \$10. K2MEM, Champlain, 15 Pine St., Blue Point, L.I., N.Y.

A-1 Reconditioned equipment. On approval. Trades. Terms. Hallcrafters S-107, \$69; S-85, \$79.00; SX-99, \$99.00; SX-100, \$179.00; SX-111, \$149.00; SX-101A, \$329.00; Hammarlund HQ-100, \$119.00; HQ-110, \$169.00; HQ-170, \$259.00; Valiant, \$279.00; NC-300, \$199.00; Collins 75S-1, \$329.00; 75A4, \$349.00; S-85, \$499; KWS-1, \$995; Central 10A, \$79.00; 20A, \$149.00; National I-Gon, Eimac, Heath, Johnson, RME, many others. Write for list. Henry Radio Co., Butler, Mo.

FOR Sale, complete commercial station, less revr. Fully gauranteed 180 watts. C.W. 35 phone. Tolda/WA2ROZ, 103 MacDougal St., N.Y.C. 12, N.Y.

SELL: SX-101A in mint condx. New tubes, R47 speaker. First \$295.00. Elmac AF-67, mike, PE-103, PTT AC P/S, Regency ATC-1, \$197.50. SSB 200 watt VFO mobile 75 meter transceiver, AC P/S, schematics, Homebrew, exclnt, \$135.00. No trades! Bill Skipper, Evans, Colo.

FOR Sale: Mosley CM-1 receiver, exclnt condx. price \$125.00. Larry Wade, 2001 Harding Ave., Gadsden, Alabama.

NORTH Plainfield High School Radio Club (N.J.) needs a receiver. Will pick up or pay for shipping. Will repair. All replies answered. Tnx. Contact WA2VPI.

SELL: 200V transmitter. Operate both SSB (200 watts) and A.M. (100 watts) with the Cadillac of SSB transmitters. Used less than 50 hours. No time to operate. Looks and operates like new. Will ship in original crate. Buyer pays shipping. Price \$690. Stanley Cokas, 16 Edgchill Rd., Swampscott, Mass.

WANTED: O-73/URT oscillator. Prefer one manufactured by Meridian, Inc., Stamford, Conn. State price and condition. W9-TGL, 801 Glendale Rd., Glenview, Ill.

FOR Sale: HT-37, \$325.00; HQ-180 with vernier tuning, \$325.00; Heath HA-10 Warrior, \$200; W2JAV TU, \$75. Model 15 PTR 14 perforator 19 table. A. L. Edelmair, K0JFF, 4020 Ida St., Omaha, Nebr. Tel. 453-5004.

WANTED: KWS-1; Invader 2000 or HX500. State condx and serial. Gerald Newton, WA6VKR, 933 Gregory Pl., Davis, Calif.

SELL: Central Electronics gated compression audio amplifier GC-1, \$30. L. F. Munzer, W2DUR, Port Jefferson, N.Y.

HQ-100AC, in mint condx, w/spkr. \$135. Barry Hoffman, WA2ROX, 54-16 69th Lane, Spangh 78, L.I., N.Y. Tel. DE 8-4993.

WANTED: Central Electronics 200V transmitter. Write to J. Robert Wakefield, 650 E. Baird Ave., Barborton, Ohio.

COLLINS 75S1 with c.w. filter, exc. condx, \$325.00. Will deliver 100 miles. W2CIF, MD 16, Newburgh, N.Y. Tel. John 4-1747.

COLLINS KWM-1 with matching AC pwr. supply, perfect condx. never used; Mobile, \$525.00. W5EAM, 11222 Hermosa Court, Houston 24, Texas. Tel. HOmestead 8-4079.

ESTATE Must sell station including KWS-1 and 75A-4. Write for list. Hank Frey, 39 East 10 St., New York 3, N.Y.

BC-221 frequency meter w/case and calibration book, no power supply. 2 pr. 4X350 B sockets, new tubes thrown in, make offer. Need DC pwr. supply for Swan transceiver. P. Van Schuyler, 1110 Phelps Circle, Mountain Home, Idaho.

HEATH Apache with SB-10 Sideband, A-1 condx. \$250.00, HQ110 revr. \$185.00. H. Manning, Box 393, Macon, Ga.

SELL: B&W I-1001-A linear amp. with matching power supply, \$270; HT-37 SSB exciter, \$370; Drake 2B with sneaker, Q-mult. xtal calib., \$280.00. All in exclnt condx or new condx. Lamb, 1219 Yardley Rd., Morrisville, Penna.

MEISSNER Signal Shifter, 160-10 meters with FMX phase modulator, \$35.00. W9BAD/W, Claude Goldsmith, 17 Fleetwood Ave., Spring Valley, N.Y.

SSB Receiver, Drake 1-A, S/N 1053, exclnt condx. \$200. Will ship prepaid in continental USA. W4CFD, W. Hartung, 5120 San Bernardino, Apt. 15, Montclair, Calif. Tel. 714-626-0766.

WANTED: Collins 32V2 power transformer, part number 662 0014-00. W10PZ, 95 Hawthorne Drive, New London, Conn.

HAWAII, Collins 75A4 serial 4054, matching speaker, \$550, HT-32, \$375. Both little used and perfect care. K6TFL/K6H, Honolulu 286045.

HAVE Darkroom equipment, want receiver: 2 1/4 x 2 1/4—35 mm Lucky Jr. enlarger, automatic Timolite, Spotomatic meter, tanks, safelight, poly constant filter kit, dryer, cabinet, Argus C3, and a Hickock VTVM 209A, over \$400 list. Sell for \$200 or trade for rec. SSB xmt'r, etc. Will ship. Leo Severe, RR 2, Box 5, Wilmington, Ill.

SX-100 Mark II, brand new, \$200; AF67, PMR7, 12 volt and AC pwr. supplies, whip and 20, 40 coils, \$225.00. NC-109 and spkr., #110 DB23, \$25.00. K9IFE, 53 E. Dewey Ave., Northlake, Ill. FI 3-4244.

SOUTHERN California: KWM-2 with AC supply, Extra xtals, \$940.00. Prefer not to ship. W6BLZ, 528 Colima St., La Jolla, Calif.

WANTED: KWM2 and accessories, Cash. Harold Fox, W3ETA, 7219 Wayne Ave., Philadelphia 19, Penna.

WANTED: All types Collins receivers, 51J, R-388, R-390A, etc. Also Teletype and Klein Schmidt tape and page printers. Cash or trade for new amateur equipment. Write to Tom, WIAFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

VIKING 1, TVI suppressed, spare D432 \$80; Knight VFO \$20. Joe Bowen, Rt. 2, Cottageville, W. Va.

WANTED: Two meter equipment for the missions. Rev. J. L. Anthamatten, CPPS, St. Mary's Radio Club, St. Joseph's Hospital, Centerville, Iowa.

FOR Sale: Johnson KW, \$850; Matchbox, \$90; 100-V, \$450; Millen grid-dip meter, misc. parts, all plus shipping. Mrs. Milo Adamson, 4060 So. Penn., Englewood, Colo.

SELL: HQ-145C, \$210; WA2ZVJ, 2115 East 27th St., Brooklyn N.Y. Tel. SH 3-2525.

NEED Money for school: SB-10, heavy duty power supply and latest modifications, \$70, 720 and 730 with relay, \$110 or best offer. Knight VFO, \$15. Douglas Patterson, 1912 1/2 John Ave., Superior, Wis.

COMMUNICATOR III, in new condx. plus homebrew VFO, and D-104 mike push to talk Astatic, \$190. Frank Chiorello, 243 Second St., Trenton 10, N.J.

