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

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

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"It Seems to Us..."

HOME BREW

Nobody builds anything these days!

You may have often heard this comment lately. One recent magazine catering to the ham field makes its pitch on the basis of a crusade to "revive the lost art of home-brewing ham gear." Is the ham radio version of do-it-yourself really a lost art? Listening casually on the hambands, or at a radio club meeting or hamfest, you might get the idea that almost everyone buys ham radio in ready-made packages.

It ain't necessarily so.

How do we know? There are ways to find out. Next time you're with a large group of hams, ask the question: "How many here built some major portion of their station equipment, kit projects not included?" We'll bet that more than half will raise their hands. In some sessions we've found the showing as high as 90 percent.

Look in the Headquarters mailbag. Any day it can be counted on to contain a dozen or so letters asking technical questions. Most of these have to do with construction projects underway, or about to be started.

Consider the response to QST constructional articles. The 4-part series, "A Complete Two-Band Station for the V.H.F. Beginner," concluded in October QST, brought in an avalanche of mail, and it is still coming. Drilling templates for the principal surfaces of the tuner, transmitters and converters described in this series were offered free of charge if a stamped self-addressed envelope accompanied the request. We're still sending these out at the rate of two or three a day, after almost a year, and at last count more than 1000 envelopes had been stuffed with templates and mailed back to hams and would-be hams waiting impatiently to start drilling holes in boxes and cover plates. Interest in the project triggered off a demand for components to the extent that at least one manufacturer found it desirable to stockpile the specified items with his better distributors.

Take the case of a complex multiband transmitter built and described by WIJEQ some years ago. We're still getting mail on this one, yet we once thought it so complicated and costly that nobody would attempt building it. Vern's article brought in over 1200 pieces of mail, up to the time we stopped counting, and a substantial number of writers plunked down $5.00 for a set of prints from the original negatives. Surely these fellows were not just going to look at the pictures.

Even on as exotic an item as the "Ultimate" keyer, HQ received several hundred orders for an enlarged schematic drawing of what was a rather complicated circuit.

We used to think that hams build transmitters and buy receivers, but this is open to question, too. Note the rash of receiver articles in QST in the last few years, and the wide-spread enthusiasm for the HBR-14 and HBR-16. Author W6TQ still gets mail on the QST descriptions, now 5 and 3 years old respectively, from hams in the process of construction. "Hints & Kinks" items have appeared subsequently reporting minor improvements or modifications found by enthusiastic builders. Converters of various kinds are part of this picture of increased receiver-consciousness. Well over half of the template requests in connection with our v.h.f. station series are for the converters.

Nobody building anything? Don't you believe it! For more reasons than you might think of right away, a lot of people are collecting parts, drilling holes, wiring or testing a wide variety of home-construction projects, from field-strength meters to complete stations. These fellows are busy. You may not hear them on the air as you tune the hambands. They may even miss a few club meetings. But they are living through one of the great experiences of ham radio — the making of something that will eventually be a source of pride in a way that a store-bought package could never be. If you haven't sampled that feeling yet, you're missing something.

LEAGUE SUPPORT

Seldom has the true extent of membership backing of the League been so evident as in ARRL's two current campaigns for increased membership and a Building Fund.

In response to the "every-member-get-a-member" announcement in April QST, hams everywhere rallied to help the roster grow.

(Continued on next page)

1 This service is available on any piece of equipment built in the ARRL Laboratory, or photographed here. Prints are 8 by 10 inches, glossy, from the original QST negatives. The price is $1.50 each, postpaid. Templates, however, are available only when specifically mentioned.
It actually caused us some slight embarrassment, for our initial supply of "booster" pins was quickly exhausted, requiring an immediate re-order. These emblems are, we think, quite handsome and ones that members will wear with considerable pride. When you see a ham with an "ARRL booster" lapel pin, you will know he has done his part in the growth of the League. Have you done yours? April QST has the details and the form. You have until July 1st.

Early response to the Building Fund has been similarly gratifying. An interim report appears on page 65 of this issue. Particularly pleasing is the general reaction to the grassroots suggestion of $1 per year of holding a ham ticket. In sending one such contribution, a member said, "Have had this call for 34 years. Without ARRL, it is possible that I might not be able to say that. Hope the rest of the gang will look at it in the same light."

The real strength of the League lies in its membership support. With this kind of backing, ARRL — and ham radio — cannot fail.

WEST VIRGINIA STATE CONVENTION
Jackson's Mill, Virginia — July 7-8

An outstanding program of speakers and events is set for the ARRL West Virginia State Convention (formerly West Virginia Hamfest) at Jackson's Mill (near Weston) on U.S. Route 19. An expanded program this year will include many technical discussions, displays and demonstrations of electronic gear; also swimming, hiking, softball and other activities in the park-like setting of Jackson's Mill.

A Royal Order of the Wouff Hong Initiation is planned for midnight, Saturday. Presentation of the "West Virginia Amateur of 1962" award is to be made during the convention. Special activities are on the program for the women and children.

Registration is $7.00 per person; children, eight years old and under, $5.00. The fee includes dinner Saturday evening, breakfast and dinner on Sunday, lodging on Saturday night and admission to all convention activities. The lodging is dormitory style with separate cottages for the men and women. For those desiring more privacy, there are motels and hotels in Weston (three miles away) and Clarksburg (20 miles). Individual meals may be obtained at the Mill, provided the convention is not sold out. Tickets are being sold on a "first-come, first-served" basis. Registration tickets for $2.00 per person (without meals and lodging) may be purchased. Since the capacity of the dining hall and cottages is 400, the $7.00 ticket-registration is limited. When ordering a $7.00 registration, be sure to state male or female to assist the registration committee on cottage assignments. Registrations may be ordered from Ticket Chairman Paul Kesling, WSNYE, Box 1074, South Charleston, West Va., Keith Chambers, WSSSA, Box 62, Bluefield, West Va., or Don Morris, W3JM, 1111 Alexander Place, Fairmont, West Va.

Hamfest Calendar

California — The San Fernando Valley Radio Club will hold its 6th annual hamfest on Sunday, June 17, at Northridge Park in Northridge, Calif. The program will include transmitter hunts on 75, 6, and 2 meters, code proficiency awards, swap table, tube guessing contest, and games and entertainment for the children and YLs. Registration is $1.00. Bring your own lunch, but coffee and doughnuts, ice cream, and soda included in the registration. For further info, contact Larry Johnson, WAEKLQ, 16156 Tribune St., Granada Hills, Calif.

Georgia — The Atlanta Radio Club hamfest will be held June 2-3 at Lenox Square. No other details available.

Indiana — This was a late notice, but you may still have time to get to the third annual Columbus Amateur Radio Club ham picnic and swapfest, being held Sunday, May 27, at Donner Park, Columbus. Take along your family, friends, and a basket lunch. Refreshments also available in the park. Plenty of shelter and facilities. Registration $1.50. For further info, contact Scott Henkle, KDVYXZ, 2555 Thompson Drive, Columbus.

Iowa — The Iowa 100-meter picnic will be held at Newton on June 10. No other info available.

Kansas — The Hams Butcher Net picnic will be held at Leavenworth on June 10 — joint with Army and Air Force MARS. Everyone is invited. No other details at hand.

Kentucky — The 3rd annual Breaks Interstate Hamfest will be held at Breaks Interstate Park, Elkhorn City, Kentucky on June 10. Further info available from Jackie T. Hewlett, WA4EON, LaRue, Kentucky.

Kentucky — The annual Mo-Ark-Ry hamfest, sponsored by the Paducah Amateur Radio Club, will be held on Sunday, July 9, at Noble Park Community House, Paducah. This is an all-day get-together with a big noon meal. No registration fee. Entertainment for children and non-hams. For further info, contact U.S. Morris, WKKCH, 3528 Gregory Ave., Paducah.

Maine — The 6th annual Augusta hamfest, sponsored by the Augusta Amateur Radio Club, will be held on June 17 at the Cruise Club, highway 101 North, West River Road. Doors open at 0900, turkey dinner served at 1200. Advance registrations prior to June 15 at $3.00; at the door $3.50. Children under 12, $2.50. Net meetings, mobile hams, swap table, informal dance at the Club the previous evening. Send for reservations and overnight accommodations to Wilfred E. Lemire, WIVXU, 181 Camp St., Augusta, Me.

North Carolina — The 5th annual Charlotte hamfest will be held Sunday, July 1, at the National Guard Armory, Municipal Airport, Charlotte. Activities for hams and family. Barbecue lunch. Tickets are $3.50 per person, except $1.25 for the lunch only or for children.

COMING A.R.R.L. CONVENTIONS

June 1-3 — Southwestern Division, Anaheim, California.
July 7-8 — West Virginia State, Jackson's Mills (near Weston).
July 21-22 — Rocky Mountain Division, Denver, Colorado.
August 3-5 — West Gulf Division, Corpus Christi, Texas.
September 1-3 — ARRL National, Portland, Oregon.
September 1-3 — Delta Division, New Orleans, Louisiana.
October 13 — Hudson Division, New York, N. Y.
October 19-20 — Ontario Province, Toronto.
Chuck Kunze, WØWVM, hard at work in his satellite-tracking shack. At his left hand are three switches for azimuth and elevation control of his beam, and lobe switching for accurate fixes. The black and white disk is the face of the high-accuracy azimuth indicator. Converters for 108, 136 and 144 Mc, communications receiver, tape recorder and typewriter are also visible. In addition to taping signals, Chuck "talks to himself" on the tape recorder in order to log information in greater detail than would be possible by more conventional methods.

Right from the launching of Sputnik I in 1957, WØWVM has been listening to satellite signals and gathering all kinds of data from them. On 20 and 40 Mc, on 108 and 136 Mc, and finally with Oscar I on 145 Mc, Chuck very likely has run up as many hours of satellite listening as any amateur in this field. Along the way he has come up with many ingenious ideas for antennas and tracking devices. Here are a few of them, of interest to the earth-oriented user of beams, as well as to the would-be space communicator.

Space-Age Antenna Ideas

Practical Hints for Oscar, Echo or Moonbounce Arrays

BY E. C. KUNZE,* WØWVM

The launching into orbit of Oscar I opened to hams everywhere an opportunity to build a foundation of technical knowledge and experience necessary to push the frontier of ham communications far beyond any dimension even dreamed of a few years ago. In the five years since the sudden arrival of the space age, possibilities have become practicalities: Buck Rogers fiction has become fact. Now, with more Oscars earmarked for hams to handle, we can contribute directly to a challenging project. In the coming space age, as before, hams will no doubt continue to provide ideas, techniques, and facilities to improve and simplify present methods of communication.

Many hams in the United States have already been exposed, in varying degrees, to such space-communication experiments as moonbounce, satellite tracking, deep-probe monitoring, ion cone reflection attempts, and so on. Those who followed the Soviet efforts on 20 and 40 Mc. have become familiar with the mechanics of orbits, Doppler effect, ionospheric refraction, intensity levels, and other related details. From experience gained in five years of rather intensive activity in satellite tracking and in the design and construction of the equipment necessary for such a project, I have learned a number of things which might be worthwhile passing along in the form of hints and kinks or simply for comment and comparison by other hams.

Satellite Listening Before Oscar

Here at WØWVM, all satellites carrying transmitters on the 108-Mc. band have been tracked intensively. The log book and tape recordings show information on hundreds of satellite passes. Tracking in the v.h.f. region differs from lower-frequency Sputnik-type tracking in that the higher frequency necessitates the use of low-noise, high-gain converters ahead of the communications receiver. Accurate tracking with the use of highly directional antennas is, however, far easier to accomplish in the v.h.f. region.

At the time of launching of 1958 Alpha (Explorer I) in early 1958, a small stacked beam was used to pull in the signals when the satellite passed to the south of WØWVM or near its 33-degree north vertex. Many checks were run on the Explorer I low-power transmitter in an effort to determine how propagation was affected by distance, elevation, time of day, terrain at the sub-satellite point, etc. Vanguard I provided the opportunity and necessity to start looking up instead of on or near the horizon (at apogee it is about 60 degrees above my southern horizon). A series was run to determine the solar power blackout pattern. Circular polarization was tried in the effort to smooth out the spin pattern. The long-term torque transfer effects on the signal were noted.

Tracking of Explorer IV provided a few tapes showing effects of Project Argus — which experiment was not announced until a year later. The paddle-wheel satellite was followed over

* 2905 Arona St., St. Paul 18, Minn.
the hump at least once and the retrogression effect at apogee was noted. Paddle-wheel at apogee required the use of a high-gain antenna, provided with azimuth and elevation controls. With parallax, the DX was something over 26,000 miles and was, incidentally, just within the capability of the receiving system.

Echo I gave a chance to check the accuracy of the system used to take radio fixes on the various satellites. All sightings by radio, naked eye, and optical instrument provided enough data to predict meridian crossings for a week or two later.

On 136 Mc., several Discoverer satellites have been followed for the purpose of getting the feel of tracking in a near-polar orbit. Currently a fix is taken occasionally on Courier and Tiros III on 108 Mc. and on Transit IVa and IVb, TRAAC and Tiros IV, all on 136 Mc.

The helical antenna used on 1958 Beta showed the advantage of being able to point the array above the horizon. Magically, the noise arriving horizontally would disappear and it became much easier to pull through the very low-power signals. This experience led to the construction of the pair of 8-element horizontally-stacked Yagis capable of being rotated both in azimuth and elevation from the ham shack. A lobe-switching facility was added to improve the accuracy of the fixes taken with the system. The lobe switcher immediately proved its effectiveness and will be described in detail later.

The Oscar Antenna

The antenna system designed for the Oscar project is quite similar to the tracking antenna used on 108 Mc. Improvements have been made to insure added strength, higher efficiency, and more precise direction control and indication. The antenna proper consists of two 9-element Yagis, stacked 9½ feet apart in parallel planes perpendicular to the horizontal cross boom. The cross boom and the booms carrying the elements are 10-foot lengths of 1½-inch diameter TV mast sections. The configuration can be considered as being vertically polarized when at zero degrees elevation.

The method used to mount the Yagi booms near the ends of the cross boom is simple and effective. Four-inch diameter circular steel plates are drilled to hold four U bolts, each pair lined up at right angles to the other. Variations of this method are shown in v.h.f. antennas described in the ARRL Antenna Book. To fasten the elements to the Yagi boom, 2-inch sections of aluminum U-channeling are force-fitted over the 1½-inch boom and fastened to it with two sheet-metal screws. The elements can then be mounted on the flat center section of the channel material with metal straps, and the feed sections of the dipoles supported on ceramic standoff. No drilling through the elements is necessary. Caution—any unplated steel parts must be protected against rust. A base of rust-preventing paint, covered with a mixture using equal parts of white enamel and aluminum paint, is satisfactory and wears well.

Folded dipoles and balanced feeders are used to insure that there is no skewing of the lobes due
to unbalanced currents being induced in the line runs. Each antenna is assumed to present a basic impedance of 19 ohms. The folded dipole is made with 3/8-inch tubing and the 4-to-1 step-up ratio (characteristic of the folding) brings the effective input impedance close to 75 ohms. Each dipole is fed with two RG-50/U cable sections, the inner conductors providing a balanced 150-ohm impedance. The outer conductors are simply connected together at the ends and grounded.

The physical length of the pair is such that the electrical length is an odd multiple of a quarter wavelength. Any convenient number of half wavelengths repeats the impedance of the dipole. The additional quarter wavelength acts as a linear transformer. As the characteristic impedance of this transformer section is 150 ohms, it will act to transform the repeated antenna input impedance of 75 ohms to 300 ohms according to the formula \( Z_{02} = \frac{Z_0^2}{Z_1} \). The main line run can then be 300-ohm ribbon. The reason for using pairs of coax at the antenna end is that the outer conductors provide a fixed impedance to ground, and the pairs can be run along or through booms and around rotators without upsetting the \( Z_0 \) or introducing losses.

Random but equal lengths of 300-ohm Twin Lead are run into the shack. The lobe-switching device is connected at this point, and another matching transformer section is inserted to bring the impedance to approximately 200 ohms. Then a balun made of 50-ohm coax converts the impedance to an unbalanced 50 ohms for connection to the receiver and/or transmitter. The transmission-line system is shown in Fig. 1.

**El-Az Control**

In addition to having an efficient antenna and transmission-line system, it is important that the rotation, control, and indicating mechanisms be designed to provide control in both azimuth and elevation, and to give an accurate indication of the direction the antenna is pointing. Provision for changing the angle of elevation from the horizon to zenith is desirable for several reasons: (1) Noise generally comes into the antenna from the horizon. Elevating the antenna, in say, 15 degrees above the horizon will attenuate such noise to a great extent. (2) Most passes that are appropriate for tracking are at angles above the horizon and, of course, are at times overhead, so with elevation equipment a good solid signal can be maintained at all times. (3) Making provision for elevation cuts the antenna in the running for tracking deep space probes, moonbounces, and other experiments involving weak signals, such as communication via passive satellites.

The mechanical system on our Oscar antenna consists of three Alliance T12 rotators, one to provide elevation, the other two in tandem to provide azimuth rotation. This type of rotator is useful in several ways: (1) A mast section can be slipped through the rotating mechanism. This is handy when designing elevation facilities. (2) The worm-gear drive has less play than a spur-gear type. (3) The action is smooth, sufficiently fast (1 r.p.m.), and is (in my experience) trouble-free. (4) The fact that the worm turns 30 times during one revolution of the main drive to the antenna can be used to advantage in designing a highly accurate direction indicator. (5) As there are no switching impulses set up in the control unit, the system is quiet electrically.

The horizontal boom supporting the two Yagi antennas is driven at the mid-point by one rotator. TV-type mast bearings are added to give more stability to the cross boom and to prevent teetering. The elevation rotator is fastened to the azimuth mast by appropriate hardware.

For rotation in azimuth, two T12 rotators are used. This provides double torque and double holding power at rest. About two feet of masting
must be allowed to project above the top rotator in order to provide some torque take-up to relieve strain on the mechanisms. The azimuth rotators are controlled from the shack by simultaneously switching both control units. This is done by running the control contacts out to a d.p.d.t. key switch with spring return to the center off position.

The elevation rotator is controlled by the rocker switch on the control box, and the rough elevation reading can be taken from the magnetic balance pointer on the unit. Azimuth accuracy is important in the Oscar project or in any other tracking-project work, so a far more accurate system is called for.

**Getting Accurate Fixes**

Why the accurate indicating equipment when the antenna itself has a broad lobe (25-30 degrees to the half power points)? The lobe switcher mentioned earlier is used to get accurate fixes by the flick of a switch. It is of the utmost simplicity. Remember, each Yagi has a transmission line running all the way into the control room. Ordinarily these two line runs would be connected so as to put the two antenna segments in phase, thereby realizing a gain of about 3 db. If, however, the connections are reversed, the two antennas will be 180 degrees out of phase. Then, instead of a major lobe off the front end of the system, there will be a major null. This null is many times sharper than any major lobe that can be set up by having even an outlandish number of in-phase antenna segments. Experience has shown that with a well-designed system, this null is accurate to the vicinity of a degree.

Some satellites under certain conditions provide signal strengths as high as 30 db, above the noise level. Even under such a strong-signal condition, switching to the null position will cause the signal to drop into the noise and be undetectable for a few seconds, until the satellite begins to move out of the null. The signal then increases in intensity rather quickly because the slope of the null is so very steep. In the out-of-phase, split-lobe condition, the antenna has a pair of lobes adjacent to the null, about 25 angular degrees apart. The gain of these split lobes is down about 3 db from the major in-phase lobe. That fact should not be interpreted as a deficiency in the system because, with 8 or 9 elements on the individual segments, there still remains a gain of 10 to 12 db over a dipole.

I suspect that the use of a lobe switcher becomes of even more value in the case of a pair of low-gain segments; say, 3 or 4 elements on each boom. The in-phase lobe would be very broad in that case, but the null would be just as deep, even though the split lobes would be wider apart angularly, and the slopes would not appear to be as steep.

In addition to being of value in taking fixes during ordinary passes at medium distances and lower angles of elevation, the lobe switcher can be used to advantage in proving a zenith or near-zenith pass. The method that has been used here is to slew the beam 90 degrees to the direction of approach and to raise the elevation to 90 degrees straight up. Then, when the satellite passes through the null, an accurate fix can be taken. This method was used because it is virtually impossible to follow a low overhead pass because of the high angular velocity of the satellite.

**High-Accuracy Indicator**

Now that an accurate fix can be taken, it is necessary to design indicating equipment to at least an equivalent degree of accuracy. The simplest servosyn system calls for a unit coupled to the rotating mast, and a mate at the control room to repeat the reading. By experimenting extensively with such a setup it has been found that the necessary accuracy simply cannot be obtained. The system is seldom within 5 per cent of the actual, and it is virtually impossible to return to any given orientation with an accuracy of better than 10 or 15 degrees.

This is where the worm-gear drive in the T12 rotator steps into the picture. It turns 30 times for each revolution of the mast. Making up a torque take-off from the worm is not hard to do.

A hole was drilled into the end of the worm shaft in the lower azimuth rotator, and an extension shaft of small dimension was force-fitted into the hole and brought out through the white metal housing. This extension was connected to a sur-

Close-up view of the elevation rotator. The conventional TV unit is stabilized through the use of shaft bearings at either side. The main cross boom runs through the rotator.
High-accuracy azimuth readout system, ingenious yet relatively simple combination of selsyns and clock mechanism gives an indication accuracy of about plus or minus 1 degree. Elevation, azimuth and antenna lobe switches are on the plywood panel at the right.

the antenna and the control units. Telephone cable containing 41 pairs of about No. 20 wire is used here, with pairs used in parallel in order to reduce the $\frac{L}{R}$ loss. No phase-shift effects have been noticed in the selsyn circuit even though the units are 75 feet apart. The accuracy of the entire system is about ± 1 degree.

Such equipment will make your tracking project more interesting and certainly more accurate. After following a few passes of an Oscar, you will find that you will be able to manipulate the system with surprising accuracy. The system provides the basic requirements for an effective v.h.f. tracking setup. The antenna proper has the gain necessary to bring in substantial signals even at extreme distances. Strong, accurate rotating and indicating equipment will guarantee that the gain of the system is being used to advantage. A lobe switching device will prove that the antenna is looking at the satellite. In the later and more challenging phases of the Oscar Project, and in work with the projected Echo A-12, an efficient and versatile system will be of even greater value.

Some Thoughts on Polarization

Vertical or horizontal polarization has no meaning for a satellite in space. For us, “vertical” can be taken as linear polarization perpendicular to the plane tangent to the surface of the earth at the antenna location, when the system is looking at the horizon. When looking at a satellite in orbit, polarization can be considered only as linear in a certain direction with respect to the attitude of the satellite at a given moment. This complicates matters, but it provides a handy tool for picking up additional information on the various attitudes of the vehicle.

During the first two weeks of Oscar I there was no particular difficulty in acquiring on the northbound passes using vertical polarization.

Fig. 2—Patterns available with the lobe-switching device used by W0WVM. When the Yagis are in phase the pattern is the normal one shown with a solid line. Switching the buays 180 degrees out of phase results in a very sharp null between split lobes, shown in a broken line. The null provides a very close check on the position of a signal source, when high-accuracy indicating devices are employed.
During the third week a trend became noticeable. By this time W0AUS and W0JHS were deep in the project with horizontal polarization. Both were beginning to acquire earlier and hold longer than I was, and it dawned on me that Oscar’s attitude might be changing to favor horizontal. On Dec. 20 (northbound) I had sporadic results. On the 30th I had negative results on a pass to the east. W0AUS and W0JHS were getting progressively better results!

Equipment and antenna checks showed nothing wrong, so I set up a 14-element horizontal beam fixed northwest, for a Dec. 30 pass to the west. The path was followed with the vertical until both systems were looking at Oscar. There was no signal on the vertical up to this time, but the signal pounded in on the horizontal. Switching back to vertical, the signal was heard, but down at the noise level. After Oscar walked out of the fixed horizontal beam’s pattern the signal was detectable for some time with vertical, by tracking.

Southbound passes during this time should have become easier to acquire with vertical. During the interval between the early western pass mentioned above and the daylight pass to the east, Oscar’s keying went bad and the signal level dropped markedly, yet acquisition was made on the southbound pass to the east, and the pass following it. Results were not good, but they were better than the horizontally-polarized boys were able to achieve. None of them heard the 9:50 A.M. pass, but W0AUS held a few seconds on the next one. On the 31st (daylight) I held one pass for 6 minutes, when AUS and JHS held in only briefly.

Conjecture on Oscar’s orientation in space was that the satellite was not spinning on the axis of the antenna, but in a plane perpendicular to the axis of the antenna. (The antenna was spinning like a propeller.) Northbound over the USA, the plane of spin was nearly parallel to the plane tangent to the earth’s surface, but southbound the plane of spin was nearly perpendicular to the plane tangent to the surface of the earth.

Note that this is all conjecture, but it fits the evidence. It triggered off a train of thought and preparations for the next Oscar. Shortly before Oscar I was officially pronounced dead I had a chance to play with the orientation of the elements in the antenna. The left-hand boom was turned 45 degrees in a clockwise direction, and the right-hand boom the same but counterclockwise. This made the plane of the elements part of the two sides of an isosceles triangle, with its imaginary base horizontal.

This reorientation was made while I was under the impression that the lobe-switching facility would probably be destroyed, but such was definitely not the case. It developed that with this cross-polarized arrangement a major lobe responsive strictly to horizontal polarization is obtained with the booms 180 degrees out of phase. A major null is realized when the booms are switched in phase. Lobe effects with vertical polarization are exactly the reverse of this. These facts were confirmed in observation of the 2-meter signal of horizontally polarized W0JHS, and the vertical signals of the Minneapolis taxi cab service. (It’s more fun tracking Oscar than cabs!)