S-36 Wanted. Want to buy Hallicrafters S-36 receiver. Must be in operating condition and in fair physical shape with no circuit modifications. Must have instruction manual and schematic, W3LJV.

HAM-M rotor, \$80; Johnson TR Switch, \$15; RME DB23A (new), \$30; Heath VFO, HG10, \$30. Want: 4-1000A, Jack O. Aber, K2IZA, RD2, Canisteo, N.Y.

WANTED: HRO coils. Need them all. Lost all in moving. Also want CE600L final. WRKPT.

FOR Sale: Sacrificing station for college: DX-100; SX-71. Many extras. K2SEB, 851 Bogart Rd., River Edge, N.J., \$225.00.

KNIGHT VFO V-44, scarcely used. Perfect. 30% discount. Sell \$20.95. W5LLU, 4607 Huisache, Beltaire, Texas.

MUST Sell: Complete SSB station—SX-111, \$185; C.E. 10B exciter, QTI, 458 VFO, 100 watt linear, \$175.00; HT41 KW linear, only \$295. All equipment like new, not a scratch! Richard Nadelson, WA2MJF, 688 Loncaire Ave., Woodmere, L.I., N.Y. Phone FR 1-0824.

COMPLETE Station: Heath AR-3 w/cab., \$25.00; 35-watt 6DQ6 B xmt'r; K4T-G, \$45.00. KNIWNL, 89 Stadelty Rough Rd., Danbury, Conn.

FOR Sale: HQ-110, \$170.00; Hy-Lite 10 meter beam: QSTs, mostly 1956 to 1962, some copies older. Alfred Luurtsema, K2-BNU, 806 Clinton Ave., South Plainfield, N.J.

FOR Sale: DX-100, best offer. J. D. Mulqueen, KØBHU, 110 Third St., Council Bluffs, Iowa.

THREE Complete Navy MAB-1 compact transceivers, headphones, microphones, antennas and carry cases. Coverage 2.3 to 4.5 Mc. Two sets of xtals for each, one set in 75 meter phone band, instruction manual, \$55 or trade for gud BC-348, BC-342 or equivalent rcvr; or what have you. Pat Miller, K5-1XQ, 809 Hazel, Kilgore, Texas.

S/LINE. Sell complete \$900 or best offer. W9NNS, 1031 Main St., Onalaska, Wisconsin.

WANTED: Perfect condition gear train from Hallicrafters S-20; state price and condx. K4LVP, 211 2nd Ave., Indialantic, Fla.

SALE: HQ-170C, w/spkr, brand new, one month old; \$275.00. Sorry, no shipping! Ruskin, Cornwall Lanc. Sands Point, N.Y.

SWAP: Approximately \$1500 equity in 3 bedroom modern ranch home, Orlando, Fla, for ham gear, boat, airplane, cash, etc. Call or write Ellis Kruse, 21 Parkland Place, Milford, Conn, K1WVZ, Ph TR 49346.

WANTED: Amateur Radio equipment. Please send any donation regardless of condition, to Franciscan Friars Radio Club, Mt. St. Francis, Ind.

SALE OR Trade: B&W coax switch, signal tracer, 300V P/S, carbon mike, BC-455. Want Heath AC-1 ant, coupler, QF-1, K4JXC, P.O. Box 162, Oak Ridge, Tenn.

TREASURE Hunt! Radio hams, collectors and antiquarians: Check to see if you have a straight line, non-rotationally operated linear potentiometer, variable resistor, rheostat or trimming device made prior to 1952, such as used in the Brunswick radios of the 1930's. I am looking for a rheostat in which the resistance element is disposed in a straight line and the contact moves in a path parallel to the element. Please describe the device before sending same. It will definitely be worth your while, whether by sale or loan. Tom O'Clane, P.O. Box 1597, Milwaukee 1, Wis.

WANTED: GRC-9, TCC-1, TCC-3 (AM682-TA219/U), PRC-URM, UPM, TS, URC, ARC, ARG-23 and 44; all types military ground and aircraft radio. Top cash prices paid. Philmar Electronics, Morrisville, N.Y. Phone 518-561-3429.

FROM Estate of W8CRB: RME-4350A w/spkr, \$175; Gonset Super-6 \$10; Heath T-3, \$15.00; WRL UM-1, \$25.00; H&W TR, \$15.00; Heath AM-1, \$5.00; Heath AC-1, \$5.00; xfrms: Stancor SA3894, SA3893, A4416, PCR412, A-53-C choke, 2-C1001. Complete issues of QST, run 1948-1957 and 1960 Co, most issues 1949-1958. Make offers on any above items. W8-FDO, Pellston, Mich.

WANTED: BC-221 freq. meter in gud condx. Send price, description. Kikon, 3 Beechwood Rd., South Norwalk, Conn.

MUST Sell: Immaculate Johnson Viking Invalder, \$500. Used less than 10 hours, manual, original carton. Jerry Felch, 2416 Halmac Drive, Huntsville, Alabama.

TRADE: 4CX300A, socket, chimney, in sealed bags with warranty (Hamfest prize) for new 3-400Z, socket, chimney, K3-SMNL, 2304 Donwood Rd., Northrest rec. Wilmington 3, Del.

SELL: Collins VS44 serial 5704 with 1.5, 2.1 and 3.1 filters, \$575; Hallicrafters HT32-A serial 249440, \$475. Both units in excel condx. W7LPE, 331 N. Harris Ave., Tucson, Ariz.

FREE Turner 350 mike with Viking Challenger, \$100. Fourteen tube rec'dr (Navy RB5-2 with manual) 110 volt pwr supply 2-20 M.C., \$95.00 Knight V.F.O., \$25.00. All A-1. \$200 takes all or best offers. K8MGT, Mace House, Muskingum College, New Concord, Ohio.

MUST Sell as complete high power VHF station, ready to operate with cables, relay and accessories: Clegg Zeus, Tapetone Sky Sweep rcvr with 2 and 1/4 mtr, 417A converters and speaker with VHF-UHF Assoc, 6 mtr. 417A preamp. Almost new; reasonable offer from \$800. Also never-used factory-wired Johnson 6N2 with Ripley blower, \$130. Pete Russelt, WITWK, 161 Winter St., Weston, Mass.

FOR Sale: ARC T-13A transmitters, \$110; R-19 tunable 118-148 Mc. rcvrs, \$120. Brand new, Power supply for Command series directly interchangeable. W8BBA/6, 17552 Kittridge, Van Nuys, Calif.

COLLINS Owners work AM! Wired kit \$5.00! Instant switching! Install in five minutes! Kit Kraft, Harlan, Ky.

COLLINS Authorized distributor offers big bargains in trade-ins and demonstrators. 75S3S, \$580; 32S1S, \$496; 516F-2, AC supplies, \$99; MP-1, 12 volt DC supply, \$174.50; 301I, \$450; 75S1, \$375; KVM-2, \$995.00; 500 cycle filter and BFO crystal for 75S1, \$50. All items completely checked and guaranteed perfect. No trades on used equipment. Electronics, Box 3687, Corpus Christi, Texas (W5GEI).

FOR Sale: Globe Chief transmitter, Model 90A, \$42.00. Earl Bill, 127 New Hartinton Rd. Torrington, Conn.

WANTED: General Radio K.F. impedance bridge, Model 916 A, or 1606 A W5EPB. Dr. Robert P. Thomas, Jr., 1003 Nix Professional Bldg., San Antonio, Texas.

WANTED: Mechanical filters, 500 or 800 cycle and 6 kc. for 75A-4, W4BUZ, 2606 Immanuel Rd., Greensboro, N.C.

ART-13, exc. condx. with manuals, and p/ate power supplies, \$110.00. K3HLN, 1918 Juniata Road, Norristown, Penna.

KNIGHT-Kit receiver, all accessories, \$100; Trihand ground-plane, \$15.00 David Slivka, 102-19 65th Road, Forest Hills 75, L.I., N.Y.

S-85, Q-Multiplier, S-meter, crystal calibrator, all in excel condx just \$100. Pick up deal only. Metropolitan New Jersey, Call Pete Jansson, W4FKL, TE 6-4691.

SELL: TS-173/UR freq. meter 90-450 Mcs., .005%, CDR Ham-Motor, Telfex 6m. Spiralaray, all excel condx. No reasonable offers refused. KITSB, 22 Morton Road, Arlington, Mass.

WANTED: OSTS prior to 1930, COs prior to 1955. Also need several extra binders for both magazines. David McKenzie, KØ-SVI, 1200 West Euclid, Indianapolis, Iowa.

EXCELLENT Station: NC-240D (twelve (12) tubes), Knight 50, V.F.-1, Johnson modulator, key, mike, crystals, 250-watt p.s., \$160.00. K2UBC, Davidoff, 2045 Rockaway Parkway, Brooklyn, N.Y.

SX-115, \$430; HT-32B, \$498; SX-110, \$105, R-47 speaker, \$9.00; Johnson 275W Matchbox, \$30. All in pert. and mint condx. W1KYG, 4, 945 S. Buchanan St., Arlington, Va. Tel. 67-14486.

SALE: Heath OM3 'scone, \$25; DQ-100B, \$160; MRI, \$90; MTL, \$80; Lampkin 105B, \$190; 205A, \$200. All in excel condx. Ed Turner, W5VVQ, Box 682, Pawhuska, Okla.

ALUMINUM For every ham need. Write to Dick's, 62 Cherry Ave., Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

HQ-100C receiver, \$125.00; HT-40 transmitter, factory wired, \$65; A-mo-co meter converter and power supply, \$20; all in clean and excel condx. WA2NEL, 955 Lafayette Ave., Hawthorne, N.J. HA 7-0494.

SELL-Trade: 6 meter 15-watt phone xmtr, including mike, xtal, supply, complete, \$40.00; New 1962 Plymouth car receiver, \$20; Novice electronic TR switch, \$9; Vibration, 12v, 280v/90 Ma., \$9; Complete kit of new parts for ART-13 supply 28v./12 amps D.C., \$20.00; 30-watt plate modulator, \$15.00; supplies: 75v/25 Ma., 6.3v.; \$15.00, 1000V/200 ma., \$18.00, Triplett 630 VOM, \$28. Everthing is in A-1. Mint condx. Stan Zuchora, W8OKU, 2748 Meade, Detroit 12, Mich.

KILOWATT Transmitter 80-15; 813's final, 805's modulator. Technical Radio 350.00. Mobilizers Complete station; Morrow Iwms whip, pwr., etc., \$200.00. K6GIUW.

SELL: Johnson KW Matchbox 250-30-13 with directional coupler and indicator. Like new condx. Ship for \$100. W0CMB, Jim Keith, Coffeyville, Kansas.

TUBE Tester mounted on embossed satin aluminum panel with charts (self-service type) \$140.00. Also new Eico 14-watt amplifier kit, \$15.00. W1KSF, 609 Lanston Lane, Falls Church, Va.

MM2 Central Electronics wired, 50 Mc and 455 Mc adapters, \$85; Ac Instructograph with oscillator, key, phones and 10 tapes. Like new, \$45.00. Don Vaughan, W4MTY, 4607 Briarcliff Rd., Atlanta 6, Ga.

32V2 and BW 51SB, \$325.00; SX-111, \$175.00; BC-312, 110 volts, \$45.00; Sigsbee, ARC-27-33 and 44; all types military generator 100 Kc to 32 Mcs., \$25.00; coax relay, \$5.00; no shipping, sry. K1MFD, Horace Miles, 13 Edgewood St., Cromwell, Conn.

FOR Sale: C-E 200V, 9 mos. old, immaculate, \$725.00. K3MLR, 7561 Overbrook Ave., Phila, S. Penna, TRinity 7-8281.

SELL OR swap 6 months old Rolleiflex 3.5F in perfect condx. with coupled light meter, case, Rolleinars one and two, red and yellow filters, and lens hood, Worth \$379. Want: Ranger II in perf. condx. Dana Wood, K6AHM/5, 3500 Modlin, Ft. Worth, Texas.

SELL: Excit Fico 232 VTVM, \$42.00; 324 sir. gen., \$34; wanted: will pay \$50 for 1B5-50D with AP5-50 pwr. All F.o.b. Donell Reed, K9LFO, 911 North Lynn St., Independence, Mo.  
SELL: 6-WE 416Bs at \$5.00 each, 5 Weston #301, 200 ua. meters calibrated 2500V \$5.00 ea., micro pots and dials. Make offer. Advance 0-60 sec. time delay pwr. relay, \$5.00; preceding PPD. Also, 300W. linear, 811As, like Handbook except (G) xrrmr and choke, \$150 plus shipping; 750V-280 Ma, 250V 50 Ma, 6V 10A coil, rating, pwr. supply, 8" rack panel, in cabinet, \$35.00. Other pwr. sup. components cheap, W5DAU, Box 1443, Hobbs, N. Mex.

WANTED: Johnson Matchbox and Telrex Triband beam. WAR-4HG, 852 Walnut St., Elyria, Ohio. Tel. FA 3-1245.

WANTED: Commercial or surplus Airborne, Ground, Transmitters, Receivers, Test sets, 618S, 18S, 17L, 31R, ARN-14, GRC, PRC, BC, AR, Bendix, Collins, others, etc. Ritco, Box 156, Annandale, Va.

RUBBER Stamp, Case, ink pad, Call. name, address, \$1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SELL: Collins 32V3, \$350.00; 75A3, \$350.00. W4IEA, 4363 Englewood Ave., Jacksonville, Fla.

WANTED: 75A4, KW51, Tower, Beam, Separate or package deal, State serial, condx. WA6YKR, 933 Gregory Place, Davis, Calif.

COLLINS KWM2 serial No. 1472 with AC supply, \$850; 301L linear amp, serial No. 11809 for \$395.00; 75A1 receiver for \$185. W1L0P, 71 Hilldale Rd., West Hartford, Conn.

SWAP: Precision visual alignment generator Model No. 7008 and Heath tube checker for (prefer) mobile transceiver or what have you? WB2CJF, Arthur Feketev, 110 Winant Place, Charleston, S.C., N.Y.

COLLINS 32S-1 516F-2, 75S-1, 312B-4, Astatic Dynamic, Extra 312B-3 spkr, L. E. Vibroplex, Gud condx, \$1195. No trades! No shipping, sry. John C. Powell, K4IZY, Box 63, Murrefreesboro, Tenn.

DX-100: All factory modifications, in excnt condx. no scratches. Sry. will not ship. \$150.00. W2EPZ, 80-44, 259 St., Floral Park, L.I., N.Y.

LIKE New HQ-170C: \$250.00. Also Heath Seneca, \$150. Jerry Maslowski, W8LKM, 3523 Pickwick Pl., Lansing, Mich.