It seems likely that, with elements realigned this way, the use of a 90-degree line segment and appropriate switching facilities would provide for circularly polarized reception with either right-hand or left-hand sense. This would be handy for tracking an Oscar having a circularly polarized antenna, and for moonbounce or satellite-reflection work, where Faraday rotation is a problem with linear polarization.

1 Late report: this has been tried and found to work nicely.
Recent Trends in Receiver Front-End Design

Noise Figure and Cross-Modulation Characteristics of Tube and Transistor Front Ends

BY E. A. ANDRADE,* WDAN

Building a receiver for immunity to cross-modulation calls for compromising on other desirable features. Here is a discussion of receiver front-end design that the man who makes his own can't afford to miss.

Earlier QST articles, 1,2,3 have painted a fairly comprehensive picture of the performance to expect of a modern high-quality communications receiver. Superheterodyne front-end performance has certainly come a long way from the days of the National FB-7 (a very advanced receiver for its day, indeed!), with its two 20-meter bands 910 kc. apart, to the modern double-conversion crystal-controlled s.s.b. receiver.

Two recent trends in receiver design, the band-passed front end and the transistor front end, will be discussed in this article. Means of minimizing some of the problems will also be discussed.

Before proceeding, it might be well to review the requirements for a good communications receiver r.f. section.

Sensitivity

The receiver must have enough amplification to make the weakest signals audible in the loudspeaker. Such amplification is fairly easy to attain in the modern superheterodyne, where gain may be obtained at several different frequencies. The gain can be relatively low at any one of the frequencies, so gain stability is not a serious problem. The gain from antenna to loudspeaker in a typical communications receiver may be as high as 10 million.

However, all this gain will not allow the operator to copy a weak DX signal unless the signal-to-noise ratio is adequate. This means that the noise contributed by antenna coupling circuits, r.f. amplifiers and mixers must be held to a minimum.

The best way to express receiver sensitivity is either in terms of signal-to-noise ratio or — even better — in terms of noise figure.

It is generally agreed that in the h.f. spectrum (2 to 30 Me.) a noise figure of 6 to 7 db. is all the sensitivity that can be used because of the masking effects of antenna noise, provided that a matched antenna system is used. In our discussion we will consider this sensitivity adequate. For a further discussion of noise figure, see references 1 and 2.

Cross-Modulation

Unfortunately, adequate gain and sensitivity are not the entire story in a communications receiver. An often neglected area of front-end design is its performance in the presence of strong signals out of the pass-band.

If we are listening to a weak DX signal with and S-meter reading of, say, 82 and a strong local comes on the air, perhaps 50 kc. removed from our DX station's frequency, the modulation of the undesired signal may appear on the weaker

One way of assembling a 20-db. 50-ohm pad for checking receiver cross-modulation. The pad should be shielded to prevent stray pickup, and the construction should be such as to minimize capacitive coupling between the input and output connectors.

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signal. This effect is known as cross-modulation. In the case of single-sideband signals, the splatter that you have been blaming on the other fellow's signal could be generated in your own receiver by its cross-modulation.

Another effect, closely related to cross-modulation, is desensitization, or blocking. This occurs when a strong off-channel signal actually drives the r.f. amplifier or a mixer into grid current so that the tube biases itself toward cutoff. Generally, if the cross-modulation capabilities of a receiver are adequate there is no trouble from blocking effects.

Cross-modulation performance of a receiver is usually plotted for a fixed level of desired signal in the passband against various levels of undesired signal that cause cross-modulation 10 db. below the desired-signal audio level.

If you suspect that your receiver is cross-modulating, an easy check may be made by inserting a 20-db. pad between the receiver and the antenna. The desired signal is usually strong enough so that it may still be heard. However, if the interfering signal is the result of receiver cross-modulation, it will disappear when the pad is inserted. Fig. 1 gives the circuit and values for a 20-db. pad.

The Band-passed Front End

A considerable simplification in the tuning mechanism of a multiple conversion receiver may be accomplished by replacing all signal-frequency tuned r.f. circuits with suitable broad-band transformers, usually designed just to accommodate one ham band. The receiver band switch then selects the proper transformer for the desired band. The reduction in mechanical complexity is certainly very attractive, particularly to the home constructor. Unfortunately, a serious penalty in cross-modulation performance, and to a degree sensitivity, is incurred.

Curve D in Fig. 2 shows the cross-modulation of a typical commercial receiver having a broad-band front end, compared to one (Collins 75A-4) which uses two tuned circuits at r.f., Curve B. The curves were taken with a 5-μv. desired signal, both the desired and undesired signals being fed to the 50-ohm receiver input. For undesired signal levels of 0.1 to 1.0 volt, the cross-modulation occurs essentially in the r.f. amplifier tube of a tuned receiver. In a broad-banded receiver it usually occurs in the first or second mixer. Cross-modulation of undesired-signal levels below 0.1 volt generally occurs in the mixer stages, in a tuned receiver, unless extremely low r.f. amplifier gain and very high antenna-coil gain are used. The noise figure of the broad-band receiver was considerably poorer than the 75A-4, as a result of a compromise in antenna-coil gain in order to minimize cross-modulation as much as possible.

The poorer performance of band-pass circuits would be most noticeable on the three lower-frequency bands, 3.5, 7, and 14 Mc. As the signal frequency is increased, the effective selectivity of the simple r.f. tuned circuits decreases. At 30 Mc., with an operating Q of 40 in each tuned circuit, the 6-db. response points with two tuned circuits would be 1.4 Mc. apart. Thus at this frequency there is very little choice between the band-pass characteristics of the usual two-tuned-circuit r.f. amplifier and mixer, or the band-passed system.

Let's say that in spite of the problems outlined above, we've decided to build that "dream receiver" with broad-band r.f. circuits, in the interests of simplified home construction. What can we do to minimize the problems? Cross-modulation is caused by two factors: lack of selectivity, and insufficient dynamic range in the r.f. amplifier and mixer tubes. We have sacrificed front-end selectivity for broad-band r.f. circuits, but if we are able to find some tubes with a very low equivalent-noise resistance, we can use low antenna-coil and r.f.-amplifier gain. This would have the same effect as increasing the dynamic range of the tubes, thereby allowing us to handle stronger undesired signal levels than previously. While the same approach applied to a tuned receiver would provide outstanding strong-signal performance, a fairly
acceptable band-pass receiver could be built.

Fig. 3 shows a rough schematic of such a front end. A 6386 remote-cutoff dual triode, with both sections in parallel, was selected for the r.f. amplifier. The plate load for the 6386 is very low, about 200 ohms. This keeps the voltage gain between the grid and plate less than unity, and no neutralization of the r.f. stage is necessary. Voltage gain to the mixer is obtained in the broad-band coupling transformer. A transformer voltage gain of 5, combined with a tube voltage gain of 0.8, provides an overall r.f. stage gain of 4, which is adequate to overcome the mixer noise.

When setting up the transformer, adjust primary turns and coupling for a voltage gain of 0.8 from grid to plate of the 6386. Then recheck the secondary voltage to make sure there is a gain of 5 in the transformer.

The mixer is the triode half of a 6U8 or one section of a 12AT7, with cathode injection. These tubes used as mixers have an equivalent noise resistance of about 2000 ohms, compared with 60,000 ohms in a pentagrid mixer such as a 6147. It is this low mixer noise resistance that allows us to use a total r.f. stage gain of only 4 and still realize a 6.5-dB, over-all noise figure. To accomplish similar sensitivity with the 6147 as a mixer would require an r.f. stage gain of nearly 25. This would result in severe degradation of mixer cross-modulation performance because of the very high levels of undesired signal that would appear at the mixer grid.

By using no more antenna-coil gain than is necessary to provide our 6.5-dB noise figure, we keep undesired-signal levels relatively low at the r.f. amplifier grid. The 6386 equivalent noise resistance under these operating conditions is 750 ohms, including the effect of first-mixer noise. An antenna-coil voltage gain of 5 will satisfy the noise-figure requirements.

The broad-band version of this front end has not been breadboarded to date. However, the tuned-version cross-modulation is shown in Fig. 2, curve A. A projected curve, C, based upon the gains and known cross-modulation levels in the tuned circuit, indicates the performance to be expected with broad-bandning.

A word of caution is necessary concerning the injection signal for the triode mixer. To fully realize its low noise resistance, it is quite necessary to have a low-noise injection system as well as a source impedance of 50 ohms or less. The most troublesome noise in injection sources is generally the white noise occurring at intermediate frequency. In most cases a parallel-tuned i.f. trap, inserted in the lead to the mixer cathode, is sufficient to reduce this noise to an acceptable level (L1C1 in Fig. 3). If a variable i.f. is used following the first mixer, it may be necessary to substitute a high-pass filter with a cutoff frequency below the lowest injection frequency.

A simple way of checking source impedance is to connect the r.f. probe of a v.t.v.m. across the unloaded output circuit of the injection oscillator. Then try different values of resistance across the output circuit, looking for the oscillator voltage to drop to one-half its unloaded value. The resistor value that causes this to happen is equal to the source impedance of the oscillator.

The Transistor Front End

Certainly a general article on receiver design these days should include a discussion of transistorized circuitry. Unfortunately, although it is fairly easy to obtain excellent sensitivity with the newer r.f. transistors, there is a severe limitation on strong-signal performance. In fact, unless a very severe reduction in sensitivity is accepted, a transistor front end may be expected to cross-modulate with 20- to 30-dB, less undesired signal than an equivalent tube receiver. A typical transistor receiver cross-modulation curve is shown in curve E, Fig. 1.

Textbooks tell us that there is no significant difference in the noise figure of a given transistor in any of the three amplifier configurations: common base, common emitter, and common collector. This has been pretty well confirmed in practice as well as theory.

It is now possible to attain a transistor noise figure of 4 db, as high in frequency as 200 Mc., with transistors in the three- to five-dollar class, thus making a 7-db. noise figure in the 3- to

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30-Mc. range a relatively easy job. It should also be possible to design some excellent 6- and 2-meter portable equipment using these types. Some transistors that will do this job are the Philco types 2N1742, T2012, and T2028, Texas Instrument types 2N2189 and 2N2191, and the Amperex Universal type 2N2081.

In order to realize the best noise-figure capabilities of an r.f. transistor, careful attention must be paid to both the recommended collector current for minimum noise figure and the recommended source impedance. The source impedance for minimum noise figure is generally near the value of the input impedance of the transistor in the common-emitter configuration. This value does not change significantly when the transistor is used in the other amplifier configurations. Fig. 4 shows how collector current and noise figure of the Philco 2N1742 are related.

Fig. 5 is a schematic of a typical common-emitter r.f. stage and mixer stage using the 2N1742 and 2N1743. The r.f. stage available power gain is partly a function of frequency, and varies from 45 db. at 3 Mc. to 35 db. at 30 Mc. A noise figure of 7 db. is attainable if the coil tap to the transistor is set to match the input impedance of the transistor. A collector current of 3.5 ma. corresponds to the recommended value for minimum noise figure, and is adjusted by selecting the proper value for \( R_1 \) (approximately 12,000 ohms).

![Transistor r.f. amplifier and mixer circuit. Capacitances are in \( \mu \text{f.} \), except as indicated; resistances are in ohms; resistors are \( \frac{1}{2} \) watt. See text for adjustment of antenna coil tap. Interstage coil center-tapped.](image)

- **C1**: Selected for desired r.f. stage gain; typically 7 \( \mu \text{f.} \)
- **R1**: Approximately 12,000 ohms; adjust for 3.5-ma. collector current.
- **R2**: Approximately 18,000 ohms; adjust for 1.0-ma. collector current.

Fig. 6 is a plot of input capacitance and input impedance vs. frequency, for various values of collector current, for the 2N1742. If the 2N1742 is used in the 3-30-Mc. frequency range, neutralization will probably not be necessary. However, if it is used at higher frequencies than 30 Mc., it would be desirable to add the network shown dotted in Fig. 5, to realize maximum power gain and minimum noise figure.

**Cross-Modulation in Transistor R.F. Stages**

As stated previously, cross-modulation is a serious problem in transistorized receivers. R.f. transistors have an inherently limited dynamic range and will cross-modulate with some 20- to 30-db. less signal than a tube stage. Although to date no one has come up with a good answer to the problem, there are a few design tricks that help to minimize it.

The most simple device to minimize cross-modulation would be a 20-db. attenuator with a switch to connect it between the antenna and the receiver input stage when a strong off-channel signal is cross-modulating. Perhaps this sounds a bit agricultural, but it works, provided the desired signal is strong enough to overcome the 20-db. loss. Admittedly, this ruins the noise figure of the receiver, but there's not much point in having a 6- or 7-db. noise figure when a strong local is wiping out the whole band.

A more exotic way of improving the r.f.-stage cross-modulation would be to improve the r.f. selectivity by using two or even three tuned circuits ahead of the r.f. transistor. Noise figure would suffer to a degree, but this is a compromise that the receiver designer is frequently required to make, even in a tube receiver.

Another means of improving the cross-modulation is to introduce degeneration in the emitter lead of a common-emitter r.f. stage. Caution must be exercised to assure that no more than 3 or 4 db. of degeneration is used, or the noise figure will deteriorate excessively. Other negative feedback schemes have been considered, but
stability becomes a problem if any great amount of r.f. feedback is used.

**Transistor Mixers**

A transistor used as a mixer will generally provide about 3 db. less gain than the same transistor operated as an r.f. amplifier. This is considerably different than tubes, where the conversion gain is approximately 25 per cent of the tube's gain as an amplifier. R.f. gain in transistor front ends must be held to the minimum consistent with the desired noise figure, just as in a tube r.f. section; otherwise, mixer cross-modulation will become excessive.

A 10- to 12-db. mixer noise figure is fairly common for transistor mixers such as the Philco 2N1743. In order to realize this noise figure, careful attention must be paid to the recommended collector current and oscillator injection power requirements for the particular transistor being used. Fig. 7 shows the effect of collector current on noise figure, and Fig. 8 shows oscillator injection power vs. mixer gain.

The formula for computing the effect of mixer noise figure on r.f.-stage noise figure is

\[
F_{AB} = F_A + \frac{F_B - 1}{A}
\]

where \(F_{AB}\) is the total noise figure, \(F_A\) is the noise figure of the r.f. amplifier, and \(F_B\) is the noise figure of the mixer. These are expressed as power ratios. To get the noise figure in db., take 10 times the \(\log_{10}\) of the power ratio. \(A\) is the power-gain ratio of the r.f. stage including all coupling losses between stages. A numerical example is given below:

\[
F_A = 4 \text{ db.; power ratio} = 2.5
\]
\[
F_B = 10 \text{ db.; power ratio} = 10
\]
\[
A = 10 \text{ db.; power ratio} = 10
\]

\[
F_{AB} = 2.5 + \frac{10 - 1}{10} = 2.5 + \frac{9}{10} = 3.4
\]

10 \(\times\) \(\log_{10}\) of 3.4 = 5.3 \(F_{AB}\) = 5.3 db.

The noise figure (5.3 db.) is now referenced from the base of the r.f. amplifier transistor. Antenna-coupling-circuit losses must also be considered in determining the over-all noise figure of the receiver. Although it is possible to compute the over-all noise figure including the antenna-coil tuned-circuit losses, it becomes somewhat involved because three variables affect it. These are the losses inherent in the tuned circuit (Q), losses due to mismatching, and the effect on transistor noise figure with change in source impedance. The computation of this is somewhat beyond the scope of this article. However, a good approximation may be made by setting the transistor tap on the input coil to match the input impedance of the transistor, measuring noise figure, and then moving the tap as close to the ground end of the coil as you can get, while still maintaining a 7-db. noise figure. This will keep signal levels to the r.f. stages as low as possible, thereby minimizing cross-modulation.

Needless to say, it is very desirable to use as high a tuned-circuit coil Q as possible in order to maintain the maximum r.f. selectivity for best cross-modulation performance.

**Automatic Gain Control**

The choice of an a.g.c. system in transistorized r.f. sections may have a considerable effect on cross-modulation characteristics of the receiver. In general, "forward" a.g.c., which reduces

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(Continued on page 184)

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In a previous article we described plans for the launching this year of NASA's "bigger and better" passive communications satellite, Echo A-12, and those station modifications that will be necessary for advanced v.h.f. operators to make use of the satellite. To review briefly, Echo A-12 will be a 135-foot inflated sphere constructed of laminated aluminum foil and Mylar, launched into a circular polar orbit of approximately 800 miles altitude. The scheduled launch date has been postponed, and the orbital attempt from Vandenberg Air Force Base, California, is now slated for the third quarter of 1962. A sub-orbital test of the new Echo balloon is slated to go from Cape Canaveral late in June. W1AW will carry news of both firings as they approach.

The purpose of this article is to discuss sporadic enhancements of the reflected signal which offer the possibility of greatly increased DX for the best-equipped stations, and an opportunity for contacts that those not so well equipped could not be expected to occur by normal passive reflection from the satellite.

But first, an important correction:

On Circular Polarization

In the discussion on standardized circular polarization in the April article we said that a plus-sign antenna which transmits clockwise will receive counterclockwise. This is true, from the antenna's own point of view. However, as seen by the incoming wave, the clock is turned around, and what was counterclockwise to the receiving antenna is clockwise to the wave. Since the convention goes with the wave and not with the antenna, we should have said that a quadrature-fed antenna constructed according to the article will not only transmit clockwise, but receive that way as well.

Inasmuch as the sense of rotation is reversed upon reflection of the wave from the moon or a satellite, the clock convention means that our standardization section was wrong, and oppositely-polarized antennas must be used. This means that if you are using the feed system described in the April article, which receives and radiates clockwise, then any station wanting to work you via reflection must use a counterclockwise antenna (or vice versa). Don't neglect this in setting up your schedules!

The antenna's sense of rotation can be reversed at will by using identical stacking harnesses to make separate antenna systems out of the horizontal and vertical elements of the plus-sign array. Then run a line from the station to the vertical array, and a second line from the station to the horizontal array. These lines must be exactly the same length. At the station end connect a quarter-wave phasing section between the two. By transferring the transmitter feed from one end of the quarter-wave line to the other the direction of rotation can be reversed.

Propagational Anomalies

From work conducted on satellite-ionization phenomena at other frequencies, we know that whenever a satellite encounters enough ionized particles moving at high enough relative velocities, the resulting interaction produces a reflecting region or cloud. Depending on the kinetics of the situation, this sporadic cloud may either travel with the satellite or break up into fast-moving trails. Also, magnetic field perturbations may enable the ion clouds to coagulate and move slowly away from the satellite, or even form far from the satellite to begin with. Such traveling ion cloud effects have been observed by radar. In the case of Echo A-12, we may consider such signal-enhancing phenomena as resulting from four principal causes: The re-entry sheath, spread-F clouds, auroral clouds, and fast-moving radioactive streams.

The Re-Entry Sheath

In a satellite's last days or hours, the above conditions are often met, and a highly-ionized plasma sheath is formed around the satellite. Signal enhancements resulting from the re-entry sheath may be expected to exhibit Doppler shifts at, or fairly close to, the predicted passive-reflection frequency, with the discrepancies, if any, caused by the traveling ion clouds. Although coherent reflections from ion concentrations of this type have been observed, be on the lookout for some form of garbling in the sound of the c.w. note. This is more common.

Spread-F Clouds

At night, the F layer has exhibited a tendency to break up and form patches of ionization, known

as the spread-F phenomenon. In the later stages of the satellite’s life, interaction with particularly intense spread-E clouds may produce enough interjection to result in signal enhancement. Little quantitatively is known about this one. In theory, Doppler shifts should again be at or close to predicted values, with some garbling possible.

Auroral Clouds

There are two things which contribute to satellite ionization interactions — the number of electrons striking the satellite per second, and their relative velocity. In the case of auroral clouds, fluxes of up to $10^4$ or $10^5$ electrons per cm$^2$-sec may be encountered by the satellite, more than enough to produce significant interactions. These are low-energy particles, so the relative velocities involved in collision will be nearly those of the satellite itself.

The K2LGK-K2GQI results with SHotput IV passing through an intense auroral electron cloud exhibited Dopplershift very close to the predicted value. The received signals were fairly coherent, yet 20 db. stronger than those obtained from other Shotputs at the same position in the absence of clouds. We know auroral clouds to be more prevalent at lower regions of the ionosphere (100 miles or so), so we will have to wait a few years for the best effects. Auroras have been observed at Echo A-12’s altitude, though, so don’t give up the ship.

Fast-Moving Radioactive Streams

At Echo’s nominal launch altitude, these represent the most likely cause of quasi-passive phenomena. The most likely reason for the streams’ existence is Van Allen belt leakage; the satellite itself will be passing through the belt’s lower regions, and will definitely encounter some in their native habitat. Kraus’ experiments with Explorer VII, which carried radiation-measuring equipment, showed abrupt rises in the counting rate coinciding with WWV signal enhancements. Radar observations of satellites in the altitude region of Echo A-12 showed evidence traceable to interactions with fast-moving streams of particles, which in all probability were radioactive.

The stream hypothesis is born out by Dopper study of signal returns. Applied to Echo A-12 at 141 Me, the theory of stream interactions would indicate that the signal returns from such phenomena would probably come back at Doppler shifts far removed from the passive-reflection value. Shifts of up to 75 kc. may be expected, with most coming at perhaps 20-40 kc. away. These high shift deviations stem from the high relative velocities of the reflecting ion concentrations; the major contributor to these velocities is not the satellite but the stream velocity itself.

Such stream-interaction signal returns will show serious frequency instability, since the velocities of the streams with reference to the stations are fast changing.

Secondary traveling ion clouds have been observed in such interactions which exhibit near-satellite velocity, but these are rare. More frequently, streams may split into two or more components following their encounter with the satellite, with the resulting signal returns being split into two or more simultaneous Doppler components. The “Doppler smear” effect, as this is called, will require the development of new operating techniques if full use is to be made of it at v.h.f. For example, if the receiver is continually kept tuned to the passive-reflection component, it will, in all probability, miss the stream-interaction components completely, since these will be too far away in frequency. Tune around, OML.

Communication Possibilities

With the exception of the one aurora case mentioned, we have no idea of the magnitude or frequency of occurrence to be expected of these phenomena at 141 Me. Hence the research interest in them.

From your point of view as an amateur interested in communication, these interactions are useful because they will sporadically increase the effective scattering area associated with the satellite, and hence will mean stronger signals. For example, should a 20-db. enhancement occur at 800 miles altitude, stations whose tropo-scatter range was only 470 miles before Echo A-12, and whose satellite-bounce range under normal conditions is 1000 miles or less, would find themselves able to work all the way out to 4500 miles with the same signal strength. The same 10-db. reduction in one-way path loss applies to the threshold as well, and stations whose tropo-scatter range is only 320 miles (instead of 465) will find themselves able to make sporadic use of the satellite. Should this same enhancement occur at 100 miles altitude — and the chances of this occurring are much greater here — the threshold in terms of maximum permissible path loss will drop from 283 to 183 db., meaning that stations whose reliable tropo-scatter range is but sixty-four miles — nearly everyone on the band — would find the satellite sporadically accessible. Remember, these figures all assume the use of c.w. The types of fading and frequency shifts associated with these interaction enhancements will tend to render voice modulation unintelligible.

Besides making the satellite accessible to very many more people, it is quasi-passive reflection (satellite scatter to you) which holds the key to European QSOs for eastern stations and Hawaiian contacts for those in the plains or mountain states. Southerners may even find themselves working South America. Floridians might work Alaska, if they would just keep trying and keep tuning for those far-removed Doppler components.

We know these interactions to be inversely

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frequency dependent. Users of 220 Mc. probably will experience considerably less of them than will the two-meter men. If any of you six-meter enthusiasts are still with us, this may be your big chance. Interaction phenomena should be a good deal stronger and more frequent on 50 Mc. than on 144, and will probably prove your only chance for successful, albeit sporadic, Echo work. Doppler shifts will be but a third of what they are at two meters, further helping your chances. The same considerations of equipment engineering apply to you as well, since losses in s.n.r. on any band hurt you in your most sensitive area — your QSL file!

**Reporting**

Most of the information on anomalous behavior given in this article is derived from extrapolation of results achieved at lower frequencies. There is a real need for more experimental data in the v.h.f. spectrum, both to confirm what we already think we know and to discover such new effects as may be presently unknown. In this area, the radio amateur may help by providing data on the results of his own experimentation.

In addition to its over-all project management responsibility, OSSC is also responsible for the technical-research phase of the program, and is handling it in two ways. First, its Research Group on 144-Mc. Techniques, under the able leadership of K2LMG, plans extensive research work of its own in conjunction with the launching. Amateurs interested in working directly with the group are invited to contact K2LMG either directly or through the author. The work will involve schedules with group members, monitoring, and so on.

For those who would rather not get involved in organizational activities, but who would still be in a position to contribute information, we have prepared a questionnaire which we would like each of the participants to fill out to the best of his ability after each successful QSO using Echo A-12. These will be available from the ARRL Technical Department when you need them, and should be returned to E. P. Tilton, W1HDQ, V.H.F. Editor, 36 LaSalle Road, West Hartford 7, Conn.

**Tracking**

It is expected that orbital predictions covering Echo A-12 passing over the United States and surrounding coastal waters will be transmitted by W1AW during the regular Official Bulletin periods. Foreign amateurs interested in participating in the Echo program are invited to contact the author; arrangements will then be made to have orbital information sent to these DX stations directly. In addition, foreign societies in countries having stations suitably equipped to attempt Echo reflection can be supplied with predictions in a form suitable for transmission over the societies’ own headquarters stations. The predictions will be based on information supplied by NASA.

If schedules are arranged and efficient operating techniques employed, it should not be necessary to follow the satellite across the sky with a continuously-moving antenna. K2LMG has calculated that at typical long-range distances the satellite will take long enough to pass through the beam of a fixed antenna to permit two-way transmission and reception of the information required by ARRL for WAS credit, if techniques normally employed for meteor-scatter communication are used.

As an aid in acquiring the satellite and in lining up antennas, two beacon transmitters have been placed aboard, at 136.1702 and 136.1738 Mc., each putting out a steady carrier. You will not be able to hear both at once, but you are close enough in frequency to permit reception within a single properly adjusted receiver pass band. Antenna and converter details, supplied by W1HDQ, may be found on page 15 of April 1962 QST.

**June Tests**

In cooperation with the M.I.T. Office of Public Relations, OSSC is also handling the public information phases of the program, and for that reason we will be soliciting direct telephone reports from amateurs who make successful QSOs during the June sub-orbital test, and within 24 hours after the satellite launching. (We are not looking for tracking reports from stations hearing the beacon transmitters.) It is expected that W1AW will carry the details of this as the time approaches.

Inquiries of a general nature concerning either the Echo program or the OSSC organization as a whole should be addressed to the author, who is serving both as chairman of the Echo committee and as director of OSSC. The organization address is Office for Satellite Scatter Coordination, Room 10-206, 77 Massachusetts Ave., Cambridge 39, Mass.

Good luck!

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* Until September 15, letters to the author should be sent in care of the A.R.R.L. Technical Department, 38 LaSalle Road, West Hartford 7, Conn., for forwarding. — Editor.

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W4OWI, who long ago realized what gold was hidden in old TV chassis and how they could be used as an inexpensive source of parts for beginning hams, now points out that a similar situation exists with old auto radios. He says that many of these can be obtained from auto salvage yards for $5 or $10 each, and that a simple converter ahead of something like this is an easy way to set yourself up for receiving mobile.

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K2DBM reports that while a group of scientists were conducting some experiments involving a cat, a high-gain audio amplifier, an oscilloscope, and various recording electrodes attached to the cat, their efforts were rudely interrupted by the loud voice of an amateur operator. Seems as though there must have been some stray (1) rectification between the electrode and the cat.
Getting Started in RTTY

Basic Requirements for Beginners

BY JOHN E. MAGNUSSON, W8AGD

The interest in RTTY increases daily as more and more machines become available. Used machines can be obtained from a number of very reliable societies, as well as through the MARS program, and will cost from $15 to $75. These will be page-printing machines, and the cost may also include local servicing, crating and transportation charges. (You can spend considerably more than this amount by buying the machine through a commercial outlet.) By dropping a QSL card to ARRL Headquarters, you can obtain a list of reliable sources of machines.

Machines

Two popular machines are the Model 26 and the Model 15. The Model 26 is an older machine using a type wheel that is stationary, while the paper moves back and forth behind the type wheel. The Model 15 is a more recent machine, in which the paper and the roller are stationary, while the type carriage moves back and forth in front of the paper. The latter is probably a more familiar machine, as you will see a number of these page printers in television shots of newsrooms, and in your local broadcasting studios as well as in Western Union offices. These machines are gradually being replaced by a newer machine, the Model 28. You will run across fellows on the band who are using the Model 28 machine already. If you would like to obtain a Model 28, I think you will find that the waiting list is relatively long, and the cost is between $2500 and $3000.

Basic Connections

Once you have the machine, it is important to consider what the machine actually does. Studying the wiring harness of the teletype machine may be a little confusing at first, but a large part of the wiring can be ignored. Only six terminals are important. (See Fig. 1.) The first of these is the pair of terminals that require 115-volt 60-cycle a.e. to run the motor, usually controlled by an on-off switch on the machine. The second pair of terminals delivers the impulses from the keyboard contacts to the transmitter keying system. The last two terminals receive the impulses, from the receiving equipment, that energize the printer magnets which control the typing mechanism.

Local Operation

After you receive your machine, about the first thing you do is hook it up in a d.c. loop to see if you can type. In both of the previously-mentioned machines we have selector magnets, and either machine can be operated without a polar relay. (Some proponents of RTTY highly endorse the use of a polar relay, whereas others of us prefer to use neutral operation, because we feel that the printer magnets are a better filter than a polar relay. Articles on terminal unite deal with both types of operation.) Fig. 2 shows how you can connect up the machine to practice sending to yourself. In effect, you have the equivalent of an electric typewriter. This requires a small d.c. power supply, capable of delivering either 20 or 60 ma. at 120 volts. The power supply is connected in series with the keyboard terminals and the printer terminals. In both the Model 26 and the Model 15 machines the printer selector magnets can be operated on either a 20- or 60-ma. d.c. loop, depending on whether the two coils of the selector magnet are connected in parallel or in series. Some machines have a switch with a lock tab that makes it convenient to switch from series to parallel operation. Normally, the equipment is operated on a 60-ma. loop, whether you use "polar" — a relay-controlled source to the printer selector magnet — or "neutral," where the selector magnets are connected directly into a vacuum-tube circuit.

Now, when you press a key on the keyboard, the motor turns the mechanism one complete revolution. (We won't go into the details of...
machine functions and operations, as that would require a lengthy discourse in itself. The device that is actuated by the keyboard is essentially the same as an electrical distributor that you find in an automobile. When you press the key, the result is either the presence of, or the absence of, an impulse during various portions of the complete revolution or cycle, much in the same manner as we send International Morse code by the use of short and long impulses at a definite rhythmic rate. In addition, in order to synchronize the machines at opposite ends of the circuit, it is important to have a starting pulse and a stop pulse.

Experimenting with the equipment on a d.c. loop, as shown in Fig. 2, will be time well spent, as you can actually see the mechanical operation of the equipment and develop good operating habits. At the end of each line, be sure to hit the carriage return twice, line feed once, and letters twice. This allows the machine at the opposite end of the circuit to perform these functions more positively in the event there should be a slight fading of the signal. There is nothing more discouraging than to walk over to the machine and find that it is sitting at the end of the line and making a big black glob out of perfectly intelligible copy.

A frustrating fact, in comparison with a typewriter, is that you cannot back space to make corrections without running to the end of the line and sitting on the space bar until you get back to the point that you wish to overstrike. You will soon agree that this would be impractical in communications, so the standard procedure is usually either to make two or three Xs, and then start over and type the word correctly.

Receiving

Once you get the feel of the machine on a d.c. loop, the urge will become greater to build a receiving converter, to receive signals off the air. Only the two printer selector-magnet terminals are involved, and these can be connected to a commercially-available terminal unit, as it is called, or you can build a terminal unit as outlined in a number of periodicals.¹

With the receiver audio output connected through the terminal unit, and the terminal unit connected to the printer magnets, you have one half of an RTTY station. You are now able to copy signals in the amateur bands as well as the commercial teletype circuits. A tuning indicator, which will be described in a second article, is almost essential until you develop an ear for the two tones that will be emanating from the speaker. Even after you become a veteran RTTY operator, you will find it more convenient to use a scope than to go by ear. First of all, a scope tells you whether or not the signal is right side up or inverted, and lets you tell at a glance if you have tuned too high or too low. It also gives you a monitor on the amount of shifting, so you can easily tell if the received signal is being shifted too much or if the station is using narrower than normal shift. At the present time, the standard shift is 850 cycles (FCC allows a maximum shift of 900 cycles). You will, on occasion, find stations experimenting with considerably narrower shifts.

An F.S.K. Unit

After you have the terminal unit constructed and operating satisfactorily, the urge becomes greater to modify the transmitter so as to begin

full RTTY operation. Fig. 3 shows a very simple arrangement to provide frequency-shift keying in a variety of commercially-available transmitters. Any v.f.o. that uses a Clapp oscillator can be modified in this manner to provide f.a.k. control. This arrangement has three distinct advantages:
(1) You don't have to design the equipment.
(2) The voltage across the keyboard contacts is great enough to burn off any machine oil that could cause intermittent operation or misprints.
(3) Last, but not least, the shift is right side up for normal f.a.k. operation.

The 6AL5 is nothing more than an electronic switch; a high-priced relay could be equally well controlled by the keyboard. The tube, when it conducts, connects the 18-muF capacitor to ground. This automatically shifts the frequency of the v.f.o. to a lower frequency. The potentiometer allows you to control the amount of shift. This is important in any transmitter where you do not use the same v.f.o. frequency on all bands of operation or if frequency multiplying takes place after the v.f.o. If you have to double from the v.f.o. frequency to the operating frequency, it becomes necessary to reduce the shift to one half because the amount of shift will be doubled also. For instance, in the Ranger transmitter, if you are operating 10 meters, you would use one-fourth the normal shift that you would use on 40 meters, as the equipment is operating on the fourth harmonic of the v.f.o., and the shift would be automatically increased four times.

If this reactance shift is used in s.s.b. transmitters, the shift remains the same on all bands of operation, because the mixing provisions in the exciter result in no change in the degree of shift with change in the band of operation.

At this point, you might well ask how is all this accomplished with two tones. Originally, as we began the discussion, we referred to a closed circuit. In the closed circuit there was either the presence of current flowing through the line, or the absence of current that made up the code combination for each figure or letter available on the machine. This presence or absence of information from the keyboard is transformed into one of two tones by the f.a.k. network. The amount of shift would not be a serious consideration, except that it is well to standardize on one value around which all the equipment is built to simplify tuning operations. The two signals have been named "mark" and "space" and, according to present standards, the frequencies are 2125 and 2975 c.p.s., giving a separation or shift of 850 cycles.

As the transmitter transmits these two different frequencies in a sequence following the intelligence transmitted by the keyboard, the receiver picks up this same information and through the application of the receiver beat-frequency oscillator, we hear two distinct audio tones in the receiver output. These two tones are now demodulated, so to speak, by the terminal unit so as to present the same type of signal to the printer magnet as it would normally see if it were connected in the d.c. loop discussed earlier.

To check out the system when you first begin, connect the two keyboard contacts to the f.s.k. unit. With only the exciter on, and the receiver connected to the terminal unit, and the terminal unit connected to the printer, you should be able to send to yourself from your own transmitter through the receiver and obtain copy. Once you have your shift set and you are satisfied that the system is adjusted and operating properly, it is time to get on the air and give RTTY a try. In my own case, even using a full kw. on f.s.k., I monitor myself through the receiver and the converter, or terminal unit, into the printer. This is a little awkward in that you must always operate on the same frequency as the calling station. Two diodes were connected back-to-back across the input terminals of the receiver to limit the amount of voltage to the receiver to a reasonable level, as shown in Fig. 4.

At the outset, all of this may sound extremely complicated, but as you obtain more and more experience with the mechanics of the machine, as well as with the electronics of the transmitting and receiving equipment, you slowly begin to realize that RTTY is essentially very simple. It is also extremely fascinating, and has lured some very devoted c.w., s.s.b. and a.m. men in both high-frequency and v.h.f. bands in the past ten years. And I am confident that you will find it equally attractive and challenging. As yet, there is a limited amount of commercial equipment available to be used as the receiving converter or terminal unit. I think it is reasonable to say that in the next few years we will find a gradual increase in the number of commercially-available equipments that can be used. If you enjoy building your own equipment, then this should be just the ticket for you, and many very relaxing and satisfying experiences lie in store for you.

It is also important to consider that one should join one of the active RTTY societies, so as to obtain latest information on equipment available, the people who wish to trade equipment, new techniques developed among other amateurs for the reception and transmission of RTTY, as well as news of interest around the country among other active RTTY operators. As the saying goes, "See you on the green keys."
1962 ARRL Field Day Rules
Annual Test for Emergency-Powered Stations, June 23-24

FIELD DAY TIMETABLE

<table>
<thead>
<tr>
<th>Time</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMT</td>
<td>2100</td>
<td>2400</td>
</tr>
</tbody>
</table>

(Operate no more than 21 consecutive hours out of the total 27-hour period)

Ge: ready for Field Day, June 23-24. Thousands of amateurs in the ARRL Field Organization are busily preparing generators, planning operating schedules, allocating assignments and otherwise impatiently awaiting this official radio-amateur way to start the summer season.

With emergency preparedness the theme, clubs and groups will take to the field and set up and operate stations independent of normal power facilities. You can participate with a club or non-club group portable; one- or two-man portable station; mobile; emergency powered home station or as a regularly powered home station. Whatever your class of participation, you're sure to gain valuable operating experience under atypical conditions as well as have a grand time.

The rules and entry classifications are unchanged from last year. Pick any consecutive 24-hour period from the Field Day timetable. To raise contacts call "CQ FD" on c.w. or "calling any Field Day station" on phone; then swap signal reports and ARRL sections or specific locations.

Here are examples to assist score calculations:

Example 1
Assume a 25-watt rig wholly on batteries, not originating or relaying any messages, and not having more than two operators.
10 points (40 stations worked) 
× 3 (power below 30 watts)

120

× 3 (all radio equipment independent of commercial mains)

360

× 1.5 (if Class B or C and everything on batteries)

540 claimed score

Example 2
Same as Example 1 but one Field Day Message to the SEC or SCM is originated and passed in good form.
65 points (10 QSOs + 25 points for FD message)

× 9 (3 × 3 = power multiplier multiplied by independen-
ence-of-mains multiplier)

585

× 1.5 (everything on batteries)

877.5 claimed score

(Copies of all messages originated and relayed must accom-
pany Field Day reports.)

Example 3
The Podunk Hollow Radio Club (or any group of three or more licensed operators), portable at its FD site, operates two transmitters simultaneously. Each rig uses 75 watts input and batteries or generators furnish power. One message is started in good form (35 points), is received and relayed onward (2 points), and 250 stations are contacted.

257 points (300 QSOs + 25 + 2)

× 2 (power input over 30 and under 150 watts)

514

× 3 (all gear independent of mains)

1542 claimed score

(No battery multiplier for either club or groups.)

Mobiles are an important part of Field Day, too, and clubs should strive to get all member-owned mobile units on the air during Field Day and report their mobile scores for the mobile aggregate scores to appear in the final results. Mobile units are the key to any emergency communication.

Log forms and summary sheets are now available on request from ARRL. Your best bet is to send for some, but the sooner the better. You may also use the summary on the next page, or prepare a facsimile. All reports should include a starting and ending time of operation, bands used, dates and contact times, calls of stations worked, signal reports sent and received, and locations of stations worked, as well as power sources and inputs, location and call of station, number of transmitters in simultaneous operation, number of persons participating, club name (if any), and score computations. Results must be postmarked no later than July 23 for listing in QST.

Portable stations are reminded to be sure they comply with FCC regs in signing portable. C.w. stations follow their calls with a slant bar followed by the numeral of the area in which they are operating; phone stations follow their calls with their geographical location. See Sec. 12.82 2(b) of the Amateur rules for details (in License Manual).

Check these FD rules, which follow below, very carefully; a scan of last year's FD results (November 1961, QST) may give you some hints.

Rules

1. Eligibility: The Field Day is open to all radio amateurs in the sections listed on page 6 of this issue of QST.

2. Object: For portable and mobile stations to work as many stations as possible; for home stations to work as many portable and mobile stations as possible.

3. Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Contest Committee.

4. Entry Classification: All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or nonclub group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations

28 QST
operating from emergency power; "EC" stations operating from commercial power sources. Thus a club or group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 3C classification.

Portable stations are those installed temporarily, for FD purposes, at locations away from customary fixed-station locations. Portable equipment or units must be placed under one call and the control of one license, for one entry. All control locations for equipment operating under one call must be within a 1000-foot diameter circle.

Group participation is that portable-station work accomplished by three or more licensed operators.

Unit or individual participation is that portable-station work accomplished by either one or two licensed operators.

Mobile stations are complete installations including power source and antennas, mounted in or on vehicles and capable of being used while in normal motion. If they utilize antennas supported normal or suitable for use during motion, installations must be classified as portable instead of mobile. Each mobile entry call must be different from any other FD station participating.

Home station participation is that work by fixed amateur stations not operating portable or mobile. A transmitter used to contact one or more stations may not subsequently be used under more than one other station call during the Field Day period.

Field Day Period: All contacts must be made during the period indicated elsewhere in this announcement. An entry may be operated no more than 24 consecutive hours of the 27 hours available.

Bands: Each phone and c.w. band is regarded as a separate band. The following called additional u.h.f.-vhf bands are designated separate bands: A1: 1600-1825 "east" or 1975-2000 "west", 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.45, 28.0-29.7, 50-54 and 144-148 MHz. (A2: radio-teletype and frequency-shift keying are grouped with A1 in the bands where they are allowed.) A3: 1600-1825 "east" or 1975-2000 "west", 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.45, 28.0-29.7, 50-54 and 144-148.9 MHz. All forms of wire transmission will be grouped with A3 in the bands where they are allowed. (In Canada the respective phone bands apply.)

The use of more than one transmitter at one time in the same band is not allowed.

Exchanges: Signal reports and ARRL section (or specific location) must be exchanged in proof of contact.

Valid Contacts: In Class A, B and C, a valid contact is a complete exchange with any amateur station. In Classes D and E, a valid contact is a completed exchange with any station in Class A, B or C. Cross-band contacts are not allowed. Contacts made in mobile stations may be made in motion or from any location(s). A station may have worked more than once only if the additional contacts are made on different bands.

Field Day Message: A Field Day Message is one originated by a Class A, B, or C station and addressed to the

Entries must be accompanied by this summary sheet. You may obtain the summary shown here plus log forms free on request from ARRL. Or you may use the very one shown here or prepare a facsimile. Attach logs of all Field Day contacts and copies of all messages originated and relayed with your entry.

ARRL FIELD DAY SUMMARY

<table>
<thead>
<tr>
<th>OFFICIAL CALL</th>
<th>FD LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Insert call(s) / where applicable]</td>
<td>[Insert location]</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS OF ENTRY (check only one)</th>
<th>ENTRY NUMBER OF TRANSMITTERS OR SIMULTANEOUS OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Club or group portable.</td>
<td>[Insert number]</td>
</tr>
<tr>
<td>B. Unit or individual portable.</td>
<td>[Insert number]</td>
</tr>
<tr>
<td>C. Mobile</td>
<td>[Insert number]</td>
</tr>
<tr>
<td>D. Home -- emergency power.</td>
<td>[Insert number]</td>
</tr>
<tr>
<td>E. Home -- Commercial power.</td>
<td>[Insert number]</td>
</tr>
</tbody>
</table>

[If club entry, name of club.]

<table>
<thead>
<tr>
<th>IF CLASS B ENTRY, call(s) of operator(s)</th>
<th>NUMBER OF PEOPLE PARTICIPATING AT THIS STATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Insert call(s)]</td>
<td>[Insert number]</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PERIOD OF FD OPERATION: Starting time</th>
<th>Ending time</th>
</tr>
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<tbody>
<tr>
<td>[Insert time]</td>
<td>[Insert time]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SOURCE (check)</th>
<th>[Insert check]</th>
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</thead>
<tbody>
<tr>
<td>Generator.</td>
<td>Commercial power.</td>
</tr>
<tr>
<td>Battery.</td>
<td>Other.</td>
</tr>
</tbody>
</table>

| Description of power source (generator type etc.) | [Insert description] |

<table>
<thead>
<tr>
<th>BAND</th>
<th>VR. GAMS. ACCEPTED</th>
<th>MULTIPLIED</th>
<th>SCOPE</th>
<th>TRANSMITTER</th>
<th>INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 Mc. V</td>
<td>x</td>
<td>2</td>
<td>Y</td>
<td>[Insert symbol]</td>
<td></td>
</tr>
<tr>
<td>5 Mc. V</td>
<td>2</td>
<td>2</td>
<td>Y</td>
<td>[Insert symbol]</td>
<td></td>
</tr>
<tr>
<td>7 Mc. V</td>
<td>x</td>
<td>2</td>
<td>Y</td>
<td>[Insert symbol]</td>
<td></td>
</tr>
<tr>
<td>11 Mc. V</td>
<td>2</td>
<td>2</td>
<td>Y</td>
<td>[Insert symbol]</td>
<td></td>
</tr>
<tr>
<td>14 Mc. V</td>
<td>x</td>
<td>2</td>
<td>Y</td>
<td>[Insert symbol]</td>
<td></td>
</tr>
</tbody>
</table>

Field Day Message: [Insert message]

TOTALS: [Insert total]

[Signature of club secretary or licensed station whose activities covered by this FD entry]

This certifies that the station whose call appears above was operated in accordance with the current Field Day rules and that, to the best of my knowledge, the points and scores as set forth in the above summary are correct and true.

[Signature of club secretary or licensed station whose activities covered by this FD entry]

June 1962
The Novice likes to look ahead a little
— to operating in any ham band, to
more power, to v.f.o. — in short, to
his "Generalship." This transmitter
has that "look-ahead" design — five
bands, 150 watts input — but com-
plies with all Novice requirements in
the meantime. Based on TV receiver
salvage, it's an economical set to
build.

80 Through 10 Meters Using a
Pair of 6GJ5s

BY LEWIS G. McCOY,* W11CP

A "Novice Gallon" or General 150-Watter

This article describes the construction of a
transmitter capable of 150 watts input on
c.w. and 120 watts for plate-modulated a.m.
phone. Recent articles have demonstrated the
appearance of using components scrounged from old
TV sets, and this same idea was followed in this
rig. In addition, the two amplifier tubes, 6GJ5s,
are medium-priced (about $2.00 each) tubes de-
dsigned for use as horizontal sweep amplifiers in
color TV sets. They work very well as r.f. ampli-
fiers.

Novices, 150 watts input is more than you
are permitted, but it is a simple matter to reduce
the loading to the legal input. Then when you
graduate to the General Class you will have
a transmitter capable of phone or c.w. work at a
higher input.

The transmitter covers the bands from 80
through 10 meters, and is crystal controlled, with
provision for v.f.o. input.

Circuit Details

The circuit as shown in Fig. 1 is set up for c.w.
work only. It was felt that some amateurs would
not be interested in a modulator, so the rig can
be built as shown and the modulator added if
desired. The modulator and its incorporation into
the rig will be treated in a later issue.

The first stage is a 5763 oscillator in which
either 80- or 40-meter crystals can be used, de-
pending on the output frequency. The oscillator
circuit is of the electron-coupled grid-plate type
with an adjustable feedback control, C4. The
plate circuit of the 5763 uses slug-tuned coils
when operating on 20, 15 and 10. With the switch
in the 80- and 40-meter positions, the combina-
tion of L1, L2 and L3 is resonant in the 40-meter
band. When using an 80-meter crystal for 80-
meter output, there is adequate excitation to the
following stage even though circuit is not reso-
nant on 80.

Output from the oscillator drives a 5763 buffer/

*Technical Assistant, QST.
100 ma. In the second position a full-scale reading of 20 ma. is used for reading amplifier grid current. The third position is left blank for later use in checking modulator current. The fourth position, full scale 400 ma., monitors the amplifier plate current. In the fifth and last position the meter is connected to read the high-voltage with a full scale of 1000 volts.

**Power Supply**

As mentioned before, costs are held down by using parts obtained from an old TV set. The biggest saving here is represented by the power transformer $T_1$ and the choke $L_4$. The rectifier circuit is a bridge using a pair of 6D1E-4s and a 5U4. The choke-input filter consists of $L_9$ and two 40-mf. electrolytic capacitors connected in series for adequate voltage rating. Two 20,000-ohm, 10-watt resistors connected in series across the two electrolytics serve the dual purpose of providing the correct voltage division across the two capacitors and also as a bleeder resistor for the high-voltage line.

The low voltage is taken from the center tap of $T_1$. It also uses a choke-input filter, $L_9'$.

The a.c. line is fused with 115-volt, 5-ampere fuses. These mount in a fused-type 115-volt line plug.

**Construction**

The complete transmitter is built on a 3 × 12 × 17-inch aluminum chassis, with an aluminum front panel measuring 9 by 12 inches. Before constructing the photographs should be carefully studied. While layout is not particularly critical, it is a good idea to follow the general arrangement as closely as possible. The power supply and its components are mounted along one side toward the rear of the chassis. All the r.f. section is installed toward the front. One area is left clear to provide room for the modulator.

Considerable time was spent in arriving at a panel arrangement that would be pleasing to the eye while still providing a good electrical arrangement. The oscillator tube socket is mounted near one edge of the chassis and the buffer is near the amplifier tube. $S_4$ is positioned below the chassis between the oscillator and buffer. The two slug-tuned coils, $L_1$ and $L_2$, are mounted between the oscillator socket and the rear wafer of $S_4$ (bottom view). Most of the components on the grid side of the oscillator were mounted on a terminal strip before installing the strip in place. This makes the wiring easier than trying to install the components after the strip is already mounted.

Only one length of the R & W 3018 coil stock is needed to make both $L_1$ and $L_2$. Be careful when cutting the coil into two sections, as it is easy to deform it. One method of cutting the coil stock is to heat a razor blade and slice through the poly support bars.

The multiplier plate capacitor, $C_5$, is mounted next to $S_4$ and is at the exact center of the front of the chassis. This capacitor must not make electrical contact with the chassis, so insulating washers should be used. $L_5$ is installed just behind $C_5$ and is cemented to a 1-inch isolantide standoff. $L_4$ is supported by its own leads and is mounted on the rear wafer of $S_4$.

The amplifier tank circuit components are all mounted above deck. The coil assembly is mounted on the panel on 2-inch isolantine standoff insulators. When installing the coil, be sure to allow enough height so that the rotors of $C_4$ and $C_5$ will clear the bottom of the coil when they are opened. $C_5$ is a three-gang t.r.f. tuning capacitor with the three stators connected in parallel to give a total of about 1200 μf.

$S_4$ is mounted on the panel between the two standoffs that support the coil. The parasitic suppressors used in the plates of the 6GJ5s are wound on 1-watt carbon resistors. Any resistor value over 1000 ohms can be used, because the resistors are only used as forms.

The neutralizing capacitor, $C_5$, is made from a piece of aluminum 1/2 inch wide and 3 1/4 inches long. The piece is bent to form an L which is 3/4 inch long at the bottom. A hole is drilled in the bottom portion and the strip is mounted on a 1-inch standoff insulator. The insulator is positioned between the two amplifier tubes so that the upright 21/2-inch strip faces toward the plates of the tubes.