SELL: 75A3, spkr. top shape, \$320.00; SX-42, AM/FM, .54 to 109 Mcs., \$95; P & H linear ampl. (400 w.), \$50; BC 1031C, Panadaptor, \$35; Elmac A54 xmtr, \$25; Gonset Super Six, \$10; Bud Codemaster, \$6; Speedx Key, \$4; Antennascope, \$3; Dow-Key TR sw., \$3; complete power supply components, 1600V at 500 ma., complete modulator components, 500 watts; 6 m. transmitters and converters, Tubes: 813, 304TL, 829B, 832, 6146s, QSTs to 1946, 5¢ each. S. Savage, W6ABN, 2375 E. 20th, Long Beach 6, Calif.

COLLINS 75A2, product detector, 500 kc. calibrator, spkr. \$285.00; Viking II, VFO, H&W SSB adapting kit, \$175. Both excellent condx. Bob Dixon, K1SCC, Boulder Circle, Glastonbury, Conn.

SELL Or Trade: TS-175/U frequency meter with AC supply for any ham gear worth approximately \$200. W9ERU, Box 350, RR 4, Rockford, Ill.

JIM Lansing 175-D.L.H. D-130A; N-1200 spkr. components, \$135.00. L. Wecker, 56 S. Foster Blvd., Babylon, L.I., N.Y.

SELL: Morrow 3BR mobile converter, \$30; Elmac PMR6A mobile rcvr and pwr. supply, 160-110 plus bdest, \$60; Heath VOX, \$20; Ultra modulation unit for 1 KW, \$50; 66 in. open frame rack, \$12; 364" AC supply, excellent condx. 1-m, w/ conversion data for including and band spreading 20 and 15 meters, \$35; Viking Adventurer, screen modulation, antenna changeover and receiver mute relay, \$30; UTC S-20 and Collins 20 watt modulation xrrmrs, both for \$12. Supreme VOM, \$5. F.o.b. K7QD, 3513 N. Grandview, Flagstaff, Ariz.

JOHNSON Invader 2000, \$825; Drake LA, \$150; Heath Mohawk, \$225; Hallcrafters 101A, \$275; Collins 32V3, \$249; Hammarlund HG-1 \$75; AIG gear, extra 1m, w/ audio, with conversion data for including and band spreading 20 and 15 meters, \$35; Viking Adventurer, screen modulation, antenna changeover and receiver mute relay, \$30; UTC S-20 and Collins 20 watt modulation xrrmrs, both for \$12. Supreme VOM, \$5. F.o.b. K7QD, 3513 N. Grandview, Flagstaff, Ariz.

SELL: Heath Comanche, excnt condx, \$80; HP-10 transistor supply, \$30; Hammarlund SP-400 Super Pro with supply, \$115; mobile whip, mount, loading coil, 18"; Heath (G161), Hi-Fi reverberation system, \$35. Don Kilbrith, 26 Farrell Ave., Colonia, N.J.

CUSTOM Building, Ham gear, VHF specialists. Converters, power supplies, etc. Free quotes, Frontier Electronics, Orr 1, Minnesota.

SELL: Hallcrafters HT-37, \$325.00. Never removed from original carton. W2CMD, 2206 Smith St., Morrick, L.I., N.Y.

SACRIFICE Station: Hallcrafters SX-111; DX-20; VF-1; Hornet Antenna V-75. Excnt condx. Best offer over \$250.00 takes all. Carole Ostergren, WA21BY, Mark Ave., MD No. 25, Newburgh, N.Y.

SELL Collins 32V3, \$295; RAK lo freq. rcvr, \$30; 15kc-600kc. Pick up or local sale above terms. Three 4-250A and two 6c-21 tubes @ \$10.00 ea. Johnson SWR mtr., \$25.00. R. D. Stimpson, 5910 Old Chesterbrook Rd., McLean, Va. Phone 356-4290.

COLLINS 301L, 32S1 and 75S1, Perf. condx. original wiring untouched, little use. At least 20% off. Offers and payments considered. W2HQH, Ivanhoe -1875, L. Rosencrans, 644 Wildwood Rd., W. Hempstead, N.Y.

FOR Sale: BC-640 transmitter with extra set of tubes, excnt condx. F.o.b. \$125.00. DX-40 with VF-1, excnt condx. \$60. K4ISA, Box 8080, Allandale, Fla.

SELL: Viking Adventurer, \$50; and Hallcrafters SX-28A, \$100; both in excnt condx. Will deliver within 30 mile radius. WA2UDK, Rutherford, N.J. 83 Sylvan St.

1X-100, w/ relay, \$140; SX-71; 6 meters, \$135.00; NRI Communications Course, xmit, inc, mic, key and 80 meter xtal, \$65. Gene Cronewitt, 102 Cypress Ave., Findlay, Ohio.

RENOVATING Shack, Heath I/C Tester, \$12; Knight VTVM w/ 18 tubes and movement, \$10; Vibroplex Bug, like new, \$10; F130C, \$5, assorted coax, QST collection 1939 to date (run incomplete), and many others. Write to Ben Goldfarb, 1414 Madison St., Hollywood, Fla.

TRADE GPR-90 for Eddystone 680X or coins; trade 1500X microscope, test equipment, violin, binoculars, Vibroplex, etc. for NC-190. Percy Ott, 507 Juniper St., Quakertown, Penna.

WANTED: Tapetone XC-144-C4 converter. Price, condition. Airmail, W7VS.

KWS-1, \$875; 75A4, \$490; new 75A4 noise blander, \$59; Globe 6N2 transmitter, \$79; Tecraft 6M transmitter, \$29; new factory-wired SB-10, \$89; Heathkit color generator, \$59; Tapetone TC-220 converter, \$45; Supreme Audio generator, \$17. Clean-up list. W4AP1, Box 4095, Arlington 4, Va.

SELL DX-100, \$125; HQ-129, \$75; gud condition. Deliver Richmond, Washington area. K4IFZ, Rt. 2, Box 195, Montross, Va.

BC-221-AH with orig. calib, book and built-in A.C. pwr. supply, \$49.00. K4KCT, 1037 Michigan Ave., Adrian, Mich.

MINIBEAM Homemade G4ZU Triband March 1957 CO. Sturdy construx. \$15.00, Local deal only. K2YMO, 38 Mead Lane, Westbury, L.I., N.Y.

APACHE, HQ-150, TB-600, Matchbox, Prop pitch motor, sell-ins, indicator, extras, \$300. Sry, no shipping! W2ZC, 29 Pascap, Milford, Conn. Tel. R4inity 4-3461.

GONSET G-66B with 3-way pwr. supply, cables, mobile mount. In exc. condx. used mostly in fixed station. \$150.00 f.o.b. K6-EJY/J. J. M. Kootsey, Physics Dept., Brown University, Providence 12, R.I.

VALIANT: FW, in mint condx, w/LP filter, Dow-Key relay, G-stand, \$315.00, T433 Jr w/TR 4 rotor cs 60 lt. RG8/U, \$85.00, NC-3/XTL calibrator, like new, factory-tested; \$355.00. K1OGA, Boston.

FOR Sale: FV Valiant, \$325.00; Globe Hi-Bander, \$100; T-Craft 2 mtr. conv., \$18; Heath VTVM, \$20; Globe 4 & 6 mtr. VFO, \$25; Heath SVR Bridge, \$10; Astatic JT30 mike, \$8; Shure 707A mike, \$8; Vidiconc, \$40 each; semi-conductors, 3 for \$1. WA2FLA.