The power transformer $T_1$ and choke $L_4$ were obtained from an old TV set. Nearly all TV transformers have three filament windings, one at 5 volts and two at 6.3 volts. One of the 6.3-volt windings has a current capacity of about one ampere and is used for the high-voltage damper tube in the TV set. We fell into a trap, wiring the rig described here, and encountered a great deal of trouble before finding the reason. Both the 6.3-volt windings on $T_1$ were examined and the one that appeared to have the heavier leads was used. Unfortunately, it happened that this was the one with the 1-ampere winding. Running the
C₁—3-30-µuf. trimmer.
C₂—100-µuf. variable (Hammarlund HFA-100A).
C₃—See text.
C₄ — 325-µuf. variable (Hammarlund MC-325M).
C₅ — 3-section variable, 365-400 µuf. per section, with sections in parallel.
C₆—500 µuf., 20 kv. (from TV set), or 500 µuf., 3000 volts.
C₇, C₈ — 40-µuf., 500-volt electrolytic.
C₉ — 16-µuf., 450-volt electrolytic.
F₁, F₂ — 5-amp. type 3AG fuses mounted in fuse-in-plug holder.
J₁—Crystal socket.
J₂—Key jack, closed circuit.
J₃ — Coax chassis connector, type SO-239.
L₁ — L₀, inc. See coil table.
L₀ — 16 hy., 50 ma. (Stancor C-1003).
L₁—Choke from TV set, approx. 2 hy., 300 ma.
M₁—0-1 d.c. milliammeter.
P₁—A.c. line plug, fuse-in-plug type.
R₁—50,000-ohm, wire-wound control, 4 watts (Mallory M50MPK).
R₂—7500 ohms, 25 watts, with slider.
R₃—1 megohm, 1 watt, 5 per cent.
R₄—12 ohms, 1 watt, 5 per cent.
RFC₁, RFC₃, RFC₅—1 mh. r.f. choke (Millen 34300-1000, National R50).
RFC₄—2.5-mh. r.f. choke (Millen 34103, National R100).
RFC₂—1-mh. r.f. choke (National R-3005).
S₁, S₂—S.p.s.t. toggle.
S₃—D.p.s.t. toggle.
S₄—2-pole, 2-section, 5-position rotary, stellite insulation (Centralab type 2005, Mallory 176C).
S₅—1-pole, 5-position rotary, stellite insulation (Centralab 2301).
S₆—2-pole, 5-position rotary (Mallory 1215T, Centralab 1403).
S₇—S.p.d.t. toggle.
S₈—S.p.s.s. toggle.
T₁—TV power transformer; see text.
heaters in the rig from this winding resulted in low output from the amplifier, insufficient excitation, and other problems. After much checking we found that the heater voltage at the tubes was slightly less than 5 volts. Changing to the heavier-current winding cleared up all the trouble.

The oscillator tube (in shield) is at the right near the panel in this view. To its left are the two slug adjusting screws for \( L_1 \) and \( L_2 \). The buffer tube is partly hidden by the right-hand final-amplifier tube. \( C_3 \) is mounted on a small aluminum bracket from one of the standoffs that hold the amplifier tank coil.

The power supply components are mounted along the right-hand side of the chassis. Just visible to the right of the SU4 rectifier is \( S_1 \), the v.f.o./crystal switch. The two terminals on the rear wall of the chassis are for the a.c. connections to an externally mounted antenna relay. The key jack, \( J_1 \), is to the right of the terminal strip.

The insert shows the area around the final amplifier tubes. The piece of aluminum which forms \( C_3 \) can be seen between the tubes at the lower center of the insert. The area on the main chassis underneath the insert is now blank, but a subsequent article will show that space filled with modulating components.

The plus-B voltages you end up with will, of course, depend on the voltage from your particular power transformer. However, the difference between TV transformers rarely amounts to more than 50 volts one way or the other. In our case the high voltage out of the filter was approximately 800 volts at no load and dropped to 650
The photo above is an enlargement of the area below shown outlined in red. The lower photo shows the entire under-chassis layout of the transmitter. To the right of the power transformer are $C_1$ and $C_2$ and the two 20,000-ohm 10-watt resistors. Just above this group are $L_4$, $C_3$, and the 50,000-ohm bleeder of the low-voltage supply. The enlargement above shows the detail in the area of the r.f. section. The oscillator components are mounted on a terminal strip at the left side. Nearby is $L_1$, mounted between the terminal strip and $L_2$, the upper slug-tuned coil in this photo. $L_1$ is just below $L_2$. $L_4$ is the small coil mounted at an angle from the rear washer of $S_3$. $C_3$ is at the center of the chassis on the front wall. $R_i$ is to its right. The large adjustable resistor in the lower right corner of this view is $R_3$.

Volts with a load of 230 ma. on the amplifiers. Low voltage out of the filter was 310 volts. Letters from builders of previous rigs using old TV transformers have expressed concern over the current-carrying capabilities of such transformers. TV sets are designed for continuous duty and the current drain from the high-voltage winding is usually 300 ma. or more. The average TV transformer can easily handle a 150-watt rig plus a modulator, in intermittent service, without danger of burning out the transformer.

The r.f. portion of the transmitter is shielded by a piece of Reynolds perforated aluminum stock measuring 17 1/2 by 30 inches. The extra 1/4 inch on the 17-inch dimension is used to hold the piece to the panel. The sheet is bent to form an enclosure measuring 9 inches high and 17 inches long. Strips of aluminum or steel, 1/2 inch wide, are drilled and tapped and attached to the panel as shown in the rear view. The 1/2-inch lip on the perforated stock is clamped to the panel by these strips. Another section of perforated stock, 6 by 12 inches with a 1/2-inch lip all around, is used for the back wall of the r.f. shield. This piece is secured to the perforated cover and the chassis top with screws and nuts. In the rig shown here, the back portion of the shield is approximately 7 inches from the front panel. A bottom plate on the transmitter completes the shielding.

If you live in an area where the TV signal is weak and you are likely to cause TVI, the meter hole also should be shielded. A shield in the form of a box can be made up from a piece of the perforated stock and used to cover the back of the meter. Make sure the shield doesn’t touch the meter terminals.

In order to dress up the appearance of the transmitter, the panel and perforated cover were given several coats of gray acrylic spray paint and then the panel was lettered. We have had
many inquiries from hams asking how we letter our gear. They apparently aren’t aware that decals are readily available from radio supply houses. The decals are cut out, wet down, and then applied to the panel. After they have dried, the letters can be “set” by using lacquer thinner.

**Tune-Up and Adjustments**

The first step in tuning up the rig is to adjust the oscillator and buffer stages. Before turning on the power, move the slider on R2 so that the entire 7500 ohms is in the circuit. Use an 80-meter crystal first, turn on the power and let the tubes warm up. Leave S3 in the tune-up position, the one that grounds the screens of the amplifiers. Put S2 in the 80-meter position and switch the meter to read amplifier grid current. Tune C2 for an indication of grid current. Make sure the drive control, R1, is set at maximum — arm the plug-B side of the control.

You’ll probably find that the grid drive will be more than enough. Proper operation of the amplifier cells calls for 2 to 4 ma. This drive can be reduced with R1. Change to 40 and make the same check.

If you find that you don’t get any grid current indication on either band, check your wiring carefully for errors. You can find out if the oscillator is working by listening for the signal with your receiver. If you have a voltmeter you can check between the grid of the buffer and chassis to see if there is any grid voltage. The voltage should be on the order of — 50 volts. Use an r-f choke in series with the negative test lead or your test meter will load the circuit, resulting in no grid voltage reading.

After checking on 80 and 40, switch S3 to the 20-meter position. With R1 full on, adjust the slug in L2 to give the maximum grid-current reading. When S3 is switched to 20 or 15, the plate circuit of the oscillator is peaked on 10 meters with L2. The 40-meter drive from the oscillator is fed to the multiplier, which works as a doubler on 20 or a tripler on 15. You can also check the adjustment of L2 by measuring the grid voltage at the buffer/multiplier. The voltage should be between — 50 and — 100 volts when peaked. In both cases you will probably find that you have more grid drive than needed for the final amplifier. This, of course, can be controlled by R1. Only the one adjustment of L2 is needed for both 20 and 15.

Next, change to a 40-meter crystal and switch S3 to 28 Mc. Use the same procedure for adjusting L1. In this case, the oscillator plate is tuned to 20 and the multiplier works as a doubler. The amplifier grid current on this band should be 2 to 3 ma.

You should now be ready to check the final amplifier and also neutralize the stage. We found that without neutralizing, the amplifier was unstable on some bands. One method of neutralizing is to remove the plate and screen voltage from the amplifier (actually disconnect the plate and screen leads); apply grid drive, set C5 at maximum capacitance — plates fully meshed — and then turn the amplifier tuning capacitor, C4. As you go through resonance you’ll notice a “kick” in the meter reading with meter reading amplifier grid current. Adjust C5 by bending it toward or away from the amplifier tubes, looking for the position that will result in the least kick in the grid-current reading when C5 goes through resonance. Actually, we found that the setting of C5 was not critical and the amplifier was neutralized at almost any position of the aluminum strip.

After neutralizing, connect a dummy load to the output terminals of the transmitter. A 100-watt light bulb is OK for this purpose. Set all the controls as you did for the initial tests and tune up for grid drive to the amplifier. Then switch the meter to read amplifier plate current and set C5 at maximum capacitance. Slowly tune C4 through its range and you will notice a slight dip at one point, indicating resonance in the amplifier. With C4 at this setting, switch S3 to the “operate” position and load up the amplifier by decreasing the capacitance of C5. Use the dummy load as an indicator and always readjust C4 for maximum output after each change in C5. With 150 watts input the 100-watt lamp should be at full brightness.

Next, key the transmitter while observing the VR-150 to see if it goes out when the key is closed.

(Continued on page 106)
resistance of $R_2$ by moving the slider down the resistor. Only go a little at a time and check the VR tube action. When you reach the point where the VR tube stays lit with the amplifier loaded, that is the correct setting of $R_2$. If you have a 0-50 milliammeter you can open the ground lead of the VR tube and insert the meter. Adjust $R_2$ for a no-load reading of 28 to 30 mA.; this will be a satisfactory setting.

In our setup the plate voltage under load was 650 volts at 230 mA. Plate voltage on the oscillator and multiplier was 310 volts. Screen voltage on the multiplier was 220 volts, and on the screens of the oscillator and amplifier, 150 volts. With the exception of the last, these voltages may not be the same with your transformer. A variation of about 10 per cent should not be important.

Using a 40-meter crystal, tune up on 15 or 10 and listen to the keyed signal on your receiver. Adjust $C_1$ for best keying characteristics. You only have to adjust $C_1$ once and then you can forget about it.

In order to keep the input down to the Novice 75-watt level, proceed as follows. Set $C_4$ at maximum capacitance and resonate the amplifier with $C_4$. Gradually bring the loading up by decreasing $C_5$ and keeping the amplifier in resonance with $C_4$. Check the plate voltage reading and, using the standard formula $P = I \times E$, adjust the loading (plate current) so that the amplifier runs at the 75-watt maximum for Novice licenses.

If v.f.o. operation is desired, the output from the v.f.o. should be fed into $J_1$, with $S_1$ switched to the v.f.o. position. This grounds the cathode of $V_1$ through a 0.01-$\mu$F capacitor. Tune-up is the same as with crystal input.

A plate modulator for the transmitter will be described in a coming issue of QST.

---

**New Apparatus**

**Eddystone Full-Vision Dial**

The partially-disassembled dial mechanism shown in the photograph is the Eddystone No. 598 dial and drive. The dial escutcheon, which is finished in black crackle, measures 6 inches wide by 4 1/2 inches high (with a 3/64-inch lip) and the dial scale is marked on the perimeter from 0 to 100 over a 180-degree arc. There are four blank spaces for the addition of any other desired scales. Several spare cards are furnished with the dial. The backlash-free ball-bearing drive mechanism is of the epicyclic type with a reduction ratio of about 10 to 1. A ball-bearing driving head, similar to the unit in the left foreground of the photograph but without any pointer, is also available as a separate item (catalog No. 892). A 2 1/4-inch black fluted knob is part of the dial assembly. Input and output shafts are 1 1/4 inch in diameter. Eddystone products are distributed in the U.S.A. by the British Radio Electronics, Ltd., 1742 Wisconsin Ave., N.W., Washington 7, D.C.

— E. L. C.

**Eddystone Die-Cast Boxes**

The accompanying photograph shows a solid substantial box for v.f.o. construction or other applications where mechanical ruggedness and a high order of electrical shielding are desirable. The zine-alloy die-cast box from Eddystone Works in Great Britain has a close-fitting flanged lid, held in place by counter-sunk screws which are furnished. Three box sizes are available with the following dimensions:

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>896</td>
<td>4 7/16</td>
<td>2 7/16</td>
<td>1</td>
<td>11 1/4</td>
</tr>
<tr>
<td>650</td>
<td>4 11/16</td>
<td>3 11/16</td>
<td>2 1/16</td>
<td>17 1/4</td>
</tr>
<tr>
<td>845</td>
<td>7 3/8</td>
<td>4 11/16</td>
<td>2 1/16</td>
<td>32 1/4</td>
</tr>
</tbody>
</table>

The box shown in the photograph is the Model 845, and its selling price is expected to be about four dollars. Eddystone products are distributed in the U.S.A. by the British Radio Electronics, Ltd., 1742 Wisconsin Ave., N.W., Washington 7, D.C.

— E. L. C.
A transistorized n.b.f.m. handy-talky for six meters with one-fourth watt output and one-half microvolt sensitivity. The circuitry employs 22 transistors and 5 diodes, and features very low receive power drain along with high transmitter efficiency. The unit is built in a $3\frac{1}{2} \times 6 \times 10$-inch Minibox and uses a standard mobile handset and an auxiliary $3\frac{1}{4}$-inch speaker.

A Transistor Transceiver for 6 Meters

BY HALFORD R. GREENLEE,* W3AXF

Interest among radio amateurs in transistors has been on the increase as the devices have been developed and improved. However, few hams feel nearly as much at home with transistors as they do with electron tubes, which are slated to become obsolete for most of their present applications. I can almost hear the protests that this last statement will bring forth—"Tubes can do a lot of things transistors can't." — "What about prices?" — "Transistors are very temperature-sensitive, aren't they?" These comments would have been appropriate at one time, but transistor development and mass-production along with better understanding of transistor circuit requirements have changed the picture in their favor. In this article, I will try to bring you up to date on a few of the potentialities and applications of transistors in communications.

Let me list a few things about transistors you may not realize:

1) Transistor life far exceeds that of tubes.
2) Transistors will operate effectively in many applications with less than a milliwatt of d.c. power — that is, less than $1/3000$ the power that the usual tube circuit takes.
3) Transistors can be compensated with present techniques to operate from well below zero degrees F. to 150 degrees F. (germanium) or higher (silicon).
4) Transistors with low noise figures and good gain at v.h.f. are available at prices amateurs can afford. An example is the Philco 2N1742 which has a noise figure of less than 5 db. at 2 meters.
5) Power transistors for v.h.f. are on the way. A Western Electric mesa transistor, the 2N1645, will deliver more than a watt output at 2 meters. A Pacific Semiconductors mesa silicon now available will produce about 2 watts output on 2. Prices on such power transistors are still rather high, but will drop in time.

Perhaps these facts will bring a few possibilities

Because their power drain is so low, transistors can be used freely in battery-operated equipment — so much so that circuits can be comparable in complexity, and performance, with line-powered tube equipment. The only limitation is transmitter power output — not a serious one in "handy-talky" gear of the type described here.

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for equipment to mind, such as a mobile receiver for a/b, a.m. and c.w., with double conversion and high sensitivity, fitting under your dash easily and pulling in no more than 10 or 15 milliamperes from the car battery. How about a mobile transmitter with a tube power amplifier, such as a 6Q6, putting out 50 watts and drawing only 100 watts from the battery? Possibly you would like a very small low-noise converter for 6 or 2 for the car, using only a few milliwatts. My own interest in transmitters has been mostly in applying them to portable, hand-held transceivers, pocket receivers and the like, where the low power drains allow small-size components and very compact construction.

The first transister project I tackled was a 6-meter n.b.f.m. handy-talky. My club, the Anne Arundel Radio Club of Arundel County, Md., has an extensive Civil Defense emergency net; our equipment is commercial f.m. mobile and fixed-station gear, rockbound on the 6-meter band. A compact, dependable handy-talky with high performance and low battery consumption was a much-needed aid to our work, so it seemed a "natural" for a project. The final result was a unit having a highly sensitive, low-drain receiver and an efficient transmitter of 1 1/2-watt output. (A high-power version of the transceiver has an additional 2E21 amplifier, transistor power supply, and nickel-cadmium battery. It delivers 15 watts — and it is still very portable.) Below is a description of the circuitry involved, which will perhaps suggest to you circuits of your own.

50-Mc. Transmitter

The transceiver uses a 6-Mc. oscillator and doublers to get to 50 Mc., as shown in Fig. 1. The last two stages use germanium mesa transistors in grounded-base configuration. Like grounded-grid tube circuits, grounded-base operation usually offers better stability, but lower gain. It might have been necessary to neutralize the final if grounded-emitter operation had been attempted. Overall transceiver efficiency runs about 30 per cent.

Notice that only the oscillator and modulator have fixed bias, and all other stages are Class C, being cut off with no drive. For a transistor to run Class A and draw significant current without drive, it is necessary to bias the base toward the collector voltage, as is done in the oscillator. A Class C transistor stage does not usually present temperature problems, other than requiring slightly more drive at lower temperatures. How-
ever, to stabilize the d.c. operating currents of a
Class A stage, certain precautions are necessary.
An emitter resistor provides degenerative d.c.
feedback and tends to minimize any tendency for
the emitter current to change. The larger the
value the better, provided the power-supply
voltage lost is not excessive. The base should be
biased by a voltage divider, which will hold the
base voltage fairly constant. Lower divider values
increase stability, but waste power, so again a
compromise is necessary. Values of all three bias
resistors must be designed for the desired col-
lector current. The d.c. bias network is very im-
portant. Circuits with poor bias arrangements
such as shown in Fig. 2 may be very tempera-
sensitive and force some builders to decide that
the transistor will work at only one temperature.

Fig. 2—The right way and the wrong way to bias a
transistor.

POOR

GOOD

BEST

a kilocycle with modulation, $R_1$ sets the operating
point of the diode, and thus the center frequency.
Multiplication is necessary to get the 10-ke.
swing desired at 50 Mc. An a.m. transmitter
could be simpler, having an oscillator, buffer and
final plus a modulator for the final.

The high-power final (not shown) uses a 2E24,
with the quick-heat-filament and transistor
power supply connected to the battery only on
transmit. The battery is a nickel-cadmium 6-volt
unit and can deliver the required 40 watts for
nearly an hour. Although it is small, about
4 X 2 X 3 inches, the heavy drain does not
damage it, as it would an ordinary lead-acid
battery. The 1/4-watt output of the transistor
transmitter easily drives the 2E24 to 15 watts
output.

**Modulator**

The modulator consists of an audio amplifier
coupled to a variable-capacitor diode. The ca-
pacitance of this diode varies from about 50 $\mu$F
down to 2 $\mu$F if an applied voltage, in the re-
verse direction, is varied from a volt or so up to
25 volts. The crystal oscillator is a series-resonant
-type, and the diode in series with the crystal
varies the oscillator frequency a little more than

This transceiver is a breadboard model, with
no attempt at neat appearance. The top shelf
is the transmitter, with the oscillator, doublers
and final from left to right. On the second shelf,
the receiver r.f. stage is
on the right, shielded
from the mixer and the
antenna circuit. On the
left are the high i.f.
amplifier, mixer and oscilla-
tor. The bottom shelf has
the low i.f. on the left,
then the squelch and detec-
tor driver stages, and the
audio on the right. The small shelf on the left
holds the switching re-
lays, and the batteries
line the bottom of the
case. The other half of
the box holds only the
speaker. The whip an-
tenna mounts directly on
the coax jack at the left

**F.M. Receiver**

The receiver, Fig. 3, is double-conversion, with
intermediate frequencies of 3369 kc. and 355 kc.
The low-noise 2N1742-series transistors are used
in the front end. They are probably the best h.f.
transistor bargain on the market. The r.f. stage
is operated grounded-base to avoid having to
neutralize it. Front-end noise figure is less than
6 db., giving an f.m. sensitivity of better than

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DECIMAL VALUES OF CAPACITANCE ARE IN μF, OTHERS ARE IN μF EXCEPT AS INDICATED.
20 db. quieting for a 1/2-μV signal. The first oscillator uses a third-overtone crystal, making frequency multiplication unnecessary. It is coupled to the emitter of the mixer because this minimizes interaction between the oscillator tank and the mixer input circuit.

Although the receiver is crystal-controlled, replacing the front-end crystal with a short will make the oscillator tunable.

The front-end image and spurious-signal rejection was -35 to -40 db. with the circuit shown. When the receiver was used in the vicinity of other-service mobile transmitters, some trouble was encountered with blocking. An improved front end was used later in a pocket receiver which had double-tuned circuits (critically coupled) at the input and output of the first mixer. This increased all spurious signal rejection to -70 db., which is quite adequate although not always necessary. Little selectivity can be supplied by the antenna circuit (Q = 10), because it must be heavily loaded to avoid losses and reduced sensitivity.

The high-i.f. amplifier, second mixer, and second oscillator are very similar to the front end. The collector circuit of the mixer is connected to a very compact 455-ke. band-pass “Pernakay” filter, made by Motorola. It has a 20-ke. useful band pass, a bit wider than necessary, to allow for misalignment and oscillator temperature drift. Better skirt selectivity is available by using subminiature mechanical filters developed by Collins for mobile receivers. The filters cost about $30.00 and are available in 12-ke. and 32-ke. bandwidths. Clevite also makes an excellent ceramic ladder filter having the best characteristics that I’ve seen, housed in a tiny case 1½ inches long.

The following low i.f. stages are RC-coupled because they do not require alignment or neutralization and because they make good limiters. Their gain is low, about six times in voltage per stage, but they use less than a milliwatt each. Following the last limiter is a Foster-Selley discriminator using germanium diodes.

The speech circuit amplifies and rectifies noise in the 15- to 20-ke. region, the resulting filtered d.e. being used to control the first audio stage. When a signal appears in the i.f. pass band, the front-end noise is quieted and the audio turned on. The first audio stage also acts as a d.e. amplifier to turn on the Class B output stage. Audio output is 100 milliwatts to the four-inch speaker. This is sufficient volume for all but the noisiest surroundings. An a.m. receiver could be very similar to this one, with the addition of a.g.e. circuits and substitution of a diode detector for the discriminator.

It is not recommended that a transformer-coupled i.f. amplifier be used for an f.m. receiver because such amplifiers will not make good limiters unless diodes are used across the transformers. When overdriven, they may break into a type of squelching oscillation, modulating the signal with an audio howl. This type of amplifier also presents problems for an a.m. receiver. Here the amplifier must have a.g.e. since limiting of strong signals cannot be permitted. When a.g.e. is applied by the usual method of controlling the base current, the transistor input and output impedances vary, shifting the loading on the transformers and, consequently, the bandwidth of the i.f. There is much to be said for selectivity lumped at the input of the amplifier. Trouble with feedback affecting alignment is minimized, as is the chance of cross-modulation of weaker signals by strong ones.

**Power Supply**

The batteries used for the receiver and low-power transmitter are mercury cells. The receiver, running from 9.4 volts, pulls only 10 ma. on standby (squelch closed), which is less than 1/10 the power used by a pilot bulb! The drain with full audio output rises to 35 ma.

The transmitter uses about 45 ma. at 17.6 volts. Despite the higher cost of mercury cells, they are to be preferred because of the much higher ratio of power to weight and size, and the very constant terminal voltage they deliver until complete exhaustion. Thirteen penlite-size cells are used, and will operate the transceiver for about 200 hours.

The battery power for the transmitter is controlled by the antenna relay, $A_2$, the -17.5-volt line being connected to the transmitter through the antenna lead. This accounts for the use of blocking capacitors in series with the antenna and the antenna input to the receiver and also for the r.f. choke between the supply and antenna leads.

**Construction Notes**

Construction of the handy-talky was done in the simplest possible manner, in keeping with the experimental nature of the original unit. A 10 × 3 ½ × 6-inch aluminum Minibox was used for the housing. A cradle was made to fit the F-1 handset. Its side flanges are bent together far enough so that the handset snaps into place. A
5-conductor coil cord was used; these are hard to find, but a rearrangement of the microphone circuit would allow using a 4-conductor cord. A 4-pin audio connector for the handset permits other microphone-earphone combinations, such as PBX headsets, to be used. The antenna is a car whip fitted with a male coax connector.

The electronics inside was built on four shelves which have flanges bolted to one side of the box. The other half of the box has only the 3 1/2-inch speaker mounted in it. The transmitter is on a single shelf, while the receiver was broken up into two shelves to fit the available space. The small shelf holds the two transmit-receive relays, which are 5000-ohm Potter & Brumfield units requiring only 60 mw, power each. The controls for volume and squelch and the power switch can be located wherever convenient.

The receiver layout incorporates shielding in the front end to isolate the r.f. stage, mixer, and oscillator. The six high-frequency inductors were wound on slug-tuned 3/16-inch ceramic forms; a rough guide for the number of turns (close-spaced) for each is given with the diagram. Receiver and transmitter wiring is done with small standoff terminals mounted on the aluminum shelves wherever needed to support components and allow short lead lengths. Low-inductance standoff capacitors were used in the front end.

The 455-ke, Rf-coupled amplifier must be laid out as much in a straight line as possible. Care must be used to avoid any feedback, because of the high gain at this frequency. The transformer between the last limiter and the discriminator is an Argonne AR-60; it should be possible to substitute any unit with similar characteristics. The audio transformers are UTC DO-T types and make possible a very compact audio section.

The transmitter layout is not very critical, except that long lead lengths should be avoided in the final. The transistors in the last two stages are mounted in low-capacitance insulated heat sinks. The power dissipation may seem very slight, but will produce excessive junction temperature if no sink is provided. Transmitter coil forms are also 3 1/2-inch slug-tuned.

The holders for the thirteen type RM-12R mercury cells are mounted on a plate in the bottom of the box.

Alignment

Receiver alignment begins with the adjustment of the 180-ohm discriminator input coil, $L_d$, for zero d.c. voltage at the top of the gain control, $R_g$, with a strong 455-ke. signal injected into the second i.f. input. A sensitive meter or scope is needed. Then all high-i.f. and front-end tuned circuits should be checked with a g.d.c. to make sure they cover the desired frequency range. Supply voltage must be applied for this, or measurements will be meaningless. Listen with another receiver to determine if the two conversion oscillators are running. If they are not, check polarity of the feedback windings. Feed a generator on 50 Mc. into the antenna jack and hook a scope to the collector of the third or fourth 455-ke. stage. Looking at the 455-ke. signal when the generator is tuned in peak all high-i.f. and front-end circuits. Keep the generator input level below the limiting point of the stage your probe is connected to. It should be possible to obtain good audio noise quieting at 1 1/2 -uv. input. If all circuits are aligned and there is sufficient over-all gain, turning up the squelch control will cut off the no-signal noise and a signal of less than 1 1/2 -uv.

(Continued on page 140)
Oscar II is about to fly! Perhaps even by the time you receive this issue of QST, but certainly within the next month, the little box will have been fired aloft from its west coast launching pad. If all goes well, Oscar II will be making a polar orbit and transmitting HIs on approximately 145 Mc. Listen to W1AW for the latest word on Oscar II and its orbit predictions.

Official Air Force permission for the shot was given in early April, again on a non-interference basis to the primary mission of the military space vehicle. And again, the Air Force has promised complete cooperation toward the success of this amateur radio experiment.

Reporting

When you hear Oscar II, half the job is done — be sure to report what you hear. Three types of reports are requested for Oscar II. The first (and simplest) is merely your QSL card, mailed to the Project Oscar Association, P. O. Box 183, Sunnyvale, Calif. Jot down on the card the time you first hear the signal and the time it fades out. Also, if you have a stop-watch or watch with a second hand, count the number of seconds it takes the satellite to send 10 HIs.

A more advanced report makes use of the form printed in July, 1961, QST, page 59. Read this article for full particulars, or write to the Project Oscar Association for a reprint.

The most complete report makes use of a special tracking form which has been printed by the Project Oscar Association. Copies, with full information concerning Doppler measurements, are available from the Association.

An article on “Eyeball and Eardrum Doppler Tracking,” by W6VMH in the April issue of QST, also gives procedures for advanced tracking techniques. And for do's on how to determine when to listen for Oscar II, see “Keeping Track of Oscar,” by W8FKC and W8CWL, in the May, 1962, issue of QST.

World-Wide Oscar Coordinators

In order to facilitate the distribution of special forms and information relating to the Oscar program, the Association has appointed a number of Oscar Coordinators throughout the world. Overseas hams are encouraged to contact whichever of the following Coordinators is nearest them for the latest Oscar data.

The signal that you will be hearing from Oscar II comes from a little 8-2b, package looking much like this. The transmitter is assembled on the circuit board at the left center, and the HI-keyer circuits are at the lower right. The case is packed with foam insulation before being buttoned up, and that mechanical trigger at the right releases the antenna into an upright position when Oscar is ejected from the parent vehicle.

Listen for Oscar II on 145 Mc, and report what you hear to the Project Oscar Association, P. O. Box 183, Sunnyvale, Calif.

June 1962
Contest contrasts. At the left is the lightly-dressed crew of K6DBZ/6, atop Sierra Peak, in the San Diego Section. They worked 477 stations on 50, 144, 220 and 1215 Mc., for 13,356 points, the West's top score. Look now at K1JBY and K1KOB, right, as they prepare to slide down the trail from Mt. Agamenticus, near York, Maine. All equipment, generator, and grub were dragged 1½ miles up the mountain road on toboggans, to set up K1NTC/1. The hard-to-get Maine Section was provided to 104 grateful 6- and 2-meter operators. Driving sleet during the trip up and through most of the contest period, didn't make things any easier.

1962 V.H.F. Sweepstakes Summary

15th Running Shows High Activity Despite Poor Conditions

There were few major records set in the 1962 version of the ARRL V.H.F. Sweepstakes. Thanks to practically no DX on 50 Mc., and tropospheric propagation at or near the winter minimum for the 144-Mc. operators, not many statistics of the 1962 contest equal the records set in 1960 and '61. That most 1962 categories even come close is a tribute to the steadily increasing level of v.h.f. interest in recent years.

Our tabulation shows 1,506 valid logs, a drop of 5 per cent from 1961, but still above any other year. Of these, 1,100 showed 50-Mc. activity — an all-time record. Operators reporting 144-Mc. contacts totaled 941, a slight drop from 1961, undoubtedly reflecting the discouraging conditions prevailing over much of the country. Club competition was stiffer than ever. There were 69 valid club entries, a new high, and the gavel-winning total run up by the Mt. Airy V.H.F. Club of the Philadelphia area, 694,552 points, is an all-time club record.

The country's top score by a single operator was turned in by W2EIF, Camden, N. J.; 521 contacts on 50, 144 and 220 Mc., for 21,960 points. Joe won the Southern New Jersey Section award, and was one of 5 contestants to work 14 or more ARRL Sections. Others were W3TYX, Philadelphia; W1MEH, Easton, Conn.; and W2LWI, Wappingers Falls, N. Y., who piled up his 14 on 144 Mc. The 15-section total of W2BLV, Haddonfield, N. J., is the lowest top in this department in many years, evidence of the dismal tropospheric conditions in the East.

The highest multiple-operator score reported was that of W1MHL/1, perennial record-setters of the June and September parties. With Wis DDF, GEF and KSI doing the operating, W1MHL/1, Hogback Mountain, Vt., worked 461 stations in 18 sections, on 50 and 144 Mc., for 25,732 points. The Vermont Section hul was pushed to full advantage in collecting those 18 sections. W1MHL/1 was heard on e.w. on both 50 and 144 Mc. throughout the contest, whenever use of this mode would pay off.

Perhaps the most encouraging statistic that can be drawn from the contest as a whole is the country-wide nature of the participation. In years gone by, it took sporadic-E DX, with its potential for large numbers of contacts from areas of low v.h.f. activity, to bring contest entries from all parts of the country. This time we find 30 entries from North Carolina; 8 from Colorado (with section winner K0TSD doing 55 stations); 28 from the Los Angeles Section (long an area of high activity, but low contest participation); 23 from North Texas; 10 from Oklahoma, where winner W5TKT worked 102 stations; and so on down the list.

At least 10 single-operator stations made more than 400 contacts. W2EIF had the top, 521. W3KKN, Willow Grove, Pa., with 514 was the only other to exceed the 500 mark. It helped to be within striking distance of Philadelphia, as witness 126 for W3TYX, 451 by W3HYJ, 434 by W3CL, 415 by K2TYW, 400 by W3HKZ, and 412 by W2AXU. Other sections of the country were not far behind. In fact, this may have been the best-balanced contest geographically that we have had on the v.h.f. bands. Note that W0ROS, Illinois Section, worked 432 stations; K6UMM/6, L. A. Section, 457 stations; W8CCl, Ohio Section, 402; and K6DBZ/6, San Diego Section, 477.

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We remind everyone that these country-wide totals are cited merely as evidence of outstanding work. Awards are made only on the basis of competition within one ARRL section, as it is recognized that no satisfactory basis exists for national awards.

Though a high percentage of all contestants worked two or more bands, some very good records were made by concentrating on one favorite. K2MLB, West Orange, N. J., won the Northern New Jersey Section Award on 30 Mc. only, posting the country's top one-band score, 540-13-15,548. Section awards were won in Minnesota, New York City-Long Island, Missouri, Nebraska, Rhode Island, Oregon, South Carolina, Wyoming, East Florida, Los Angeles, North Texas and British Columbia on 30 Mc. Winners in San Francisco, Sacramento Valley and West Virginia were 2-meter men. W31BH, Philadelphia, worked an even 300 stations on 144 Mc., for a score of 12,000 points. Charlie has missed recognition in some of our past contest reports, but he is always up there at or near the top of the 2-meter contingent. This time he was No. 1 by a wide margin.

Club activity and innovation continue to zoom upward. The Mt. Airy V.H.F. Club, taking part in only their 6th SS, put on the greatest club drive in the 15-year history of the contest. Putting practically every member on the air on one or more bands, the Mt. Airy gang overwhelmed all competition, including that from 8-time winners, the South Jersey Radio Association. A glance at the totals in the SNJ and EPA Sections, below, will give the reader some idea of how intense this rivalry is.

It is of interest to note that the first three clubs are in the same spots as last year, and the only change in the top three since 1960 was the swap of first and second places by Mt. Airy and South Jersey last year. The 6-Meter Club of Chicago remains a strong threat, holding the number-three spot for three years running. The Dayton Amateur Radio Association made another valiant try, pushing the National Capital V.H.F. Society out of fourth place. A number of others will bear watching. It will be seen that Dayton, the Rochester V.H.F. Group, the 5130 Club, the Mobile Sixers and the Central New Jersey V.H.F. Society all improved their standings over last year.

Competition for a spot in the "Top Ten" clubs provides almost as much interest as the battle for the annual gavel award. Many clubs recognize that they have little chance to hit the top spots, but that doesn't keep them from going all out each year. This kind of effort can be a great club-spirit builder. If your club hasn't tried it, right now is a good time to start planning for the 1963 running of the V.H.F. SS. — E. P. T.

**CLUB SCORES**

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<tr>
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<td>95</td>
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<td>South Jersey Radio Assn.</td>
<td>510,250</td>
<td>105</td>
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<td>6 Meter Club of Chicago</td>
<td>399,017</td>
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* K3EKE, op.  

June 1962
No-Holes
V.H.F.
Mobile Installations

Some Car-Saving Hints for 6- and 2-Meter Mobile Enthusiasts

BY EDWARD P. TILTON,* WIHDQ

Latest in a long line of WIHDQ mobile installations. Antenna shown, a 2-meter turnstile, can be removed in a few seconds and whips for 50 or 144 Mc. substituted.

Almost since the first ham gear was installed in a car, the fellow who wants to work mobile has had to do battle with other members of the family, and stare down his car dealer, before getting clearance for installation of a mobile rig in the family chariot. This is not surprising, in view of what is done to some cars in the name of amateur radio. The writer speaks from experience in this department, having had his first mobile QSO in the summer of 1933 (when in-motion operating of a ham station had not yet been legalized) and he has owned mobile gear of some sort almost continuously ever since.

The Corvair Monza, bits of which appear in some of our pictures, is the 12th car to carry WIHDQ/mobile. Every new car presents new problems, but we have found it possible to make a good installation for 50 and 144 Mc, without upsetting the principal occupant of the car too greatly. Perhaps it's just that she's well accustomed to this business by now, but even the dealer who sold the car agrees that nothing has been done to lower its trade-in value. Possibly some would-be v.h.f. mobileers will be interested in the means by which this desirable state of affairs is achieved.

No Holes — Almost!

Now and then it is possible to make a true no-holes installation, but more often the term used for our title requires a little modification. There are many ways to run wires and mount antennas, using holes that will not show. This may not always be easy when you have to accommodate a 10-foot, center-loaded whip, but the kind of antenna needed for 50 or 144 Mc can be installed fairly simply and unobtrusively. Fixtures for v.h.f. antennas can be attached to the car body in various ways, or adapted to some kind of bumper mount. It is nearly always possible to design the entire setup so that it can be removed in a matter of minutes, leaving no visible evidence that the car formerly housed an amateur mobile station. If you trade cars fairly often, this is a considerable asset. Let's consider body mounts first.

If your car is equipped with a broadcast receiver, it probably also has a whip. The simplest mobile installation for 6 or 2 uses this whip, and nothing more. At something around 53 inches long, a whip will work passably on both 6 and 2, without too bad a mismatch to either 50- or 75-ohm cable. In fact, with 50-ohm coax and an adjustable whip there will be lengths that will give near-perfect match on both bands. This is not the world's best antenna, but it will work, and many v.h.f. mobiles use nothing more.

The usual place for a broadcast whip is not the best spot for a v.h.f. antenna, vertical or otherwise, but it will do in a pinch, especially for the aesthetically timid. Then there are ways to utilize the whip, or something more solid

*V.H.F. Editor, QST.
mounted in the same way, as a support for a 2-
metal halo 1 or turnstile, in order to capitalize
on the advantages of horizontal polarization.
One of the neatest jobs we've seen done with a
turnstile is the 2-meter mobile setup of W1CUT.
Laird modified one of his turnstiles 2 by installing
very small-diameter white coax, in place of the
original black vinyl-covered feed line. He taped
the 90 degree phasing loop to the vertical support
with white plastic tape, and then ran the main
feed line down inside a 1/4-inch dural tube used
for the main support. The mount is one normally
used for broadcast masts, and it is in the usual
place, on the cowl just ahead of the door on
the driver's side. The turnstile is high enough
to clear pedestrians, and with the partial camouflage
described, it draws few fewer of those dreaded "What channels do you get on that thing?" comments than the installation pictured in the original turnstile article.

Rear-Deck Mounting Methods

The rear-deck opening on most cars is a good
place for whip mounts, if not for more ambitious
antenna supports. A small piece of sheet aluminum
only a little wider than a coaxial fitting and
perhaps 3 to 6 inches long can be bent up to fit
tightly into the rain gutter at almost any spot
around the edge of the rear-deck opening. One or
more self-tapping screws can be run into the bottom or side of the gutter to hold the mount in
place, but often such fastening is not needed.
No use making a sketch; the problem is different
for every car. If RG-58/U or smaller coax is used,
it can be run from the exposed coaxial fitting,
over the edge of the gutter, and into the car
wherever convenience dictates, or you can drill a
hole in the rain gutter at the risk of a slight leak.
A small hole in the forward wall of the rear
compartment will permit the coax to be fed into the
passenger area, and run under the rug up to the
operating position, in any number of ways.
Various W1HDQ mobile installations using versions
of this technique have appeared in QST.

1 For a 2-meter halo that uses the white as part of the
transmission line, see Breetz, "A Simple Halo for 2-Meter
2 Campbell, "Turnstile for Two," QST, April, 1950, page
29.

Many cars have easily removable bits of trim
that offer possibilities for hidden access holes.
Pontiac, a few years back was a favorite with
mobile enthusiasts, because of a removable
emblem on the side of the rear fenders, just the right
size to be replaced by a spring mount. Not many
car makers are that considerate, but there's
usually some gimmick that can be removed or
drilled, and then either replaced or repaired
when trade-in time comes around.

The Monza's contribution to v.h.f. mobile is
in the form of two U-shaped decorations on the
horizontal surface just in back of the rear window.
Our photo shows one way of making use of these.
The antenna mount, an inverted U of aluminum, is
held in place by the two sheet-metal screws that
fasten the trim to the car body. The trim is a stock item, inexpensive to replace, so you
can drill it to your heart's content. The car
body can also be drilled in back of the trim, and
when the brightwork is replaced there will be no
visible hole.

We drilled a quarter-inch hole in the sloping
surface of the body in back of this trim. A couple
of inches farther in there was a metal partition in
the way. This was drilled through, keeping the
drill pointing down at an angle of about 30
degrees below horizontal. Then a piece of quarter-
inch tubing a couple of feet long was run down
through these two holes, and the point at which
it touched the fiber wall in back of the tilt-
forward Monza seat was determined by probing
carefully. Another hole was made at this point
through the fiber backing, and the tubing was
run into the passenger compartment through this
hole. Small-diameter coax was snaked through
the length of tubing, and then the latter was
pulled out. The small coax is expensive, and its
r.f. loss is high, so we used only a short length,
patching on some RG-58/U to make the run under
the carpet, up to the dash area.

The antenna mount has a coax fitting mounted
on its upper surface. The bracket was made from
1/16-inch sheet aluminum, which turned out to
be flimsy, even after being bent into the desired

Closeup of the antenna mount. Note that it is held in place with two sheet-
metal screws that also are used to mount the U-shaped pieces of trim.
The trim at the right is drilled to take small-diameter coax. In removing the
installation, the trim can be repaired or replaced, covering the single small hole
drilled in making the installation.
shape and fastened in place. The solution was to fit a piece of \(\frac{1}{4}\)-inch aluminum under the top surface, adding enough stiffness to support the turnstile steadily.

We now have a choice of simple whips, which can be attached by means of a coax fitting, or any more pretentious antenna that can be supported by the bracket. The turnstile support is quarter-inch tubing, slipped into a socket made from half-inch aluminum rod. This is about 2 inches long, drilled to a depth of 1 inch. A key point here is that the turnstile support is a sliding fit in this hole. Leaving it free to rotate in the mount will save many an element when the antenna brushes minor obstructions. It won’t take a solid whack against a heavy tree branch, but it has survived many lesser encounters that might have wrecked a more-solidly-mounted turnstile.

Locating an antenna of this kind at some point where it does not overhang the edges of the car has many advantages, perhaps the most important being protection of pedestrians. A turnstile at eye level can be murder otherwise, and putting it high enough to clear tall pedestrians may mean risking a lot of tree-branch and garage trouble. Long-range mobile antennas on the V.H.F. bands has convinced the writer that a few inches of height one way or another is of no real importance performance-wise, so this one was set only high enough to put it reasonably above the top of the car, and at a height that would not appear out of proportion to the car. Few people outside amateur radio will call this a beautiful installation, but any ham has seen worse! If we want to look our best, we can lift the turnstile off at a moment’s notice, and substitute piano-wire whips for either 50 or 144 Me., that are all but invisible except at very close range. The 6-meter job is only 30 inches long, base-loaded, but it works well enough so that we’ve had some good DX contacts with it when conditions were right.\(^3\)

**Some Bumper Mount Hints**

If you’re going in for real eyecatchers like 6-meter halos or other large antennas, you’ll need something more substantial than what we’ve been talking about up to now. Probably the simplest and least damaging to the car is some kind of bumper mount. There are several on the market that can be adapted to our purposes, but if you’re a real scrounger you can make one just as good, or better, for a lot less money.

If the antenna is as heavy or clumsy as a halo, you’ll probably want to support it on a length of tubing, 1 to 1\(\frac{1}{2}\) inches in diameter. This can be held to the several available bumper mounts in ways too numerous to mention. A lighter antenna such as a 2-meter halo or turnstile can be supported with something a bit less obtrusive. An arrangement we’ve used on several cars is shown in Fig. 1.

Clamps of \(\frac{1}{4}\)-inch aluminum, A and B, hook over the inner edges of the car bumper. A U-

\(^3\) Two base-loaded, 50-Me. whips are described in March, 1960, *QST*, page 18.

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Fig. 1—Top and side views of a bumper mount for v.h.f. antennas. Clamps of \(\frac{1}{4}\)-inch aluminum, A, B and C, hold a round vertical member, D, tightly to the bumper. Large antennas such as a 6-meter halo will require a 1- to 1\(\frac{1}{2}\) -inch aluminum support. Lighter antennas may employ a wooden dowel, as shown at D, drilled to take a \(\frac{1}{4}\)-inch aluminum rod, E, of any desired length. Dimensions are not given, as they will vary with each installation.

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shaped clamp, C, is bent around to fit a round wooden dowel, D, which takes the support, E, for the antenna. If the aluminum parts are buffed clean and then sprayed with clear lacquer, and the wood dowel is treated with metallic paint, this inexpensive mount will look as good as anything you can buy, and it will cost very little. The wooden member need not be round, but round stock is easy to come by. It should be 1 to 1\(\frac{1}{2}\) inches in diameter. If it is of hard wood it will last almost indefinitely. Soft wood may be strengthened by adding a strap of metal (a hose clamp is good) around the top, where the hole for the vertical support is drilled.

Our vertical antenna support was \(\frac{1}{4}\)-inch aluminum rod about 4 feet long. This was drilled at the top end to take the turnstile’s \(\frac{1}{4}\)-inch support, in a manner similar to that shown for the short stub in the photograph. This left the turnstile free to spin, even more of an asset on a support mounted on the back bumper than where the antenna does not extend beyond the car body.

This type of mount has been used on several cars in conjunction with a rear-deck whip socket, and it can be removed in a moment’s time and whips substituted, for appearance’s sake. There are times when most of us want to muster whatever dignity we can, and 2-band halos\(^4\) and other

A Transistor Power Supply

Battery Substitute for Transistor Circuits

BY GEORGE GRAMMER,* W1DF

In ham circles the words “transistor power supply” are usually taken to mean a modern substitute for the vibrator supply. This one isn’t. It’s an a.c.-line-powered supply for transistors.

One of the nice things about transistors is that they take so little power—easily furnished by a few flashlight cells (it says here). There are two fallacies in this pleasant theory: (1) You never have any flashlight cells when you get the urge to try a transistor circuit; or (2) you have some, but they’re dead. A few of both experiences prompted the construction of the low-voltage d.c. supply shown in the photographs. Its output voltage is adjustable up to 18 volts, depending on the current demanded of it. The maximum current at 18 volts is about 30 ma., but at some lower voltages the current can be as high as one-half ampere.

The Circuit

The electronic filter circuit used by Joe Galeski in his “Imp-TR”1 appeared to answer the problem of how to get adequate hum filtering. This circuit also suggested the possibility of getting continuously-adjustable d.c. output voltage, by installing a potentiometer for setting the base bias of the filter transistor.

To save the trouble of rewinding a transformer to give some desired output voltage, a 6.3-volt filament transformer was used, along with a voltage-doubling full-wave rectifier. This on the theory that a nominal 12-volt supply would take care of nearly all requirements, since 12 volts is standard for ear electrical systems.

The parts were first haywired together on the bench to see how the circuit would work. It met expectations, so the version shown was built up. The Minibox is 3½ by 2½ by 8 inches. Everything is insulated from it, so either side of the output circuit can be grounded.

The only part of the circuit that required any special attention was the potentiometer, R1. A few measurements showed that the d.c. output voltage stayed more constant with load changes as the total resistance of R1 was made smaller. However, reducing the value of R1 also decreased

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*Technical Editor.


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Fig. 1—Circuit of the low-voltage power supply. Capacitances are in µf., capacitors are electrolytic. Resistance is in ohms.

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CR1, CR2—Silicon, 750 ma., 50 volts or more inverse peak (1N536, etc.).

R1—2000-ohm control, linear taper.

S1—S.p.s.t. slide switch.

T1—Filament transformer, 6.3 volts, 1.2 amp.
All circuit wiring is between tie points on two strips, one mounted as shown and the other in the corresponding position on the far side of the box. The two diode rectifiers can be seen below the two filter capacitors in the center; these capacitors are the 1000-µf. electrolytics in the voltage doubler. The filter capacitor for the transistor base is at the right. The transistor is mounted on an aluminum shelf measuring 2½ by 1½ inches, with a half-inch mounting lip bent upwards. Insulating washers are used in bolting the shelf to the side of the case, since the collector is not insulated from the shelf.

The binding posts are similarly insulated.

The effectiveness of the electronic filter, no doubt because the IC product in the base circuit should have been kept constant. Unfortunately, getting some additional hundreds of microfarads at a 25-volt rating would have run into undesirable bulk. A value of 2000 ohms for $R_f$ was finally settled upon as a suitable compromise.

Incidentally, the transistor is not a d.c. regulator per se. The circuit does resemble the series-type regulator, but there is no stable fixed voltage to serve as a reference. Nevertheless, there is a species of d.c. regulation — enough so that the output voltage is held considerably more constant than the d.c. input voltage (between points A and B) with changes in load current. With a fixed setting of $R_f$, in the middle range, the voltage drop is of the order of 20 per cent, from zero output current to a load of around 300 ma. At light loads (up to perhaps 50 ma.) such as would be representative of most transistor circuits, the drop is under 5 per cent — hardly noticeable. The d.c. could easily be regulated by using a Zener diode as a reference, but at the expense of the voltage-adjustment feature.

**Ratings**

The supply wasn’t intended to be a replace-

ment for a storage battery, but all of the components used do have rather ample ratings, as compared with what might be taken continuously from flashlight cells. Theoretically, the d.c. output current should be limited to no more than 350 ma, or so, to keep within the ratings of the 1.2-amp. filament transformer. However, the transformer doesn’t get particularly hot at this load. The actual limitations on output power are tolerable ripple voltage and transistor heating.

The ripple-voltage limitation applies at the higher d.c. output voltages, as shown by the two upper curves in Fig. 2. A figure of 10 millivolts r.m.s. was chosen as a tolerable ripple, more or less arbitrarily. It represents just detectable hum in a pair of headphones connected across the supply output terminals (with low ambient noise and a headset having reasonably good low-frequency response). This is probably a rather severe test; we haven’t yet heard a trace of hum in actual use of the supply on transistor equipment. The 18-mv. curve can be taken as an “absolute” maximum, because at higher current the hum increases rapidly; the electronic filter begins to lose control above this level.

Transistor heating is the limiting factor at low output voltages. Here the collector-to-emitter voltage is highest, leading to maximum collector dissipation. The 2N301 is rated for a flange temperature of 80 degrees C. A series of tests showed that, with the type of mounting and enclosure used here, a collector dissipation of 3 watts was just under this temperature rating. It takes a few hours for the transistor temperature to stabilize at this figure, and larger currents than are shown by the curve of Fig. 2 can be taken for short periods if the transistor is allowed to cool off subsequently. Ordinarily, however, the shaded region should be avoided. The transistor limitation could be removed by using a regular heat sink for the 2N301, but this would increase the bulk by a considerable margin.