RUBBER Stamp for hams, sample impressions, Ham, W9UNY, 342 North 93rd, Milwaukee, Wis.

HEATHKIT: HX-20, HR-20, HP-20, Excnt condx. \$400.00. R. Meyer, 5th Ave., Brooklyn, N.Y.

FOR Sale: 2-meter equipment. Write K3BCV for details.

SELLING 40 element Yaagi array for 2. Price w/stacking frame, \$53; or will trade for Twoer w/12v. mobile supply. Wanted: 6N2 meter xmit in single cabinet. Cash or trade. Hibander, Seneca, 6N2, or homebrew rig considered. William Wegner, Bridgeport, Michigan.

FOR Sale: FV Ranger, \$175; Pacemaker, \$250; HQ-110, \$175; Heath Warrior, \$260; all little used, and in excnt condx. Will ship if necessary. Dan Vermont, 83 Blackheath Rd., Lido Beach, L.I., N.Y. 516 GE 2-0707.

CENTRAL Electronics 200V, with filter plus coax ratiometer SWR Bridge, excnt condx, \$650; 32 ft. Spaulding Culvert base tower with Thunderbird Tri-bandner plus Ham-M rotor, \$200; rounded grid 813 linear with 2500 volt pwr. supply, \$100 or all for \$900. K4HPD, P.O. Box 1385, Huntsville, Ala.

SELL: Globe Scout Model 680 with Heath VF-1, \$65. WA2GVQ, 14 Lake Shore Dr., Parsippany, N.J.

MUST Sell! Immaculate Johnson Navigator, \$90. WA2QDR, O'Brien, 12 Acorn Terrace, New Rochelle, N.Y.

FOR Sale: Gonset G77A and 3-way power supply, Regency ATC-I converter, Webster Bandspanner and Shure mobile mike; \$250. You pay shipping. Charles F. Sims, K4LRG, Box 6, Georgia Tech, Atlanta 13, Ga.

SELL: 4-1000A, 6-304TLs, 3-150TLs, HRO-60 coils C.D.E. W4-PSV, 461 1st Ave., Eau Gallie 7, Fla.

SELL: HQ-160, \$275; Heath AM-2, \$12; Heath GD-1B, \$18; E-Way RB-500 wanted tower, \$110, W2CTO, 30 Linden St., Malvern, L.I., N.Y. Tel. LY 9-6170.

WANTED: KWM-2 and AC and DC pwr. supplies and mount. Johnson KW Meters with SWR meter, 2.1 and 6 Kc filters for 75A4, K3BHB, 903 Western Ave., Jeannette, Penna. Tel. IA 3-5936.

COLLEGE Bound. Will sell complete station: DX-100, Ne-109 with calibrator, vertical with RG8/U, bus, microphone, accessories, \$235.00. Chicago area. K9TXN, 1619 Ridge Ave., Evans-ton, Ill.

JOHNSON Viking Ranger II, Dow-Key relay, mike and key. Used by little, \$275. Globe Chief, \$30. Knight VFO, \$20. K7-GGA, Route 1, Box 205, Prosser, Washington.

JACKSON Tube Tester Model 636, \$25; Triplett Model 850 VTVM, \$20. First check or m.o. takes. I pay postage. WA6-MEQ, 10705 Pinole Ct., Cupertino, Calif.

SELL: SX-101, DX-100, Precision E-200-C Signal-Marker generator; Knight VTVM, all v/c clean and gud condx. W9FZM, 7409 W. 109th St., Worth, Ill. Tel. GI 8-2498.

300 QSTs and CoS, 1940 to present, \$25.00. C. Goros, WA2-UZA, 11 Everitt St., Valley Stream, L.I., N.Y.

SCOTT Radio, Ideal for SWL or experimenter. Late model with Millen dial, glass panel; extended range speaker; 3 SW bands for worldwide reception; 1 Broadcast; headphone jack; phono connection. In cabinet 42" x 21" x 21". In perf. condx. Price: \$60. W. E. Schroeder, 5 South June Terrace, Lake Forest, Ill.

BARGAINS! Used equipment sold, traded, wanted by other hams in "Equipment Exchange Bulletin." Interesting copy free! Write: Brands, Sycamore, Ill.

SELL: HQ-170 with speaker, Perfect condx. New in February 1962, \$270.00. J. O'Connor, WIMIC, 15 Edith St., Arlington, Mass.

FREQUENCY Meter BC-221AK with RA-133 power supply in excnt condx. \$75; Jennings variable vacuum capacitor one OSC 375 and two USCL 750 new, \$100; for the three two RCA 4E27, 8001 tubes, \$10 each or \$15 for the pair; three 4-400 tubes, new, \$20 each or the three for \$50. Other misc. items. Would rather not ship. Freddy L. Mason, K5MZL, 1105 Wabash Ave., Belleville, Ill.

HO-150, \$170; HQ-100C, \$130; both excnt. F.o.b. Will crate for shipping. W9KPS, RFD No. 3, Taylorville, Ill.

NEW Johnson 500, \$685; mint Hammarlund 145-C, \$185; new Deluxe Vibrolux, \$185.50; Heath OM-3 oscilloscope, \$45; Hallcrafters SR-34 6 and 2 meter transceiver, like new, \$275; NC-303B in factory sealed carton, \$380; Heath Cheyenne and Comanche mobile rig, mint, \$225. WA2LSN, Albuquerque, Jr. IN 1-1779.

FOR Sale: Hallcrafters SX-71 receiver, perfect and newly aligned, R-46 speaker, \$125; Elmac M1070 power supply wired, \$40; Herb Howe, K7CWO/7, 311 High. Apt. #2, Pullman, Washington.

SX-101A, like new, \$300. WA2LSN, 266 Debevoise Ave., Roosevelt, L.I., N.Y.

SELL: Johnson Viking II with matching VFO, \$175. W8EW, 949 Maxwell Ave., SE, E. Grand Rapids 6, Michigan.

DX100B, \$162. MR1, \$85. Both immaculate, very light use. V. E. Rutter, K.D. 2, Bath, Penna.

WANT: Early QSTs, 1920 and before. Also fourth edition ARRL Handbook. Sell QST run 1929 to 1940. Offers: W2DYU, 36 New Lawn Ave., Kearny, N.J.

COLLINS 75S1 for sale with 5 Kc filter and BFO xtal, exclnt, like new condx: \$350. K2YEQ, 57 Melbury Road, Babylon, L.I., N.Y.

SELL: Heathkit CBI-A for citizens band or 10 meters. Condx exclnt. \$27. W2WSWA, 16 Dorchester Ave., Hastings-on-Hudson, N.Y., Tel. GR 8-3180.

SWAP: TMC Communications receiver Model FFR D-8 16-32 Mcs. for HQ-129X or what have you? W3ISA, Rte. 2, Meadville, Penna.

WANTED: Triband beam, rotor, transmitter and receiver for home and mobile use. Peter Boudreau, 10 Forbes Ave., Burlington, Mass.

FOR Sale: Communicator IV (2M), accessories; National XCU-109 calibrator, KØEFM, 111 Cedar, Madrid, Iowa.

SELL: Heath SB-10, \$75; Multiphase MM2, scope, \$75; National 2-meter converter, \$20. Walt, KØEDK, Box 459, Montrose, Colorado.

VOCALINE 465 mcg. citizens band transceivers. Four like new units, \$30 each, or swap for ham gear. M. Blank, 280 east 16th St., Brooklyn, N.Y.

SALE: DX-60 and matching HG-10 VFO, 3 months old, pert. condx. Best offer, Jim Newsome, W4PBW, Box 386, Athens, Tenn.

BRAND New, sealed cartons, full guarantee Hallcrafters HT-37, \$445; HT-4, \$355; SX-111, \$249. F.o.b. E. Harms, WA4-FY, 905 Fernald, Edgewater, Fla.

SWAN 75 meter mobile station complete with power supply, antenna, \$295. K3JZH.

STORM Warning Stations. Building our 12 weather station instruments. Plans \$2.00. SAC Press, Box 2513, South Bend, Ind. 20A factory wired, 458 VFO in deluxe cabinet, \$169.00 F.o.b. WØGEP, 907 Deandell, Ferguson, Mo.

VIKING Invader, \$450; Drake 2-A, \$200, as a matched pair, \$600. Insufficient time to operate. Peter J. Rolling Lane, Trenton 90, N.J. Phone JU 6-6645. Not available Saturdays.

ELMAC AF-68 and M1070 pwr. supply. Electro-Voice 602D mike, also Johnson 275W Matchbox with SWR bridge. No reasonable offer refused. John Goodrich, P.O. Box 144, Vernon, N.J.

CRYSTALS Airmailed: SSB, MARS, Commercial, CD, Novice, C.A.P., Net, etc. Custom finished FT-243 01% any kilocycle 3500 to 8600, \$1.49 (10 or more same frequency FT-243, 99¢); 1700 to 20,000 kilocycles \$1.95. Overtones above 10 mcgacycles. Fundamentals 10 to 13.5 mcgacycles, \$2.95. Add 50¢ each for .005%. Add 65¢ each for HC-6/u hermetics. QST Projects (FT-243): SSB Package five mixer, \$9.95, seven matched filter (FT-241-9A), \$9.95; "DCS-500" FT-241 matching \$9.95 per set. Write about crystal needs. Airmailing 10 crystals, surface \$5. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, Calif.

TELEX TB2E for 10/15/20M, \$95; HT40 transmitter, \$90.00; SX-140 receiver, \$100. Call or write Tom Abare, 6 Tuttle St., Bellows Falls, Vermont, K1VNE, Tel. 802-463-4209.

FOR Sale: Factory wired Valiant in new condition and SX-100, excellent. Best offer for either or both. Want: AF-67. Will consider trades. KØPVV, Short, Box 32, Jamestown Collee, Jamestown, N.D.

FOR Sale: Heath Mohawk receiver. Used very little. Factory aligned. Professionally wired. Mint condition, \$225.00. F. Fess, 8840 Hubbard, Detroit 28, Michigan. Tel. VE 7-2298.

SELL Station: 75S1, \$395; Matching spkr, \$22; 32S-1, \$495; 516F2, \$86; MM2 scope and adpt, \$115; 80X mike, \$6.00. All used less than 30 hours. Hy-Gain Roto Brake, new, unpacked, \$145.00. Gonset Monotone, \$29.50; Millen Grid Dipper, \$35.00. Consider selling separate. M. E. Brown, 1032 Lee Ave., San Leandro, Calif. W6FJO.

FOR Sale: HRO-5 with pwr supply, spkr and all coils except broadcast; Hallcrafters SX-28 with new S-meter and good wear train. All the above exceptionally clean and with book. Spiders, coils and bamboo for Triband quad, \$25.00. Model 26 telepre, \$50; Model 12 printer with distributor and vacuum-tube keyer, \$25.00. John Nagle, 626 East Main, Moorestown, N.J.

COLLINS KWM-2. AC supply with built-in spkr, exclnt, \$925. Al Rothschild, 1223 9th St., Watertown, Wis.

Will Sell Apache for \$200. Have Marauder now. K8VHD, Benton Harbor, Mich.

FOR Sale: HT-40 factory wired eight months old and in exclnt condx. With original shipping carton and manual, \$90. WA4-FE, Dave Andrews, Box 674, Main St., Purcellville, Va.

ATTENTION: All dentist hams. We shall meet on Thanksgiving Day Nov. 22, 1962 at 8:00 GMT on 14.335 mc. to form our dent net. The West Coast manager and net control will be W6SZU. On the East Coast K3LEC will act as manager and net control.

"HOSS-TRADER Ed Moory" Can sell cheaper because we operate in a small town with low overhead. "Horse Thief Specials" Used equipment: Swan transceiver \$239; SB, \$229; HT-37, \$349; like new 75A-4, \$469; H&W LP-1, \$249; 20-A, \$125; Johnson Ranger, \$159; KWM-2, \$795; Demo-Invader in warranty, \$449; 75S-3 in factory sealed carton, \$569; Demo-new Ham-M rotor, \$85; week old TH-4 beam, \$75; last new 200-V in captivity, \$775; demo 301-1 in warranty, \$379; freight-damaged 75S-3, \$595; Sonar Transceiver, \$359 reprocessed Valiant, \$299; terms cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone Whitney 4-2820.

FOR Sale: HRO50T, coils AC, A, B, C, D, F, H. Make offer for one or all. Am looking for an E. DSB100 like new, make offer. Wells Chapin, 118 Woodmaney Lane, Fayetteville, N.Y.

GONSET G66b thin pack P/S like new with mounting brackets and manual, \$150; SB-10 like new, no modifications with manual, \$75; Elmac AS4 50W 75-10 with James P/S and relay and manuals, in exclnt condx, \$70. Above prices firm. Will ship. WUMZ, 96 Fern Court, Lake Jackson, Texas. Richard L Gilbert.

1X-40 with VF-1, in mint condx, \$80. M. Blank, 280 East 16th St., Brooklyn, N.Y.

SELL: Johnson Challenger transmitter 240-182-2 factory wired, \$70, in exclnt condx. T. Lake, 27117 Midland Rd., Cleveland 40, Ohio.

FOR Sale: Complete 500 W. SSB station HQ-170, GSB-100, factory-wired Viking Courier, \$650. Will demonstrate. K2GYV, Philip Marulles, 9 Pine Court, Westfield, N.J., Tel. AD 2-1318. NC-303, \$318.00. Scratchless, in original carton, used by little, instruction booklet, etc. 6 and 2 meter converters, \$17.00 each with all cables, Terrell W. Hacker, 53 Overlook Rd., New Rochelle, N.Y. K2ZDJ.

S-85 Hallcrafters, \$59.00. W2EEJ.

SELLING Back issues of QST from 1928 to present date, \$1.00 each inclusive. Robert Andrews, 20 Rosemont Drive, Gettysburg, Md.

SELL: Drake 2A, xtal, calibr, spkr, \$239.00 CE20A, \$129. VFO, \$10. Tel. W8IOV, 1978 Stratford Way, Columbus, Ohio. Tel. 258-3470.

COLLINS 32S-1 with A.C. power supply in v'y gud condx. \$500; 75S-1 with half Kc filter and xtal in like-new condx. \$450.00; Astatic 10-D mike on Luxo boom, \$25.00. RCA Voltthomyst WV77E, factory wired also like new. \$30.00. Or a package price of \$950 for everything. WA2SLZ, Roger Cramer, 238 Roberts Ave, Yonkers, N.Y.

SELL OR trade Drake 1A w/calibrator for 600L linear, 3000V 120 mfd. filter, \$30; custom AC supply for 32S-1 or KWM-2, \$40. Collins SM-1 dynamic mike, \$20. New Remington 740 Autoload, \$0.00 w/ scope, case for 75A2 or 75A3. WØBNF, Box 105, Kearney, Nebr.