**Uses**

In most transistor circuits the steady current

(Continued on page 148)
Alltronics Model K RTTY Converter

Up to now there have been few well-engineered RTTY converters available either commercially or in war surplus for radio amateurs interested in teletype. Home-brewed terminal units (TU) or converters have been the order of the day. Some good designs have evolved 1 and met the test of amateur practice. The features required for optimum performance in amateur RTTY operating have now been combined in a unit that is simple to handle and dependable in performance. This unit, the Alltronics Model K Teletype converter, operates on the audio impulses received from the output of any reasonably-stable communications receiver. These signals are converted to provide timed d.c. impulses for printing RTTY signals. The block diagram in Fig. 1 indicates the different elements that make up a complete receiving and transmitting system and, except for the teletypeprinter, the terminal unit is probably the essential component that non-RTTY amateurs may require to adapt their existing stations for RTTY operation.

The Alltronics converter can be rack-mounted or not, as the user prefers; it has the advantage of compactness (our composite designs have too often been unduly bulky). It contrives an excellent balance and clean-cut appearance, without this in any respect being allowed to handicap its essentials of convenience in placement of operational controls.

There's an effective use of a dual magic-eye, tube for quick easy-tuning-in of f.s.k. signals. (Our personal choice is for cross lines on an oscilloscope. However, Alltronics approach is practical and saves the user considerable space as well as permitting the dollar's worth to go farther in equipment.) There are two front-panel closed-circuit jacks connected in series so that a printer and re-perf can be operated at the same time in the series loop. If desired, a single printer can be used. There's the expected on-off switch, a send-receive switch, and a reverse switch that permits a quick turnover on any signals on which mark and space are found to be reversed, or if a signal is tuned in "upside down."

Fig. 1—Block diagram showing a typical RTTY setup.

Operation

The block diagram of the Model K converter is shown in Fig. 2. Incoming signals first pass through a two-stage limiter, V1, which adjusts the amplitude variations to a desired standard, permitting weaker signals to have their equal chance to be copied. A linear discriminator amplifier, V2, and a rectifier circuit permit operation with normal 850-cycle shift or reduced (narrow) shifts. Low-pass filtering is used here to reduce noise and take out interfering beat notes higher than the dot rate. A symmetrical clipper and d.c. amplifier, V3, slices off a section of the filtered pulses, removing any remaining distortion and beat frequencies riding on top of the pulses. A rotary control located at the center of the converter's panel, labeled distortion, and normally in the 12 o'clock position, allows for increase in the weight of either mark or space to reduce errors caused by distortion of signals due to propagation anomalies.

The printing loop is operated from a final keying-tube stage, V4, which connects directly to the printer magnets. This is a recommended way to give electronic keying, which means freedom from the radio noise sometimes generated in relay-keyed loop circuits.

Adjustments

A meter on the front panel of the converter measures loop current. This can be adjusted

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“right-on-the-nose” for 30 or 60 ma. or other desired values. Adjusting the slider on an accessible internal resistor lets the user respect the printer manufacturer’s exact specifications for his machine, or change equipment from series to parallel magnet connections. The internal 120-volt d.c. supply for the printer and keyer tube is independent of the plate supply for the rest of the converter circuit. This lets you put the printer loop at ground potential.

A separate adjustable resistor and metering jack lets you adjust the loop supply to give correct bias current for an internal or external polar relay (which is not furnished) for f.s.k. or a.f.s.k. uses.

Front panel controls allow the dual tuning-eye indicator, V₁, to be set. Adjustment is made so that the mark eye just closes when a 2125-c.p.s. mark signal is tuned correctly, and so that the space eye closes when a 2975-c.p.s. signal is tuned in.

Other provisions in the converter include an octal socket in which a polar relay (optional) may be plugged. This is used for frequency shifting a v.f.o. for transmission. The keyboard in series with the printer loop activates this relay when the converter is switched to send. An output plug is provided on the back of the Model K, so that the converter can in this same way operate an external polar relay for transmission, additional loop circuits, etc.

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**Alltronics Model K RTTY Converter**

- **Height**: 4 inches.
- **Width**: 19 inches.
- **Depth**: 8 inches.
- **Weight**: 7 pounds.
- **Power requirements**: 117 volts, 60 cycles, 50 watts maximum.
- **Price class**: $390.
- **Manufacturer**: Alltronics-Howard Co., Box 19, Boston 1, Mass.

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The Loudenboomer Linear Amplifier

So far as we know, the Radio Industries Loudenboomer, Mark II, is the first commercial rig to use the new Eimac 3-400Z high-μ zero-bias triode.¹ Probably the most convenient feature of the tube, and thus of the amplifier, is that no bias or screen voltage is necessary. This greatly simplifies the power-supply problem, as only a single high-voltage power supply, delivering about 2500 to 3000 volts at 350 ma., is necessary to operate the amplifier at the full legal input.

Designed for table-top operation, your external power supply (a matching power supply is available from Radio Industries), is placed on the floor or in any other convenient spot away from the amplifier. Since all of the operating controls for the power supply are on the amplifier unit, the power supply need not be touched by the operator when turning the unit on and off or when going from send to receive.

About 40 watts of drive are required for full input to the amplifier and, since the tube is connected in grounded grid, a large percentage of drive power appears as useful r.f. output. Drive is supplied to the 3-400Z filament through a broadband transformer designed for an input impedance of approximately 50 ohms on all bands from 80 to 10 meters. A pi-network plate tank, using an adjustable output loading capacitor, allows for working the amplifier into a variety of load impedances, but the amplifier is nominally designed for operation into a 50-ohm nonreactive load. In order to maintain low minimum capaci-

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¹ Barber and Sutherland, “High-Power Zero-Bias Grounded-Grid Linear,” QST, September 1961, p. 11.
A neat layout of components is evident from this view of the Loudenboomer grounded-grid linear amplifier. A glass chimney surrounds the 3-400Z tube. The subchassis to the right of the blower contains the filament isolation circuit. The phono jack on this chassis is for introducing the drive to the amplifier. Notice the safety interlock switch assembly attached to the filament transformer. Amplifier output is taken from the SO-239 connector which is to the bottom left of the blower. Power for the amplifier is fed through the multiconductor cable running in at the lower right of the photograph.

In addition to the tuning and loading controls, there is a five-position band switch, two 15-amp. toggle switches (Plate and Fil) for remote control of the power supply (the Fil switch also controls the blower, and heater voltage for the tube in the amplifier), and a four-position meter switch. Grid current, plate current, relative r.f. output voltage, and d.c. plate voltage are measured. A 1N34A diode is connected through a voltage divider to the amplifier tank circuit for measuring the relative r.f. output voltage.

A cable is part of the amplifier package for connection to the remote power supply. High voltage for the amplifier goes through a separate lead to a safety terminal at the rear of the amplifier chassis.

Safety has not been overlooked in the Loudenboomer. A safety interlock switch is operated by the hinged lid on the amplifier cabinet and opens the 117-volt primary circuit when triggered. However, the metering circuit requires that the negative power-supply lead be above amplifier chassis ground by about one quarter of an ohm. For this reason it is, of course, necessary for the power supply also to have its negative output lead above ground since, in the interest of good safety, the power supply and amplifier chassis should both be connected to the “shack” ground.

The instruction manual furnished with the amplifier contains the usual installation, operating and circuit information. — E. L. C.

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Radio Industries Loudenboomer Linear Amplifier

Height: 7½ inches.
Width: 11½ inches.
Depth: 12½ inches.
Weight: 25 pounds.
Power requirements: 117 volts a.c., 2500 to 3000 v.d.c., 350 ma.
Price class: $280 (power supply, $160).
Manufacturer: Radio Industries, Inc., 1307 Central Ave., Kansas City, Kansas.

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Strays

All for Want of a Penny

An applicant for an amateur examination by mail forged the signature of a licensed amateur as certifying to his qualifications. However, since the would-be ham failed to put sufficient postage (a difference of one cent) on the envelope, it was not delivered to the FCC but was forwarded to the licensed amateur whose return address appeared on the envelope. The amateur immediately reported the attempted deception to the Los Angeles field office. The case is under study by FCC.

WA2SLY and WA2RAT are brothers, and sons of WA2QAO.

Congratulations to KH6IJ, recently appointed assistant professor of physics at the University of Hawaii.
In the photo above left, in the usual order, are W9PRN, Illinois SCA; W9GPI, Central Division Director; K9CJI, Twin City ARC president; and KB1AX, QST author. KB1AX is seen receiving a cover plaque award from W9GPI, his article in the January issue of QST having been selected by the League's directors for the award. . . . Above center is W2IXU listening to astronaut John Glenn. W2IXU reports that plenty of hams, using both surplus gear and modified ham gear, were in on the project to pick up Glenn's voice and feed it to NBC. . . . Above right we see W9CXX, president of Collins Radio, receiving the Navy's highest civilian award, the Distinguished Public Service Award, from Vice-Admiral Pirie. The citation pays tribute to W9CXX for his contributions of time and genius in all phases of naval communications and electronic navigation and says, in part: "Every Navy ship, aircraft and shore station has equipment made possible by his personal inventive genius."

Above, left, W8RLT gives a demonstration of ham TV at the Wolverine ARS. K8PU and K8ARG look on. . . . In the center, W1JMA, FCC engineer in charge of the Boston office, receives a plaque from W1JLN (c.) in appreciation for the many years of service he has rendered radio amateurs. . . . Right, K0FYD looks pretty happy after winning science fair honors. He received an all-expense trip to the World Fair in Seattle, and was there during early May.

The Johnson twins, W6GQX and W6GQY, were almost completely paralyzed by rheumatoid arthritis years ago while in the 5th grade. Alert mentally, they have only the smallest use of their right hands. Their KWM-2 is rigged up so that it can be turned on and off and tuned anywhere in a particular band by means of a stepping relay, and they can also rotate the beam. The boys handle phone traffic all day long and so, despite a great physical handicap, perform a substantial public service. Their ham radio tutor was Father Joseph Prince, WA6JOF, standing at the left. At the right is ARRL Southwestern Division Director Ray Meyers, W6MLZ, who is working closely with the twins to organize a net to be known as the "Handicappers." This net will be composed of handicapped hams who spend most of their time at their ham rigs and who will monitor the national calling and emergency frequencies, rendering whatever public service they are called upon to do. W6MLZ will serve as corresponding secretary of the "Handicappers," and the San Diego Council of Radio Clubs will furnish engraved certificates for net members. As a starter, look for the Handicappers around 14,300 kc, sideband. And if you want further information, or if you know of someone who should be recruited for this net, write to Ray Meyers, W6MLZ, Box R, San Gabriel, Calif.

June 1962
B.C. RADIO ANTENNA CONNECTOR SUBSTITUTE

When I tried to connect my new mobile converter to my automobile b.c. receiver, I found that I needed a Motorola type antenna plug to fit the car broadcast receiver antenna input jack. Quite by accident, I found that the common phono plug could be used as a substitute for the Motorola type antenna plug. Since most junk boxes contain a supply of the phono plugs, it is not only less expensive but more convenient to use the phono plugs, since they also fit the connectors of most converters. The phono plugs fit the Motorola flange jack when they are inserted fully into the outer shell of the jack.

—Edward F. Thomas, W4KQO

PAPER THERMOMETERS

Heat-sensitive paper which changes appearance sharply from white to black at predetermined temperatures can be conveniently used to measure the temperature of transistors, diodes, and vacuum tubes. "Thermopaper" is available in 36 different temperatures, ranging from 100 to 400 degrees F. The change from white to black occurs within a fraction of a second with a rated accuracy of plus or minus 1 per cent of the stated temperature. The paper thermometers are supplied in glass vials in ready-to-use ¾ X 2-inch strips. Each vial contains 100 strips of a single temperature. Thermopaper can probably be obtained from large welding-supply houses or other large industrial suppliers.

—Robert L. Martin, K1CJX

STORING RESISTORS

To keep track of my many hundreds of junkbox resistors I use pint pickle jars with the lids fastened to the under side of a shelf. I then separate the resistors by the first color code ring; that is, I put all of the resistors that start with a brown ring in the first jar and so on through the color code. With this system, any value from 1 to 10 megohms is in the first jar, 2 to 20 megohms in the second, etc. —W. E. Leerkuhn, W5KPY

PLASTIC CLOTHESLINE TEST

As an engineer friend of mine was kind enough to make some tests for me on plastic clothesline, the kind used by many amateurs for antenna guys. The line tested was plastic-covered and filled with a rayon cord, and measured about ¾ of an inch in diameter. All the tests were made with 12-inch lengths taken from the same piece of line. Here are the results of the test:

<table>
<thead>
<tr>
<th>Length at Failure (in.)</th>
<th>Load at Failure (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 3/4</td>
<td>240</td>
</tr>
<tr>
<td>14 3/4</td>
<td>275</td>
</tr>
<tr>
<td>14 3/4</td>
<td>250</td>
</tr>
</tbody>
</table>

—Walter Myers, W8MKT

SOLDERING GUN HINT

If the tips of Weller soldering guns are inverted, there will be better illumination of the work by the built-in lamps.

—Kenneth G. Kopf, W5TKI/4

KEYING MODIFICATION FOR THE 200V

The 200V transmitter develops an undesirable transient when switching between transmit and standby, and sometimes has key clicks when operating on c.w. This seems to be because of the high value of blocking bias applied to a number of low-level stages. The circuit shown in Fig. 1 shows some additions to the original circuit that will eliminate the trouble. All of the starred components in Fig. 1 are added components. In the case of the two capacitors, the 2-µf units should be either mylar or paper types, not electrolytics.

—O. M. Carter, W9ADN

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Fig. 1 — Components marked with a star, when added to the 200V transmitter circuit, will reduce keying transients.
6BY6 PRODUCT DETECTOR FOR THE HBR-16

The designer of the popular HBR-16 receiver, W6TC, has an enthusiastic word to say for the 6BY6 as a substitute for the 6BE6 product detector, V9. The 6BY6 is capable of handling larger signal voltages without folding up, and Ted writes that there isn’t any distortion on s.a.s. signals even when their strength is such as to pin the S meter to where it doesn’t drop back during normal no-modulation intervals.

The base connections are the same as those of the 6BE6, so no rewiring is necessary. A couple of values should be changed; these are shown starred in Fig. 2. Other values should remain the same as given on page 21 of the June, 1961, issue of QST.

The tube substitution has been tried by a number of builders of the receiver, and all are highly pleased with the improved performance.

NUT HOLDER

Double-faced tape (sometimes called toupee tape), the same as that used by printers to mount their plates, can be cut into narrow strips, applied to an index finger and used to hold a nut in a tight spot when starting it on a machine screw.

— Pete Kolupaee, W91VT

EMERGENCY TRANSISTOR CHECK

An ohmmeter can be used to give a quick positive indication as to whether or not a transistor is operative. Connect the emitter lead of the transistor to the plus lead of the ohmmeter (for p-n-p types) and the collector lead to the negative ohmmeter lead. The ohmmeter should then read a moderately low value of resistance. Now touch the transistor base lead to the collector lead; the resistance shown on the ohmmeter should drop to a lower value if the transistor is good. As an additional check, touch the base lead to the emitter lead; the resistance shown on the ohmmeter should now read a higher value.

Any transistor which gives the above indications on the ohmmeter will amplify. The exact values of resistance shown on the ohmmeter will vary, of course, depending on the type of transistor being tested.

— George L. Harvey, W4UI

INEXPENSIVE TRANSISTOR POWER SUPPLY

The power supply shown in Fig. 3 is capable of 20 to 25 watts output at about 170 volts. The circuit is built around an inexpensive filament transformer, T1. The unit was constructed on a homemade 2 1/2 × 2 × 8-inch chassis designed to fit under the ear dash. The transistors specified are “heavy” enough so that elaborate heat sinking is not necessary. Ordinary mounting with mica insulators to the aluminum chassis provides enough cooling. The r.f. choke, L1, L2, along with the two 100-μf capacitors, prevent hash from getting back into the car’s electrical system and fouling up the mobile receiver. Switch S1 is the remote on-off switch. Heavy wire should be used between the switch, power source and power supply. Though I can’t claim “years of continuous service,” I can say that the supply has worked in my car for over two months, and has withstood bench tests at 20 volts input and full load. Although the supply was designed for 12-volt systems, it will run satisfactorily on 6 volts but, of course, the output voltage is halved.

One note of caution: Don’t run the supply without some kind of a load. Without loading, spikes quickly build up across the transistors and can destroy them.

— D. E. Haschwood, K91BZ

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Fig. 2 — 6BY6 product detector for the HBR-16.

Fig. 3 — CR1-4 — 400 volts p.i.v., 750-ma. silicon diodes (IN3194).
L1, L2—14-µh, 0.12-ohm r.f. choke (Miller 4624).
Q1, Q2—2N4441 transistors.
T1—12.6-volt, 2-amp. filament transformer (Stancor P-8130).
V.H.F. QSO Party Announcement
June 9-10

Here's your chance for real v.h.f. fun in the June V.H.F. QSO Party, scheduled for June 9 and 10. This gala operation, open to all amateurs who can work any band or bands 50 Mc. or above, gets under way at 2 p.m. (1400) your local standard (not daylight) time Saturday, and continues until 10 p.m. (2200) local standard time Sunday.

To raise other participants just call "CQ VHF QSO Party" or "CQ Contest." The only exchange required during contact is ARRRL Section (see page 6, this QST). Score one point for completed exchanges made on either 50 or 144 Mc.; two points for exchanges on 220 or 420 Mc.; and three points for exchanges on higher v.h.f. bands.

To derive final score, the sum of these points is multiplied by the number of different ARRRL Sections worked per band. You may work the same stations on different bands to increase both your contact points and multiplier.

A certificate will be awarded to the top scorer in each ARRRL section, as well as a certificate to the highest scoring Novice, and multiple-operator station in each section from which at least three entries in that special category are submitted.

Please follow the log and summary form as shown in the example. You can get these logs free by writing to the ARRL Communications Dept., 38 La Salle Rd., West Hartford 7, Conn. Reports should include your call and ARRRL section, as well as times, calls, and sections of stations worked. Your entry must be postmarked by July 2, 1962, for QST listing.

Rules

1) The contest starts at 2:00 p.m. Local Standard Time, Saturday, June 9, and ends at 10:00 p.m. Local Standard Time, Sunday, June 10. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.

2) Name of section exchanges must be acknowledged by both operators before either may claim contact points. A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed, portable or mobile-station operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under more than one other call during the contest.

4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRRL sections worked per band; i.e., those with which at least one point has been earned.

5) A contact per band may be counted for each station worked. Example: W2BLV (S.N.J.) works K1CQW (Conn.) on 50, 144 and 220 Mc., for complete exchanges. This gives W2BLV 4 points (1 point for each contact per band) and also 3 section-multiplier credits. If W2BLV contacts other New Jersey stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.

6) Each section multiplier requires completed exchange with at least one station. The same section may not be included in another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRRL section. In addition, the high-scoring multiple-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than July 2, 1962, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience.
FCC Proposes Kw. on 420 Mc.
Fee Comments Delayed

FEE COMMENTS DELAYED

At the request of the League, FCC extended the time for filing comment in Docket 14507 from April 16 to May 16, and for reply comment from May 16 to June 16. The delay was requested to allow more time for amateurs to express their views, and to permit a summary of the comments to Hq. (a pile a foot deep as we write this, and almost unanimously in opposition) to be incorporated in the League’s filing. The full text will, therefore, be published in the July issue.

SHF BAND CHANGE

FCC has just amended the amateur rules to bring them into line with the Geneva Radio Convention of 1959. For the most part, the changes are minor ones concerned with words: ks. becomes k/s, radiolocation becomes radiolocation, etc. There are two substantive changes however: the microwave band at 3500-3700 megacycles returns to its old stand, 3300-3500 Mc., and the open territory at the top of the spectrum for use by amateurs and experimental services now begins at 40,000 Mc. instead of 30,000 Mc. A number of other amendments are purely for editorial reasons.

THIRD PARTY WITH EL SALVADOR

The government of El Salvador has entered into an agreement with the U. S. allowing amateurs of the two countries to exchange certain communications on behalf of third parties. Conditions of the agreement, similar to those previously signed with Bolivia, Canada, Chile, Costa Rica, Cuba, Ecuador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela, appear below:

1. No compensation may be directly or indirectly paid on such messages or communications.
2. Such communications shall be limited to conversations or messages of a technical or personal nature for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. To the extent that in the event of disaster, the public telecommunications service is not readily available for expeditions handling of communications relating directly to safety of life or property, such communications may be handled by amateur stations of the respective countries.
3. This arrangement shall apply to El Salvador and all its insular territories, and to the United States and its territories and possessions, including Puerto Rico and the Virgin Islands and to the Panama Canal Zone. It shall also be applicable to the case of amateur stations licensed by the United States authorities to United States citizens in other areas of the world in which the United States exercises licensing authority.
4. This arrangement shall be subject to termination by either government on sixty days’ notice to the other government, by further arrangement between the two governments dealing with the same subject, or by the enactment of legislation in either country inconsistent therewith.

REALLY OLD TIMERS — A REMINDER

The Golden Anniversary Banquet, to be held in New York City on October 13, 1962, will honor those early amateur radio operators who were licensed in 1912 and are licensed today. A token of the esteem in which these pioneers are held by their fellow amateurs will be presented or mailed to all the eligible hams whether or not they are able to attend the banquet. ARRL Hq. is compiling the list of amateurs to be so recognized. Acceptable proof is a photocopy of the 1912 amateur station or amateur operator license, or a listing in the 1913 edition of the government call book. If you need to rely on a listing in the call book, please tell us your city and state in 1912, and 1912 call letters, and of course your complete present address and call. For further details, see page 64, April QST.

NO TRAFFIC WITH CONGO

There seems to be some confusion over the status of the Republic of the Congo (U05) as concerns third-party traffic. Apparently, on an occasion or two in the past, several U. S. hams have handled important traffic with U05US, and because of a critical communications problem between the two countries there was apparently no disposition on the part of authorities to issue citations. This situation no longer exists, however; there is no third-party agreement with the Republic of the Congo.

Michigan gets its first official Amateur Radio Week, June 24 through June 30, 1962 starting, instead of ending, with Field Day. The Council of Amateur Radio Clubs of Southeast Michigan, which was instrumental in securing the proclamation, is planning to use the event for a widespread public-relations effort. Council delegates, W8NBF, K8TD, K8DST, K8DPM, W8SS and W8OHI cluster around Governor John Swainson as he signs the proclamation.

June 1962
Congo at present, and therefore no communications service may be provided to third parties by U. S. amateurs. To quote a recent letter from FCC:

The Commission is not aware of the existence of any arrangement between the United States and the Republic of Congo which provides for the handling of international third party traffic by amateur stations of those countries. Therefore, we have advised our Monitoring Division to cite any United States amateur station licenses observed transmitting international third party traffic to the Republic of the Congo.

PACIFIC NUCLEAR TESTS

The FCC has been informed that there may be some effect on long range radio communications on frequencies between 3 and 30 Mc., as a result of ionization brought about by the nuclear tests near Johnston Island in the Pacific. The ionization is expected to affect long-range communications crossing a wide area around the test site. The Commission would appreciate receiving reports of effects observed by commercial and amateur operators, which may be sent to the Field Engineering and Monitoring Bureau, Federal Communications Commission, Washington 25, D. C.

FCC PROPOSES KW. ON 420

In accordance with a petition filed by the League, FCC now proposes to remove power restrictions on the 420-Mc. band, except for parts of the country where full-power amateur operations could be expected to cause interference to certain U.S. government installations. In the areas listed, the 50-watt input limit would continue in force; those portions of Texas and New Mexico bounded by latitudes 31°53' and 33°24' North, and longitudes 105°40' and 106°40' West; the entire state of Florida; those portions of Georgia, Alabama and Mississippi which are within 200 miles of either Patrick AFB or Eglin AFB; the entire state of Arizona; the parts of California and Nevada which are either south of latitude 37°30' North or are within 200 miles of Point Mugu, California. The proposed amendment, however, contemplates the possibility of authorization for higher power, even in the restricted areas, to individual amateurs on a case-by-case basis.

Any interested parties may file comments in support of or in opposition to the proposal on or before June 15, 1962. The text of Docket 14610 (except for amendments to Part 2 of the Rules, which duplicate the amendments to Part 12) appears below in full:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of
Amendment of Parts 2 and 12 of the Commission’s Rules and Regulations to Remove the Power Restrictions in the Band 420-430 Mc’s in the Amateur Radio Service.

DOCKET NO. 14610

R1-503

NOTICE OF PROPOSED RULE MAKING

1. Notice is hereby given of proposed rule-making in the above-entitled matter.

2. The American Radio Relay League (hereafter referred to as ARRL) has filed a petition requesting the Commission to amend Section 12.111(b) of its Rules in order to remove or modify the power restrictions in the 420-430 Mc’s amateur band. Although not stated in the petition, the proposed amendment would also require a change in Section 12.131 and in Footnote US7 to the Table of Frequency Allocations contained in Part 2 of the Rules and Regulations. Section 12.111(b) is now §12.111(b)(11).

3. Footnote US7 to Part 2 and the above-mentioned Section of Part 12 restricts the power of amateur stations to 50 watts DC plate power input to the final stage of the transmitter in the amateur band 420-430 Mc’s. This power limitation originated with the temporary post-war use by radio altimeters in the band 420-460 Mc”, as specified in Footnote US6 contained in Part 2. In 1955 the amateur power limitation of 50 watts peak to the antenna was modified to read 50 watts DC plate input power to the final stage. In 1958 Section 12.111(b) was amended to include the following additional restriction:

"In the band 420-500 Mc’s the amateur radio service shall not cause harmful interference to the Government radio-positioning service."

4. Footnote US6 to Part 2 and Section 9.312(1) of Part 9 of the Commission’s Rules provides that radio altimeters will not be permitted to use the band 420-460 Mc’s after February 14, 1963.

5. Petitioner states that the 420-450 Mc’s amateur band is unique and most important to amateur radio because it is the “jumping off” place from VHF to UHF. It is the lowest frequency amateur band where coaxial and cavity tank circuits normally replace the familiar coils and capacitors. Petitioner further contends that removal of the present power limitation will greatly stimulate amateur experimentation and undoubtedly will develop more important propagation data. The ARRL believes that the power limitation now may be removed from the entire 420-450 Mc’s band without causing interference to any other present or possible future users of the band.