HQ-170C like new, \$300 or trade for HT-41; Globe Scout deluxe, best offer over \$100; Cheyenne and Comanche with mobile supply and cables, \$175; HE-45, \$90; DX-20, \$25; AR-3 with Q-multiplier, like new, \$30. Arthur Holm 717 Greenwood Ave., Balto. 6, Md.

COMPLETE Mobile and fixed rig: Elmac AF67 and Gonset G66B, complete with 12v and 117v pwr. supplies, Offers? T. Smith, 747 No. Main, West Hartford, Conn. Tel. 232-0000.

CRYSTALS bought and sold: Ashe, WA4GEX, 4610 Sharon View Rd., Charlotte 9, N.C.

WANTED Super Pro with pwr. S. GDM, Bug, 2 meter rig, W8NAUS.

SELL 1 KW CW rack transmitter, complete, \$100. You pick up. RME 4300 receiver, spkr and xtal calibrator built-in, mint condx. \$110.00. W9DGV, 711-44th St., Rock Island, Ill.

DRAKE 2B receiver with 2AO Q-multiplier/spkr, Gonset GSB-100 transmitter. Both exclnt condx. \$500 F.o.b. Stephen O. Cook, K9SKG, 3538 N. DeQuincy St., Indianapolis 18, Ind.

COLLINS KWM-2 transceiver serial 11,467, one year old; PNT portable 110-220VA supply Transceiver factory reconditioned sealed box with warranty. Never used. College commitments force sale. Price \$1000. Contact Fred A. Dorsey, KØRXI/4 Chi Phi Fraternity, Emory University, Atlanta 22, Ga.

GONSET Communicator II, 2 meters, 6VDC, 115VAC, complete with 10 crystals; \$115. K1PYP, G. C. Koger, 55 Ledgerlawn Ave., Lexington, Mass.

SELL Ranger, y gud condx, \$150; Variac, 230v, 9 amp., \$35; Tubes: 4-65A, \$12; 4X150A, \$10; 814, \$6; 6Y6, \$20. Plus shipping. St. Mary's H.S.A.R.C., Manhasset, N.Y.

IMMACULATE 200V, \$695; excellent Heath Warrior linear, 200. W1PNM, Augusta, Me.

SELL: Heath Mohawk receiver, matching spkr, \$190, Robert Weisman, W3ZQG, Kirkland A-32 Harvard, Cambridge 38, Mass.

SELL: 2 RCA 829B tubes. Never out of the boxes, \$18 post-paid for the pair. WØEJE, RFD 1, Cabool, Mo.

SELL: Drake 2-A, used only few hours, price reduced to \$190 for quick sale. S. J. Koczko, 359 North Maple Ave., East Orange, N.J. OR 5-7943.

HT-33 KW linear amplifier, serial 153739. Exclnt condx. Delivered Philadelphia area. Best offer by November 21. All replies acknowledged. W3OPZ, Box 63, Abington, Penna.

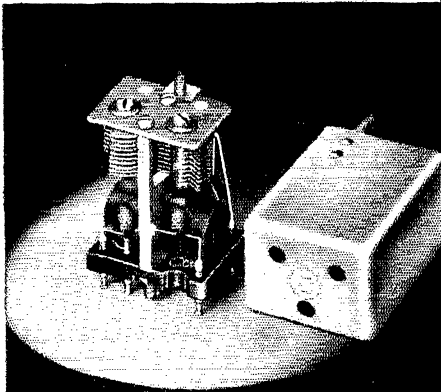
HT32 with PTT, \$400; DX-100 with PTT speech clipping, grid keying, \$125; need Gonset Communicator, WA2QGY, Aznakian, 25404 57th Ave., Little Neck, L.I., N.Y. BA 9-2043.

HAM BURGERS—Used equipment, money-back guarantee. Gonset G28, \$144.95; Communicator 2-2 meter, \$139.95; 6 meter linear, \$124.95; 2 meter linear, \$99.95; Johnson Thunderbolt, \$484.95; Pacemaker, \$334.95; Viking I TVI suppressed, \$124.95; 6 & 2 F.V.F., \$119.95; National NC-300, \$244.95; Astatic JT30 mike, \$7.95; Hallcrafters HT33A, \$449.95; HT-32, \$349.95; S107, \$74.95; SR 34, \$274.95; Heath Mohawk with speaker, \$274.95; Cheyenne \$99.95, Phasemaster 2B, \$274.95; Phasemaster 2B and VFO, \$269.95. Trades. Write for free list. Ham Burgers, Wyncote, Penna. CA 4-1740.

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Extremely high Q: Variable Coupling—(under, critical, and over) with all adjustments on top. Small size  $1\frac{1}{16}'' \times 1\frac{1}{8}'' \times 1\frac{1}{8}''$ . Molded terminal base. Air capacitor tuned. Coils mounted in special powdered iron assemblies. Tapped primary and secondary. Rugged construction. High electrical stability. No. 61455, 455 kc. universal transformer. No. 61453, 455 kc. BFO. No. 61160, 1600 kc. transformer and No. 61163, 1600 kc. BFO.

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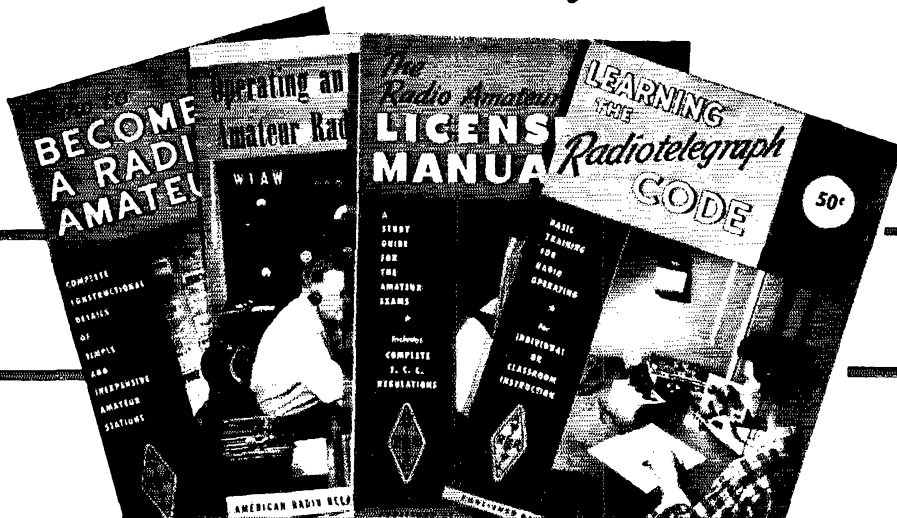


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# Gateway



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- ★ HOW TO BECOME A RADIO AMATEUR
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- ★ OPERATING AN AMATEUR RADIO STATION

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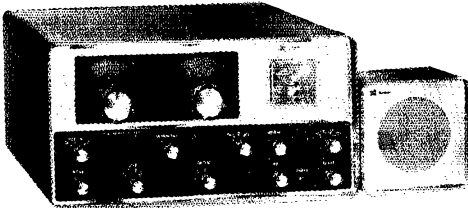
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**\$119<sup>95</sup>**

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Frequency Range: 3.5, 7.0, 14.0 Mc. amateur bands • Types of Emission: SSB (LSB 80 and 40 meters, USB 20 meters), AM (SSB with carrier inserted), CW • R. F. Power Input: 200 watts SSB PEP, 180 watts CW, 100 watts AM • R. F. Power Output: 120 watts SSB PEP, 108 watts CW, 30 watts AM • Output Impedance Matching Range: 40-60 ohms • SSB Generation: 5200 Kc crystal filter; bandwidth 2.5 Kc at 6 db • Frequency Stability: 400 cycles long-term after warm-up • Suppressor: carrier — 50 db; unwanted sideband — 40 db • Operating Facilities: all modes — full AGC and S-Meter on receive; SSB-VOX or PTT transmit, product detector on receive; AM — VOX or PTT transmit, separate diode detector on receive; CW — grid block break-in transmit, product detector on receive • Audio Input: High impedance, low level • Controls: Front panel — Main Tuning, Band Selector, Audio Gain, R. F. Gain, Microphone Gain, Mode (off, SSB, AM, CW, tune), Carrier Balance, Driver Tune, PA Tune, PA Load; Rear panel — Vox Sensitivity, Anti-Vox, Vox Delay, Bias Adjust, Vox Input, PTT Input, Key, Phones, Ext. relay • Metering: PA

cathode current on transmit; S-Meter on receive • Receiver Sensitivity: 1.0  $\mu$ V for 10 db S/N ratio • Receiver Selectivity: 2.5 Kc at 6 db • Receiver Audio Output: Better than 2 watts; 3.2 ohms • Size: 6" H, 13 1/2" W, 11 1/2" D. • Shipping Weight: 3.2 pounds • Power Requirements: 700 V.D.C. @ 300 ma., 280 V.D.C. @ 100 ma., — 80 V.D.C. @ 10 ma., 12.6 V. @ 5A. • Tube Complement: 17 tubes, 4 diodes, parallel 6GJ5's in final amplifier. Mechanical: 1/2" solid extruded aluminum front panel; perforated steel enclosure; cadmium plated steel chassis; chromium plated steel mobile mounting bracket. • Main Tuning Ratio: 45:1, employing planetary and split gear drive. • Finish: Front panel — Hydro-etch off-white matte with brushed aluminum trim; Knobs — Mil-Spec, matte black; Enclosure — gray-blue wrinkle enamel. • Accessories: NCXA 115 V.A.C. power supply/speaker console; NCXD 12 V.D.C. power supply

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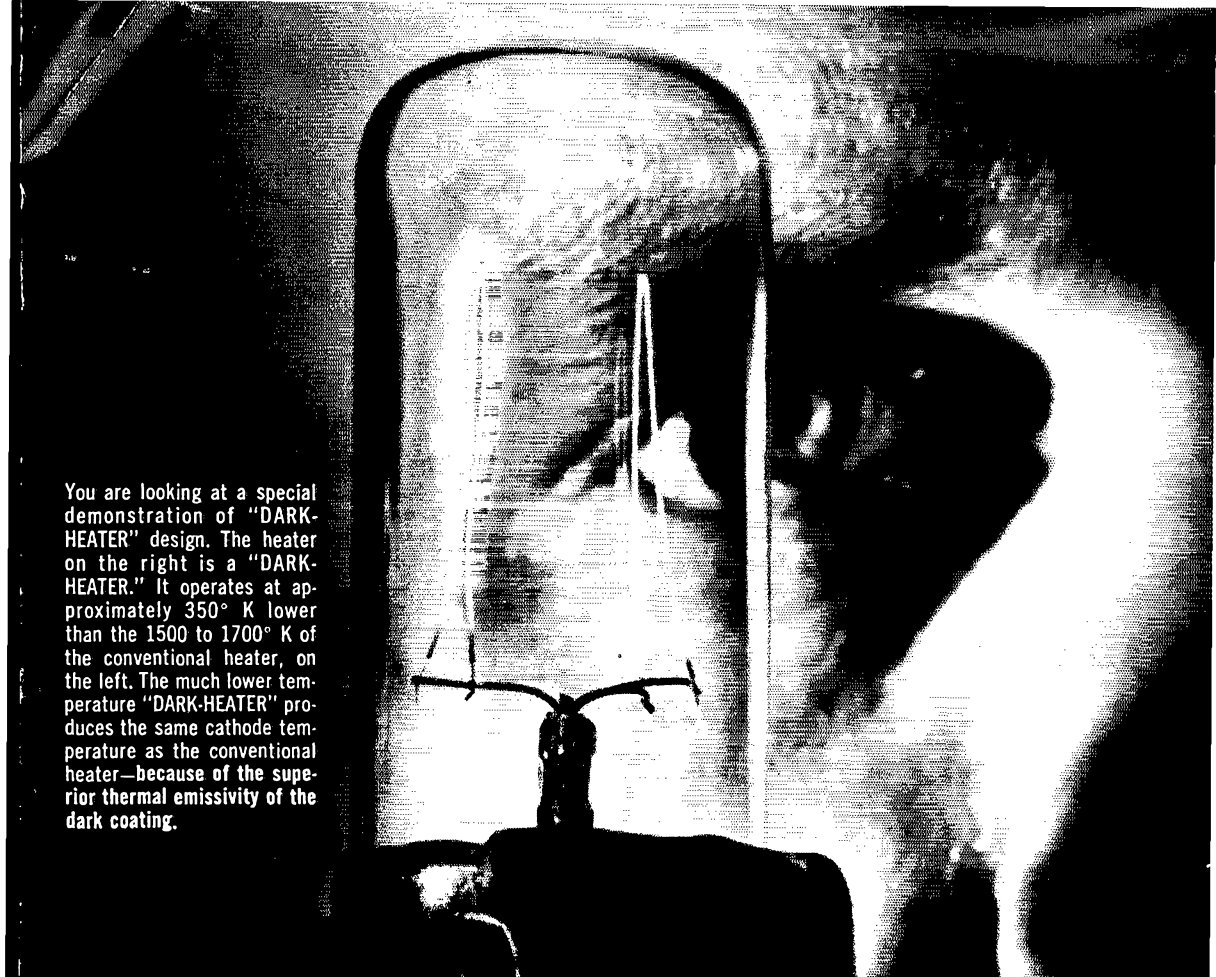


## National Radio Co., Inc.

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World Wide Export Sales: Ad Aurlima Inc., 85 Broad St., N.Y.C.

Canada: Tri-Tel Assoc., 81 Sheppard Ave. W., Willowdale, Ontario



You are looking at a special demonstration of "DARK-HEATER" design. The heater on the right is a "DARK-HEATER." It operates at approximately  $350^{\circ}$  K lower than the  $1500$  to  $1700^{\circ}$  K of the conventional heater, on the left. The much lower temperature "DARK-HEATER" produces the same cathode temperature as the conventional heater—because of the superior thermal emissivity of the dark coating.

# RCA-8032 13.5-VOLT "DARK-HEATER"



RCA-8032 Beam Power Tube—70 watts CW output (ICAS) at 60 Mc; 35 watts CW output at 175 Mc.

This is the new RCA-8032—first beam power tube with a "Dark-Heater" for amateur applications.

Heater voltage rating for RCA-8032 is 13.5-volts—just right for modern mobile operation. Power ratings are the same as the prototypes in the world-famous RCA family of 6146 designs.

Here is where RCA-8032 stands out. A cooler operating "Dark-Heater" offers these advantages in transmitter service: It delivers longer heater life—reduces chances of heater failure—cuts down on AC heater-cathode leakage and hum—minimizes changes in heater shape during life, reducing the possibility of heater damage and heater shorts.

RCA-8032 beam power tubes are sold through RCA Industrial Tube Distributors everywhere. For a technical bulletin, write: Section K-37-M, Commercial Engineering, RCA Electron Tube Division, Harrison, N. J.



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