6. The Commission, in consultation with appropriate Government agencies, has reached an agreement whereby the amateur radio service will be authorized to use the maximum input power permitted in this service except in

For the tenth consecutive year, the Governor of Ohio has proclaimed Amateur Radio Week in Ohio for the June week which ends with Field Day. The week of June 17 through 23 is it this year; W8RJ, Columbus ARA president and KN8NCY, chairman of the Ohio Council of Amateur Radio Clubs, watch while Governor Mike DiSalle makes it official.
certain areas which are defined in the proposed amendments to Part 2 Notes and Section 12.111b(14) which are set forth in the attached Appendix.

7. Public comment is invited on the proposed amendments to Parts 2 and 15 of the Commission's Rules as set forth in the Appendix hereto, issued pursuant to the authority contained in Section 303(e), (f) and (c) of the Communications Act of 1934, as amended.

8. All interested persons are invited to file, on or before June 15, 1962, comments supporting or opposing the proposals set out in this Notice and in the Appendix hereto, or submitting any modifications or counterproposals the party wishes to submit. Comments in reply hereto may be submitted by June 25, 1962. The Commission will consider all comments filed hereunder prior to taking final action in this matter provided that, notwithstanding the provisions of Section 1.212 of the Rules, the Commission will not be limited solely to the comments filed in this proceeding.

9. In accordance with the provisions of Section 1.51 of the Commission's Rules and Regulations, the original and 14 copies of all statements, briefs, or comments filed shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

REN F. WAGLE
Acting Secretary

Released: April 27, 1962

APPENDIX

Section 12.111b(14) is amended to read as follows:

3.1211 Frequencies and types of emission for use of amateur stations.

4. (b) 14) Within the following areas, the DC plate power input to the final stage of the transmitter shall not exceed 50 watts, unless expressly authorized by the Commission after mutual agreement, on a case-by-case basis, between the Federal Communications Commission Engineer in Charge at the applicable District Office and the Military Area Frequency Coordinator at the applicable military base:

(i) Those portions of Texas and New Mexico bounded on the north by the 31st parallel of latitude, on the east by longitude 105° 30' West, on the west by longitude 105° 30' East, and on the south by longitude 39° 30' North.

(ii) The entire State of Florida, including the Key West area and the areas enclosed within a 200 mile radius of Patrick Air Force Base, Florida, and within a 200 mile radius of Eglin Air Force Base, Florida;

(iii) The entire State of Arizona;

(iv) Those portions of California and Nevada south of latitude 37° 30' North, and the areas enclosed within a 200 mile radius of the U. S. Naval Missile Center, Point Mugu, California.

Section 12.121 is amended to read as follows:

3.121 Maximum authorized power.

Except for power restrictions as set forth in § 12.111, each amateur transmitter may be operated with a power input not exceeding 1 kilowatt to the plate circuit of the final amplifier stage of an amplifier-oscillator transmitter or to the plate circuit of an oscillator transmitter. An amateur transmitter operating with a power input exceeding 1000 watts to the plate circuit shall provide means for attenuation reducing the plate power input to the vacuum tube or tubes supplying power to the antenna.

Minutes of Executive Committee Meeting

No. 287

March 28, 1962

Pursuant to notice, the Executive Committee of The American Radio Relay League, Inc., met in Hartford, Connecticut, at 1:58 P.M., March 28, 1962. Present: President Goodwin L. DeSole, in the Chair; Vice President W. M. Groves; Directors John G. Doyle, Robert W. Donistone, Morton B. Kahn, Ray E. Mayern, General Manager John Hunton; Communications Manager F. E. Hunzler; and Treasurer David H. Houghton. Also present were Directors Albin E. Chaffin, R. O. Best and R. Rex Roberts of the Finance Committee; Directors L. L. Anderson, Jr., and Charles G. Compton of the Housing Committee; General Counsel Robert M. Booth, Jr.; and Assistant Secretary Perry Williams.

By invitation, M. C. Towns, Jr., K6LI, President of the Project Oscar Association, joined the meeting and reported in detail on the status of Oscar 1 as well as plans for Oscar II and future flights. On motion of Mr. Meyers unanimously VOTED to authorize reimbursement of $308.95 expended by the Association for postage and miscellaneous expenses. The Committee expressed its appreciation to Mr. Towns, who then departed from the meeting.

The Committee discussed at length the Commission's proposal to establish a schedule of license fees. Directors present indicated an overwhelming feeling by amateurs in their divisions against the proposal, and an analysis of heavy correspondence to Headquarters similarly disclosed viewpoints strongly against adoption of the proposal. On motion of Mr. Denniston, unanimously VOTED that the League file comment in Docket 14597 in opposition to the proposed fees for amateur license applications.

The Committee, jointly with the Finance and Housing Committees, examined and discussed at length plans for the new headquarters building, Messrs. Arthur Cook and Fred Clark of the firm of Jeter & Cook, architects, were present for this portion of the meeting to describe details of the building construction and to answer questions. On motion of Mr. Kahn, on behalf of the Housing Committee, unanimously VOTED that the Executive Committee approves the plans for the new building and sets May 10 as the date for opening bids.

The Committee, jointly with the Finance and Housing Committees, then examined response to the March 16 editorial inquiry concerning a proposed Building Fund and found enthusiastic membership support in more than 300 comments so far received. On motion of Mr. Meyers, the following resolution was unanimously ADOPTED:

BE IT RESOLVED, that to defray the major portion of the cost of the new Headquarters facilities, the League institutes a Building Fund with a goal of $230,000 and appoints the Chairman of the Finance Committee as Chairman of the Building Fund drive.

BE IT FURTHER RESOLVED, that the General Manager and the Treasurer, acting jointly, are directed to set up and administer separate accounts for the Building Fund, under the supervision of the Chairman of the Finance Committee.

The Chair appointed Directors Kahn, Doyle and Meyers to serve as a Special Gifts Committee.

On motion of Mr. Doyle, unanimously VOTED that the Chairman of the Finance Committee, the General Manager and the Treasurer, acting jointly, are directed to undertake preliminary negotiations for the sale of the present Headquarters property at the best possible figure, and report to the Board of Directors.

On motion of Mr. Doyle, unanimously VOTED that the League casts its vote in favor of IARU Proposal 102 concerning the admission of the Association Radio-Amateurs

This jocund group seems to be bearing up well under the strain of preparing for the 1962 ARRL National Convention in Portland, Oregon. Seated, L. to r., are W7RF, program; K7BH, executive chairman; W7ZEO, council chairman and K7ES, promotion. Standing, L. to r., W7ADU, entertainment; KBBG, finance; and W7AS, registration. Set aside the dates of September 1-3 for the National Convention in the Memorial Coliseum in Portland, Ore.
Liberian (Lemenon) to membership in the Union.

On motion of Mr. Dunnigan, unanimously VOTED that the Committee notifies its mail actions in approving the holding of a West Virginia State Convention at Jackson's Mills, July 7-8, 1952; a Rocky Mountain Division Convention at Denver, Colorado, July 21-22, 1952; a West Gulf Division Convention at Corpus Christi, Texas, August 3-5, 1952; in lieu of that earlier approved for Tyler, Texas; and an Ontario Province Convention in Toronto, October 19-20, 1952.

On motion of Mr. Doyle, unanimously VOTED to approve the holding of a Southeastern Division Convention in Miami, Florida, January 19-20, 1953.

On motion of Mr. Handy, unanimously VOTED that the Committee notifies its mail actions in approving the affiliation of radio clubs as follows:

- Central High School Radio and Electronics Club: Binghamton, N. Y.
- Central Vermont Amateur Radio Club: Montpelier, Vt.
- The Clermont County Amateur Radio Club: Batavia, Ohio
- El Dorado County Amateur Radio Club: El Dorado, Calif.
- Laurel Radio Club: Laurel, Mont.
- Mid Island Six Meter Amateur Radio Club: Levittown, N. Y.
- Order of Boiled Ovals: Columbus, Ohio
- The Order of Boiled Ovals of Mexico: Albuquerque, N. Mex.
- Palmetto VHF Club: Greenville, S. C.
- Tri-State DX Club: Memphis, Tenn.
- The Order of Boiled Ovals of South America: Buenos Aires, Argentina

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

- Amateur Radio Emergency Corps of Jefferson Co.: Steubenville, Ohio
- Arlington State Amateur Radio Club: Arlington, Texas
- ARROWS Amateur Radio Group: President: Wm. Whitewater, Wis.
- Big Orange Amateur Radio Club: Orange, Va.
- The Coven City Amateur Radio Club: Galveston, N. Mex.
- The Communicators: St. Louis, Mo.
- The DeSoto Amateur Radio Club: Rainier, Ala.
- The Fort McCoy Radio Club: New Richmond, Wis.
- The Princeton Amateur Radio Club: Maryland, Ohio
- Monmouth County V.H.F. Club: Belmar, N. J.
- North Dakota State University: Fargo, N. Dak.
- The Perfect Copy Ray Cheever's Club: Chicago, Ill.
- Perham Basin Amateur Radio Club: Perham, Minn.
- St. Mary's H. S. Amateur Radio Club: Manhasset, N. Y.
- South Community YMCA Radio Club: Pittsburgh, Pa.
- Steel City Amateur Radio Club: Pittsburgh, Pa.
- Submarine Base Medical Research Laboratory ARC: New London, Conn.
- Washburn County Radio Club: Spooner, Wis.
- Woodward High School Radio Club: Cincinnati, Ohio.

General Counsel Booth reported to the Committee on developments in the matter of Senate Bill 2261 providing for reciprocal licensing. There being no further business, the meeting adjourned at 5:45 p.m.

JOHN HUNTOON
Secretary

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**New Apparatus**

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**Cubical-Quad Components**

The aluminum-alloy end and center spiders shown in the photograph are manufactured by Skylane Products, 406 Bon Air, Temple Terrace, Florida. Both have 1½-inch i.d. center holes for attaching to the supporting mast or horizontal boom. A set screw is provided in each. The arms on both castings measure about 25½ inches from tip to tip and are notched so that "I" bolts can be attached for holding the quad spreaders. Skylane can also furnish special Fiberglas spreaders which measure 12½ feet long and which taper from 1½ inches in diameter to ¾ inch. These spreaders are reinforced at the 4-foot, 6½-foot and 10½-foot points and have projecting screws at these spots for tie points. A 25-foot spreader for 40-meter quads is also available.

Complete quad kits, which include a bamboo spreader model and the above-mentioned Fiberglas models are also available.

E. L. G.
Building Fund Progress

The incoming mail room at 38 LaSalle Road these past few days (early May) is taking on a golden hue — the yellow Building Fund subscription forms are arriving by the armload and getting the drive off to an excellent start. At press time several hundred individual contributions had been tabulated, with the total amount involved some $10,000. Our July issue will better tell the story of the initial response to the fund drive, because as we write this the May issue containing the announcement has been in distribution only a couple of weeks. But, as you can see, the base of the tower is firmly planted and the climb to the top is under way.

A formal acknowledgement certificate, suitable for framing if desired, is being prepared and will be sent to each donor. We trust contributing members will bear with us until this part of the program can be accomplished and certificates mailed, as we may run behind due to the quantity involved.

Building plans and specifications are now in the hands of a number of contractors, with the deadline for submitting bids May 10. Assuming receipt of a satisfactory bid, the contract will be awarded and we hope to announce the result in July QST, possibly along with a picture showing the first spadeful of dirt being turned. Subsequent issues will report the progress of construction as well as that of the Building Fund Drive.

If by chance you missed the subscription form in May QST, you’ll find it at page 64A of that issue. Support your League’s “blueprint for progress” toward amateur radio’s continuing growth!

At a joint meeting of the Executive, Finance and Housing Committees, League officials examine detailed plans for the new Hq. office facilities before granting the final stamp of approval. Seated, left: Morton B. Kahn, W2KR, Chairman, Housing Committee. Standing, left: Arthur Cook, of Jeter & Cook, architects. Standing, rear: P. L. Anderson, Jr., W4MWH, Charles G. Compton, W4BUC, Housing Committee members; Treasurer David H. Houghton; First Vice-President W. M. Groves, W5NW; R. O. Best, W5QKF, Finance Committee. Seated right: R. Rex Roberts, W7CPY, Finance Committee; John G. Doyle, W9GPI, Executive Committee; Milton E. Chaffee, W1EFW, Chairman, Finance Committee. Looking on from behind the camera were President Goodwin L. Dosland, WOTSBN, Robert W. Denniston, W5NWX, and Ray E. Meyers, W6HLZ, Executive Committee; Vice-President F. E. Handy, W1BDI; John Huntcon, W1LVQ, General Manager; and Robert M. Booth, Jr., W3PS, General Counsel.

June 1962 65
CONDUCTED BY ELEANOR WILSON,* WIQON

Louise Ramsey Moreau, W3WRE, of Johnstown, Pennsylvania, one of our BPL YLs (and 100% traffic), enjoys delving into the history of wireless and telegraphy. The first licensed woman operator to become a member of the De-Forest Pioneers and a historian of the Antique Wireless Association, Louise has a unique collection of telegraph keys, and she has become an authority in her "second hobby."

At the New York State ARRL Convention last year, Louise could safely claim that she was the only YL who operated rotary spark in 1961 with the smiling approval of the FCC "which is an advantage of playing around with this antique stuff and therefore being a Girl Guide in these displays and demonstrations. I don't know if we'll have a working spark rig at the Dayton Hamvention or not, but if we do, then I'll renew my claim for 1902. You understand that all this is done with special permission from the FCC and the AWA members only demonstrate the equipment at specified times - that's when one really reaps advantages from being classed as a greybearded historian!"

W3WRE claims nothing unusual, "just the female love of collecting antiques. In my case, they are old telegraph instruments instead of milk glass or Spade Blue Castle. They are intensely interesting, however, and so far as I know, this collection is the only one of its kind in this country. To be sure, there are dozens of collectors, but mine is restricted to two fields -wire telegraph instruments and vacuum tubes. I love tubes. Yes, I have an Audion - it's my prize, naturally. It's quite interesting really -that plus running down the stories behind these old items. I don't just collect; I'm curious about the how and why of it all. Would you have space for some items on the very earliest YLs in the telegraph end of the game? We gals wrote history very far back, and right here in Johnstown we have the famous "HM," the Western Union operator who sent out details on the famous 1889 flood, until the waters swept her away. You know, wireless historians point with great male pride to Jack Phillips of the Titanic, etc. I claim

I can match their wireless stories with equal ones of the telegraph."

For stories as interesting as W3WRE relates, we'll make space and here's one you'll like. In future issues, we'll have more from Louise.

YL Brasspounders

The legends and rumors that have built up so much history have not left the YL end untouched. For a long time it has been the popular, but unauthenticated, belief that Sarah Bagley was the first woman operator. She may have touched a key now and then for F. C. J. Smith, but there is no record of her actual employment as an operator. The first lady operator was appointed office manager as well as operator in the Westchester, Pa., office of the Atlantic and Ohio Telegraph Company in 1881. Her name was Miss Emma Hunter, and she did such an efficient job that the company presented her with a gift of $150 at the end of her first year. The second was Miss Ellen Laughton in the Dover, N. H., office. Appointed in 1883, at only 14 years of age, she did so well that four years later she was made manager of the Portsmouth, N. H., office.

Following these two pioneers into what had been a purely masculine profession, we have records of many women, both as operators and as managers. They are actually the very earliest traffic women and probably would have put most of us to shame with their ability and monthly traffic totals.

The ability of these "lady operators" was so well known, and appreciated that there was always a special event for them alone in the Morse Telegraph Tournaments. Usually this was a ladies' 5-minute sending class. On April 10, 1890, at the Hardman Fast Sending Tournament in New York City, Miss K. B. Stephenson won the Ladies Sending with a record of 43.5 w.p.m. Also in New York, eight years later, Miss J. McManus took top YL sending honors with a flashing 47.8 w.p.m. She had only two errors in that five-minute period. It may be noted that she was not too far behind the top man of the Men's Five-Minute Sending. It was won at 50.6 w.p.m.

It should be remembered that the semi-automatic key or "bug" was not on the market yet, and that these records were made with a hand key. There is no record of a woman's receiving event. However, considering their sending ability, they would have probably done an equally fine job. Small wonder these "lady operators" were nicknamed "Queens of the Wire".

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

66 QST for
Left: When OM K9RHN of Notre Dame sent along this photo of Joanne Wareham, K9ZRV, he exclaimed "Long live ham radio!" We see what Jim means. Joanne is a freshman at Connecticut College for Women in New London, Conn. A c.w. contad introduced K9RHN and K9ZRV to each other several months ago, and they've been maintaining weekly skeds ever since.

Center: General class licensee Alanna Koralko, WA2VFT, of Brooklyn, N.Y., now 11 years old, became interested in ham radio at the age of nine. The daughter of W2MCD, Alanna works 80 meters c.w. and 2 meters, when seventh grade studies permit.

Right: At the age of 13, Alicia Ryden, K8RRB, is the youngest YL to become a member of DXCC. Alicia received her Novice license in Sept., 1959, and her general class license in March, 1960, when she "started working for countries earnestly." In an accelerated program at school, K8RRB's studies were before her hamming on 15 and 20 c.w., but, nevertheless, Alicia has acquired many certificates in addition to DXCC. Of the four hams in K8RRB's family (mother Mary, K8ONV; dad Ken, K8OHG, and sister Sally, K8ONW), three are DXCC.

16th POWDER PUFF DERBY

The 1962 All Woman Transcontinental Air Race (popularly known as the Powder Puff Derby) will start at Oakland, California July 7 and will end July 11 at Wilmington, Delaware. Carolyn Curran, W3GTC, (P.O. Box 525, Norristown, Pa.) will again serve as chairman of the amateur radio net.

The following is a list of the stop-over cities along the flight route, along with the amateur radio chairman of each stop. Amateurs wishing to assist in traffic relay for the exciting operation, please contact W3GTC or chairman in your area.

Oakland, Calif. — Gertrude Cassady, W6FSA, with Oakland ARC
Fallon, Nevada — Captain Charles Walker, W6WUG, Fallon Amateur Radio Society
Elko, Nevada — Milo Taber, W7QYK
Salt Lake City, Utah — W. J. C. Fahey, K7FCN
Rock Springs, Wyoming — Reochester Stephens, K7ELI
Scottsbluff, Nebraska — Howard H. Poppert, W8VQR
Tri-City ARC
Grand Island, Neb. — R. E. Wilkie, W8BDL, Grand Island ARC
Den Moines, Iowa — Rev. Wintonrop Mager, W6ALJH
Pocata, III. — (to be announced)
Dayton, Ohio — Glenn Z. Wolford, W8ENII
Pittsburgh, Pa. — (to be announced)
Wilmington, Delaware — Edgar Baylis, K3BMT

National Convention

Portland, Oregon, Aug. 31-Sept. 3, 1962. The YL-XYL activities will be conducted by the Portland Home YL club. Publicity Chairman of the club, Beverly Walker, W7HPF, has submitted the following schedule of YL convention activities, with the notation that there may be some minor changes made later.

Sat. Sept. 1 — 7:00-1:00 P.m. Tour of Lloyd Center, the fabulous shopping center, with "everything," fashion show and tea, 6:00-8:00 p.m. Dinner and forum for licensed YLs only, with gifts and prizes.

Sun. Sept. 2 — 8:00-10:00 a.m. Women’s breakfast for all YLs and XYLs, with guest speaker, prizes, and gifts; 12:30-2:30 p.m. Women’s lunch for all YLs and XYLs; Talk on scenic sights of Portland to be followed by bus tour of Rose Test Gardens, Oregon Museum of Science and Industry Zoo, plus other points of interest, 6:00-7:00 p.m. Women’s dinner for all YLs and XYLs. The act of Japanese flower arranging will be discussed.

Mon. Sept. 3 — 8:30-10:00 a.m. Women’s breakfast for all YLs and XYLs. Gifts, prizes and SWOPP initiation. These events are in addition, of course, to the general convention program with its various meetings, lectures, get-togethers, etc. of interest to all hams. The committee suggests trying in the convention with a visit to nearby Seattle and the 1962 World’s Fair in that city — two outstanding events for the cost of one trip — well, almost!

Among the gals, anyway, "eyeshadow" QSO sounds nicer than "eyeball" QSO, referring to a face-to-face QSO — do you agree? We don’t know who to credit for the recent switch to "eyeshadow," but it’s a pleasing change.

Clubs and Nets

Pooper Sound YL Coffee, Vel — A new group of Washington state YLs organized Feb. 10. Meetings are on six meters weekly and informally Tues., Sat., and Sun. evenings. Members include K7JXX, KAK, KHU, KUW, N6K, NQR, O8N, Q8O and W7ITD. A certificate is awarded to OMs for working 7 regular members for 1/2 hour each; OM JOX stations need work only 3 stations. For further information, please contact Laurie Hansen, W7ITD, Rt 2, Woodinville, Wash.

Mrs. Alice Ginsburg, K4TGB, accepts a large framed replica of a QSL card in behalf of herself and husband Martin, K4TGA, from Major Andrew V. Minney (W4YJW) USMC, of Amphibious Group Two. The card, with 100 signatures, was presented in behalf of the officers and men of Amphibious Group Two who gave the Ginsburgs "a vote of thanks" for their enduring devotion toward boosting their morale during a recent deployment to the Mediterranean.

June 1962
New Jersey YL Club — A new YL club in New Jersey. Sorry we don’t have details yet, but contact Lillian Klarfeld, 148 Leslie St., Newark, N. J.

IMPS (Indiana Michigan Pottentic Sisters) — K9YIC, Amy, has designed the two certificates for the IMPS. The Member’s Certificate is issued to any YL within “hearing” distance of Goshen, Indiana, who wishes to become an IMPS. The Achievement Award is issued to any amateur who contacts 5 IMPS within a 100-mile radius or 3 IMPS beyond a 100-mile radius of Goshen, Ind. (not during net time).

Rhode Island YL Club — The club is conducting a new net Tuesday at 7:00 p.m., EST on 40 Mc.

WRONE — Some 60 licensed YLs attended the YL meeting at the ARRL New England Division Convention at Swannasutt, Mass., on April 8. V.P. of WRONE KIERO, 6616, conducted the meeting in the absence of pres. LADY. Recognition was given to W1ZVE, Des., for the excellence of Miss WRONE’s Cluster, of which she is editor.

Los Angeles YLRC — Lulu ‘N’ Lassies certificate custodian Irma Weber, K6KCI, advises a revision in rules for the certificate. Work 10 members of LAYLRC since Jan. 1, 1952. Copy of log showing name, call letters, date, time, band and type of operation may be sent in lieu of QSLs. Special recognition will be shown on the certificate if all contacts are c.w. It is not necessary for all contacts to have been made from one QTH. Only one certificate shall be awarded to an individual. Contacts made during a net will count. Send for copy to K6KCI, 762 Juanita Ave., Santa Barbara, Calif.

Coming Events

ARRL Southwest Division Convention — June 1-3 at Disneyland, Anaheim, Calif. Address inquiries to S.W. Division Convention, P.O. Box 1085, Newport Beach, Calif.

Field Day — June 23 and 24. YLs and YL clubs who participate are invited to submit summaries of their FD doings (pictures too, please) to this column for a special YL FD report.


ARRL National Convention — Aug. 3-Sept. 3 at Portland, Oregon. See item on page 67.

YLS at SSB Dinner

YLS who operate single sideband were well-represented at the annual Sideband Dinner in New York City on March 27. We are grateful to Madeline Greenberg, W2EEO, for the several fine pictures of YLS that Madeline snapped as she table-hopped among the 800 who attended the “tremendously successful” dinner. Thanks too for the FB photos of KP4CL and her OM and of K5SPD/L and K2MGE. Dorothy Brauer, K2MGE, is co-editor with her OM K2HEA of The Sidebander, publication of the SS Amateur Radio Association.
Whither?

Be there W/Ks with souls so dead
Who never to themselves have said,
"I'd rather be DX, instead!"

Perhaps. Anyway, a recent Sunday edition of the Chicago Tribune found Jeeves, totally limp with spring fever, prostrate in his hammock enjoying an overdue southern breeze. His alarming languor at this time of year is punctuated only by pangs of the wanderlust, a malady known to be propagated in epidemic proportions by anaphylactic DXophilia, the DX bug.

RADIO OPERATORS to work for

U. S. GOVERNMENT

Single with recent military experience in sending and receiving C.W.
Minimum code speed, 15 w.p.m.
U. S. citizenship
High school education
Excellent health
Willing to work shifts and to serve abroad
Starting salary, $4830 plus allowances
A representative will conduct interviews at . . .

Jeeves put down the paper, pushed his spectacles up on his forehead and gazed off into the distance. "To serve abroad . . ." He conjured up coral atolls, snowy peaks, rolling desert, cities in DXotic climates. Now the job was on him for fair. Mumbling a few applicable almost-forgotten lines from Marques's Spring Ode, he popped out of the hammock like a kid again and raced for the shack. There he thumps away on his J-38, brushing up his c.w. just in case they ever get down to the bottom of the barrel.

* * *

That help-wanted ad, from a mercenary angle, puts a new high value on our good old ham-type code. As prime requisite for the position mentioned, it breaks down to $320 per year per w.p.m. — no FCC licenses, typing, etc., specified. What's your certified speed in ARRL's Code Proficiency Program? Only 15-per? Darned good start, OM. You're in high-priced company already, and Uncle Sam obviously is concerned with your progress. He may need you.

What:

Rom voyage to successful applicants for those jobs — and, if the opportunity arises, PSE, QSLs . . . There's scarcely a more exciting means for a newcomer to gain proficiency in the o.w. art than operation on our leading Novice DX band, 130.1 -210.250 kc. In Palmer initiation days a few determined freshmen even managed to join the ARRL DX Century Club via this route. Now a new and eager Novice generation gallops along in their DX footsteps . . .

Whites DDS;

15 Novice news comes this month from KNTs PFU PIG

WNIs CMW DAA, WV's HAA TFI

VYIs TFI 100/8.24 watts worked/confirmed, YC7I ZQG ZSA and W6SHO (70/62)

who will decorate their shack bulkheads with the wall paper of G7ZBR, QO3 BGR 8H9, CT1 144 NT C70A, C75A

DJs 31W IA5 5DA 50J, DLs SQ XE, DMVSD, DUTSY.

Ps VQ 2MA ZSA 3DP 8YN 82Y, two dozen Gs, GMs 3PK 7TP, HBE AAB VA, HCD CN, HKB 1AAF 3LR

34X 6HJ, HM1AP, forty-five JAs in all area calls save the 9th and 10th, JTIKAA, KADVR/VO2, KAG LAM NY YA, etc.

KBDs KL70XG, KP4BDU, KAG 8D0J, KAM 8DA 8OJ, KS8S, KAP 8AK, KABDG, K2S ES M4 G4, KAG 4H 4G, MM, LUs 5DFR S8H8, OEH 1WT 6CR, OK2KAZ PAEHR, P0AJ J2E 1ETE 80CC, P1Q 8L 9J, nine 8M5

PS88, UA6s GF KJA, U85TXB, six mainland V5s, V8K6P, VQXW, V8s 1FE 8RM 8RS 6CH, W6Q1Q/K6G, W66s E6N, KL7EAN, W66s BAL 8BN 8DM, XE1BV, YU18, some V5s, Z86Y, ZL3GN, 601MT and 9M2FR . . .

W6AMCU, stationed in Spain, sends solid signs from KN6s 8ED 8E1, 8J30, 8J48, nine 8M8, K5B1,

KN6OEU, WNs 8AH CMA EY 80D, WNs 8AL CXG CHU CTM, W89AH X, and W8AB EHL. Over in Korea, K2GML tuned in on KN7s 8MT and KQV without much trouble.

15 c.w. among the five-year ticketeers inspires Ws 8100

1FPB 4KXX 4MXL 5EHY (130/130), 6RVC 7DIU

7LZ F7POU, Ks 8J1FLJ 1PJ 2MAF 2AIR 35G4 8AHU,

MH 8VSX 5HM 8IQG 6STT 8QDD 8NNH 80KM

SRE2 8STK 88B 8RM 8LSH, 8R6K 8VSH, Was 8VTF 8STG

8J11R, Z60S 8LJC 8P8H 8TLV 8G86 8HSR 8003, 8TE5P, L1ER and Z92U to document the 21-AM appearance of CEs 1AD 1BD 3AG 4GMP, 8RY, CP8 80 BO, 8RX1Z, GTY 1HD (25 kc), above the lower band limit; 2AJ (300), DM2s ACO AMM, KL4A, EP8XZ, ET2US (20) 18-19,

PAs 8JOA SAU 15, POSAN, GDDFXN, HAs 8SDKP (21), 8N0D 8OS 8058, HClAGI, HAs 8QO 23, 8J7T, 8HJ 8AP

8AQ, H1P1L 21-23, 8ZIAB (20), forty 4As, KAJMA J, 8KD6

CE CG, KRs 8AB AL J, 8BY, 8K8s 8CE 8DG 8, DXAB, 8L765, 8S2s 8AEO (50) 17, 8C8K 8U (35) 15,

8TAR (50) 19, SW8W 800 14-15, TS8C 8AH, TE898B, 8NSG (850) 20, 8L 89, TDBL, 8A8s AA, 8ESG 822-23, 8K6K 21, 8UBS CG FG 8KA, UCZ, 8BS EL 16, U8JKA 8A

10, Ol7FA 800, UP2VW 14, 8QZAN, VPs 8LDDR 8NQ

8QF, VY 1Q (20), 8US 8AY 8QO (10), 8Z0C

518 8BA, VRs 1B 2DJ, V8s 1FE 8RS (80) 23-24, 68M, W1WCGV Y99, 8PBBMN, YN1AA 21, a bunch of TVOs,

KR 11, 8Z 88, ZE8s 51L 58K 8AY, 8VQCA, 4Xs 8K 8KR, 5As 1TW

80 (19), 8BG, 8NZ 835 (70) 20, 8SB 80 (30) 20, 8BAZC (70)

80, 8O4MT 18, 8W8GD (50) 22, 9GD9T 8, 9R2AM and

9Q8AA (40) 20.

These Darned Oversized QSLs Are Hard to File, Jeeves

AL, Texas

69

June 1962
EP28's meteoric DX career, recently terminated, astounding 160-meter DX results earlier this year. An old-style lazy H skywire, good for more than 100 countries on its design frequency, 21 Mc, produced world-wide 1.8-Mc. QSOs as a top-loaded semivertical radiator.

(Photography via K5WSE)
null
that date will be held by H16JSM until we have a permanent address for him. I hope to resume his summer".

from K1AA: "Re VP2AB s.w. operation in the ARRL DX Test, February 17th, all who sent us QSLs with s.w. or IRCs have been answered direct, QSLs for other W/K contacts were sent to ARRL Bureau on March 13th. Not the least of the problem of s.w. is the lack of supply of cards, if you have any QSL chief?"

From K0给了 R10DJ writes W19AM: "Since coming home from VP1BB I have received every contact made outside contest hours, plus all of W9NWX's s.w. contacts, partly through the bureau and partly direct. I've also sent cards for contest contacts for which I received cards, and will continue to do so..."

W3BNV testifies that the most recent legitimate F98AF appearance occurred in July, 1940. If you're one of QST's s.w. readers you may have DX QSLs waiting for you in the SWL/QLS Bureau of Lefroy Wait, 39 Hamms St., Hudson, N.Y., DX... We hope you can boost your confirmed total with a few of these individual recommendations:

BY1PK, Box 427, Peking, China
CE9a AF AS AW AF (see text preceding)
CG5GZ (via CE1AD)
CN2BK (via W2DCM)
C06XZ, Box 9006, Havana, Cuba
C08JK, Dr. F, Magrana, P.O. Box 857, Santiago, Cuba
CR6GU (via KH1CJ)
CR7DJ, Jr. de Abreu, Matto de Queim, Edimburg, Portugal
CD7DI, A. Rebelo, Quinta Alagoa, Lote 27, Carecevelos, Portugal

D51AB, E. Bowden, 50th St. Sosd., B.F.P.O 34, London, England
DL5K (via W9U4Q)
DL5VZ (via W2DCM)
ex-HC5HA (via 5N2KO)
H192J (ex W2LIX)
H757F, Central Romana 497, Lomaroma, D.R.
ex-H18BDG (via H18BDG)
H09SMG (via W9SRY)
HR2FG (via W2CTN)

HR3MW, M. Whitaker, Aptdo. 14, La Ceiba, Atlantida, Honduras
JAY7A, S. Kamirow, 82 Anyojikita, Sendai-city, Japan
JT8DJ, T. Takada, K5CDG
K4DAD/K4HD (to K4DAD)
K5ZSK/K16E, G. Graves, USS Conservator (ARS-39), FPO, San Francisco, Calif.
K5YUV/K6E, G. Murphy, Johnston AFb, Johnston Island
K0QIG/K7L (via K9WP)
K4AAE (via K8ZJX)
K16EEM/K6E, R. Adams, Box 38, APO 06-50-00, Canton
K4G0A (via K4G0A)
KNT01/JW1, D. Barnes, Box 25, Casterton, P.R.

K6AM (via K6AM)
ex-K6OB (via E8T0)
K6BB (via K5M1D)
K6BL (via K3PFO)
K5CL (via W2CTN)
K5CLW, Box 352, Fort Galiley, C.Z.
LZ1UA, I. Lentz, Hulbert, Okla.
MISVY (via 115BV)
ex-MP3TAC, A. Dicker, 10 Avenue Rd., Gosport, Hants., England

OK1s KW KX (via W3LJE)
OKXBB (via K5M1D)
OK1L (via K3PFO)
OK1LX (via W2QSY)
OK1T (via W2LIX)

ex-NT8AF (via K6QJ)

ex-NT8AF (via K6QJ)

ex-NT8AF (via K6QJ)

ex-NT8AF (via K6QJ)

UAC3CRU/A1 (via V3ZCM)
UAC3CRU (via W2QSY)
U2LAH, Box 373, 12 George St., Sydney, N. S., Australia
V88AM, Box 139, Yellowknife, N.W.T., Canada
V88ANZ (via K9DP)

V88AN, H. Knight, D.C.A., Box 31, Alice Springs, N.T., Australia

KC4USS, here manned by RM/2c K0GVB aboard the Navy's USS Utah Island, worked plenty of 20-meter DX on phone and c.w. from the south magnetic pole. After months of battling antarctic elements and radio blackouts, the ship goes back to Bremerston for refurbishing and K0GVB returns to more elemental land-based Iowa DXing.

V69LA (via VK8RU)
V6LP, S. de Lima, c/o Aequido Ltd., Castries, St. Lucia, W.I. (via W2CTN)
V6PMV, D. Doddard, Cable & Wireless, Montserrat, W.I
V6PSH, R. Neison, Dept. of Agriculture, St. Vincent, W.I
V6KRO (via K6JAK)
V6PAM (via K1U4F)
V6PSG (via G3LWIS)
V6SFR (via W2TB3D or W2RAD)
V6TWW (via W2CTN)

V6WADG (via W2CTN)
V6WAE (via W2CTN)
V692K, c/o S. Ewing, Sleevy Hollow Rd., Atkinson, N.H.
V6Z1N (via W2ODZ)
V6ZUSAG (via AR5J)

X6JSS, F. Ramos, P.O. Box 39, Guayamas, Sonora, Mexico
W1BJC, P.O. Box 1019, Maracaibo, Venezuela
W2AB, J. Fernandez, P.O. Box 298, St. Maarten, Venezuela
W2CJD, J. de Guareca, Box 32, Barinas, Venezuela
W2GCJ, J. Urbina, P.O. Box 33, Barinas, Venezuela
W4AVV, P.O. Box 510, Valencia, Venezuela
Z60NJ (via W2CTN)
Z6DUP (via W7VETU)
Z86SL (via W1BPSI)
ZLBW (via W6EC)
Z6ABG (via K2FPC; see text preceding)

9ICDP (via K7WIF)

8RAZ (see text preceding)

KSWA (for following country)

LA: 1DG1L, LAH 1HE 4TS 1UED 1W0P 21ES 3LAM1 4M1L 7L2L8 8X, KS 1BY1 1DFP 2L8X 2M1MS 2UG 2YFG 2Z1RJ 1DIQ 4G7X 7X7 7X7 80DJ 86DE 8JR 9P7KZ 9XHH 8HHH 9GVB 9GW 9JPL 9VSH, WS 2FQG 2F2LH 2F2LX 1F4M 6H5O 6RS, V3 49TBB, plus the following worthy groups and clubs: DARC DX-CLD (1L6 R3K 9PP), Far East Auxiliary Radio League (Military), News (K2L2L), Florida DX Club (DX Roy), WHHRM, Japanese DX Club (CWK8B), Japan DX Radio Club Bulletin (JADAD), Kanawha Radio Club Governor (WB8Q4O), North Eastern DX Association (DX Bulletin W2I4GW), Northern California DX Club (DXer (K6QJM), Okinawa Amateur Radio Club (K6CLJ), Polar Bears Radio Club (DXer (W3LRN), Veron's Oriental Pacific DX (PAC 82 LOU VDV), Washington DX Association (DX Northwest W7PC) and West Gulf DX Club (DX Bulletin (K5ADQ). Note of those useful suggestions is necessarily official, complete or accurate - help yourself.

Whence:

Asia - Last year's s.w. only 2nd All-Asian DX Contest, recent courtesy sponsoring society (JARL, Japan), saw WS 7G6LDD 5PB9UOP, K0GVB, WS7HTGW KXVY

QST for
June 1962

CT3AF, who specializes in 15-meter phone DX, sent this interesting shackshot to friend W3CQ.
DX channels after a furious winter seasonal and stereo kick. KAALU, still going strong after 10,000 QSOs in two years, is a good bet for Antarctica-hunters on 10 through 160 meters, voice or code. USAF and RCAF personnel maintain link with foreign stations via satellite. Piper Kareski homebrew DX pirouette is in Greenland communications work. . . . Highlights of VE3CJ's springtime VP25P stunt: a net-together with fellow ARRL DXers on VP2VW and W10X/4. Cozy Keytone DX QSLs greet you in cardboard envelopes. VP2VY DX excursion. Absence of a beam was one disappointment but, "Monty's logs were worked well with the added help of 15-20 W6s, especially W6MBD: a great DXF; he drove the fine DX band around to the longwave DX band. VP2OF, VP2VY DX reception. DXing is entertaining and an extension of one's life. VP2VY DX trip is a good DX, DX was enjoyed but we didn't see much DX. . . .

Hereabouts — VP2MV (ex-VP6MK) of Montserrat supplies a Caribbean touch to many a DX country man. W3LMH, an old-timer, reports, "Dear Sir, arrived there in late January and not going with a little junkbox 250-200 watter on 7 MHz a few days later. Now we're down to the low end of 14 MHz, 2300-2500 QRM, while awaiting arrival of the 250-watt Barbados transmitter. We have been able to VP2MV's return to the air on 70 MHz, VP2MV is an old-timer. We get a lot of old-fashioned rag chew on the whole, and we give him the encouragement he needs."

The owner of W3LDBY (VQ5LBI) discourses on W8KX: "I bought W8KX's Viking and Wonder antenna when he left the States. Both are in use, aided by a midget ..."

Recently borrowed a bug which really puts W8KX back in business. In nearly all cases I found hams to be gentlemanly, waiting their turn on the jacks-up, but there is a small minority percentage who insist on ill-timed calling. These went on my black list and did not get worked that particular evening. The results are K21TJ and K2SD2 and encouraging and technical assistance that helps him enjoy it."

I've started it up again. A couple years and did a bit of it but I have a brass arm which is good for DX but not for a DX station, I'm told."

Recently got a bug which really helps W8KX back in business. . . . I'm told he's not far from his DX station but has a DX bug which really helps W8KX back in business. . . . I'm told he's not far from his DX station but has a DX bug which really helps W8KX back in business. . . . I'm told he's not far from his DX station but has a DX bug which really helps W8KX back in business. . . . I'm told he's not far from his DX station but has a DX bug which really helps W8KX back in business. . . . I'm told he's not far from his DX station but has a DX bug which really helps W8KX back in business. . . .
March winds and April showers,
The final test for beams and towers.
And even if they did survive the winter colds and
the spring winds it's still time to take them
down and clean the connections, re-do the phasing
lines, rematch the stubs, re-grease the rotators,
tighten up the guy wires, and get ready for the
June contest. Anybody knows that taking a six-
meter beam down at the end of April is certain to
make the six-meter band open up, so Helen
missed the first good sporadic-E opening on the
band while our beam was lying on the ground
being refurbished for the coming season.
You can't improve your last year's performance
if you don't improve your equipment and there's
no time to improve your equipment like the
present time. The coming contest bids fair to be a
wild one, with contacts being made as high as 23
kM., and it wouldn't surprise me if I find at least
one contact using lasers. W1BU will be
operating 1206 moonbounce during the entire
period of the contest in hopes of making the first
moonbounce contest contact. Cooperating on the
other end will be W6IBH and company, W6NLZ
and company, W2CXY and company, and, with
any luck, KH6UK and no company. So whether
you're hoping for a moonbounce contact or running
a Conet on a hilltop, or sitting at home
with your homebrew 100-watter, the contest in
June is designed to provide fun for everyone.
The prime objective of the contest is to promote
activity on all the v.h.f. and u.h.f. bands.
The rules are written so that the more bands you
operate, the more multipliers you can get.
If, for instance, you worked all bands available
you could amass a multiplier of ten sections
without working farther than across the street. I
don't believe that anyone has ever turned in a
score with multipliers on every available amateur
frequency in the u.h.f., but it is a situation
desirably to be desired. As with any contest, the
object is to try and amass the largest score.
However, this really is secondary to the objective
of promoting activity on lesser-used amateur
frequencies. Hence, the contact points for the
higher frequencies are fattened up considerably
to offer a reward for making efforts on the higher
bands.
Complete rules for operating the contest, which
starts June 9 at 2:00 p.m. your local standard
time, and ends June 10 at 10:00 p.m. your local
standard time, appear on page 60 of this issue. If
you operate the contest you will inevitably run
into some operators who are not familiar with
the method of scoring the contest or who have
not learned that there was in fact a contest going
on. Be sure to note of the calls of these
stations and after you have briefed them on the
contest (thereby losing three or four contacts),
drop them a card pointing out the advantages of
belonging to the ARRL, because obviously they
must not or they would have the contest
information available. As a matter of fact, if you would
send me a list of these nonparticipants, I would
consider it a great favor — as I have a little
message which I would very much like to send
them once I've discovered them. Just remember,
a v.h.f. man who in times like these is not
supporting the League is not doing his duty.
I think it would be pretty nice if the v.h.f.
fraternity held up its end of this project. To
misquote a current great American "This is not
the time to ask what the League can do for you,
this is the time to ask what you can do for the
League."

50 Mc. and Up
Away up there in Lethbridge, Alberta, Canada, VE6DB
sees that activity has been slow and DX dead since the first
of the year, but he has great expectations of things happen-
ing once the weather breaks. One short aura was heard
during February and weak signals are heard from south of the
border occasionally, so the boys are expecting to be
working the 6's and 7's again fairly soon. VE6ABS is a new
station in Alberta now working on 50 Mc. Fm. KG3MM,
in Noveltly, Ohio, writes that in late December he worked
K4PGL/V9P in Bermuda. A number of the boys worked
him but to date no one has received a QSL and they are
beginning to wonder — is he or is he not? And from Via
Frank, W7QDJ, we've received the word that V77NP is off
50 Mc. as of April 10, after three months of c.w. operation
with no QSOs. Too bad, he would have been a nice contact.
A most interesting letter received from Don, W1UWQ,
which we thought we'd like to share with you: "Thought
you'd like to know that about a week ago (March 15) I
received a SWL card from a listener in Madera, stating,
he had heard my six-meter signal a good 20 db. over 9 with
some QSB and that he heard me in QSO for about half an
hour. He asked for a QSL card. I feel it is authentic, as he

June 1962

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

Neat and natty! Operating position at QTH of W5DKP.
Transpacific Moonbounce!

Starting on May 1, and continuing for three days, W1PZJ heard KHI6UK on 1296-Mc. moonbounce. As of May 8, schedules were continuing in the hope that KHI6UK would soon be hearing W1PZJ (W1BU). Sun can hear his own echo, so figures it is just a matter of time before KHI6UK digs him out of the mud. The signal from KHI6UK is pretty weak, but Sun says that plenty of 80-meter DX has been worked with signals that aren’t as good!

addressed me as ‘Doc’ and he would have no way of knowing the ‘Doc’, as I am not listed in the call book as ‘Dr.’ He also said that the time he heard me was about 10:00 A.M. and that is about the only time I have had to turn on the rig recently. As you know I run a 650 with a 5-element wide spaced beam and have an excellent location for this city (about 200 feet above sea level).” Sounds like the 50-Mc. band has lots more life left than many thought possible, and when Doc receives further word from his SWL he’ll pass it along.

K3PFF is working on a rig for 50-Mc, d.a.b. Although disturbed at the moment because of problems with frequency shifting, Jim is sticking with it and trying something else. His next project will be a.s.b. for 50 Mc. Another sidebander now in the six meters is W8BRN who says “I am sure having a ball with a.s.b. on 30 Mc. Am looking forward to some openings to get some activity on a.s.b. has picked up as the country.” According to the many reports received such activity is picking up by leaps and bounds on the v.f.h.f. bands. A few of the active ones in the Jackson area are WB6QZ, W8DQ, W8ANL, and W8LJS. In Cheyenne K7HGD is working K7KCD in Cheyenne regularly from Westminster, Colorado, and hopes to soon have skeds going in Nebraska and Kansas. Sidebanders in the Denver area include W9JC, W9UJA, K9KBS, K9TO, and K9BBB. K9BBV is active in the Colorado Springs area and K7HGD in Cheyenne. All on a.s.b. W9CC, K9SJM, K9QCF, and K9TSD all have rigs on RTTY on 50 Mc.

On March 28 K9DSL in Merton Station, Pennsylvania saw a test pattern of W2Z — the high end of 440 Mc. Gene says it was a very poor picture and he was able to make out only a part of it, but it was the first received and builds up that old enthusiasm once again. He has purchased an RCA TV camera and has converted a Blonder Tongue 200-Mc. converter to cover the 44-meter band, and has ordered a 13-element beam. Sounds like Gene is really enthusiastic in spite of the fact that he is away at school the greater part of the time. He also mentions that 50 Mc is loaded with locals although no skip nor good ground wave has been observed at his QTH.

On March 7, 8 and 9, Jack Racey, K8AV, of Detroit, Michigan, had his own private Field Day. On the 7th Jack worked W8RBD, K9ONX, K9SNA, K9DV, K8YVR.

Up she goes! The German method of putting that dish in place, atop the mount, atop the roof, Location—QTH of DL3FM.
who sees that six meters was open to Florida, South Carolina and Alabama with many and good signals coming through. Conditions normal other than that for the month of March, in the New York City area. KS3LU has come to the conclusion that 40 watts is not enough, and right there you have the basis of a good argument. Those who say it is enough cannot be convinced otherwise, and those who say it is not enough cannot be convinced otherwise either. What's that saying about an immoveable force? Anyway, he says that in order to work 90 miles conditions have to be average for him, and for contacts of 130 miles conditions have to be good. When ground wave is excellent he can work 180 miles with difficulty. Another Pennsylvania station heard from this month is Dave, K3GUA, who sees that as far as he knows there was no band opening and no aurora during March. Groundwave has been good, though, for the past several weeks from his QTH in Bloomburg with Dave hearing 2's from New York and New Jersey and hearing Carl, W2ASD in Delaware several times. Six meters came to the rescue once again when Bertha, W4HAM was able to get information via six meters for V68ADL who was trying to get some news about the shipwrecked friend of his between Miami and the Bahamas. Original contact was on 15 meters, but V68ADL was unable to get his info on that band, so of course Bertha came to his rescue.

Clubs and Nets

The newly organized "Future Scientists Club" of Stockton, California, will be operating a pre-Fiel Day trial run on May 19 and 20 on Mt. Diablo. The group will be on both six and two meters and hope to be using the call of W6HIP which has been applied for as the club call. If this call is not received they will be using W6VYQ.

The "Royal Order of Hoot Owls" is preparing for their 8th annual family picnic to be held on June 16 and 17 at the Seattle World's Fair. Attendance this year is expected to be over 1800 because of large numbers attending the event in the past and the added attraction this year of being held at the fair.

In the Fort Walton Beach, Florida, area, the two-meter emergency net has been getting a workout with the recent tornados in Crestview and Milton. The mobile units have been acting as messenger boys for the Red Cross and the fixed units taking care of a great part of the communications in the area.

The Boy Scouts of America Emergency Service Two-Meter Net in New York City meets every Wednesday evening at 1900 EST on 146.30 Mc. and is looking for members.

144 Mc. and Up

K4LLL, Delray Beach, Florida, reports a good month on 144 Mc. Among other noted openings the 14th of March provided communication into Texas with signals running 5-7 both ways. Tom operates schedules at 400 A.M. EST each morning with W4OPT and W4PNS. They're looking for more early morning schedules in their area. Aurora reared its lovely head on the 9th of March providing contacts from W4HAF, Kansas City, Kansas, into W0EHC.
K1HCH and K1DMW, stationed in Germany and members of the Bad Aibling Sport Parachute Club, plan to operate parachute-to-parachute on their next jump. Each will carry a small 10-meter transceiver, and they will attempt to work each other even while they are busy maneuvering their duties in order to hit the ground target.

FLASH! K2SJO reports that Governor Rockefeller has vetoed the New York call letter license plate bill. Saying that the legislation is unnecessary, the governor at the same time included an executive order directing the motor vehicle commissioner to set up procedures whereby the call letter license plates would be issued beginning in the fall. This word was received just at press time, and so we'll plan to have more info for you next month.

The 5th annual Boy Scout Jamboree-on-the-Air will be held between 0600 GMT, October 20, and 2000 GMT, October 21. Use any band, any mode, and call "QC Jamboree" to contact other Scouters. VE3WSB will be on the air from World Scout Bureau Headquarters in Ottawa. Look for VE3WSB around 3760 and 3820, 7250, 14200, 21200, and 28000 kHz, and also keep an eye on your Jamboree activities at Scout Bureau, 77 Metcalfe St., Ottawa, Canada, and receive a certificate.
Ting-a-ling-a-ling.

"Two in the morning! Who could be calling? Hello, yes, operator, I'll accept the charges."

"Good morning, Number 79. DX-of-the-Month Club calling."

"Oh yes, Master, good morning."

"Please, old boy . . . that's Master DXer, if you don't mind. We've arranged a very nice one this morning for all paid-up members. I notice, however, that you are delinquent in your payments. But if you promise to remit in the morning, I'll let you in on this one."

"Oh I promise, Master . . . ahh, DXer."

"Good, Number 79. Frequency is 14,349 kc. Time 1200 GMT. Be there, on time, on frequency and get your dues in the mail tomorrow or you will be dropped from the Club."

"Please, Master DXer, who do you have lined up for us this morning?"

"We have a nice station in the Central Hawaiian Group. Probably you've never worked this island before."

"But, Master, I've worked KH6 before."

"Please, old boy, if you don't mind, it's Master DXer. Now listen Number 79, in this club you work them as I set them up. You've probably never worked this particular island before, you hear. And we're going to put the pressure on ARRL to recognize this island as a new country. Besides, you can use this island for your Worked All Islands Award. So be grateful for what I do for you. Now, be on time — and pay up."

"Yes, Master . . . ahh, DXer."

"QST all DX-of-the-Month Clubbers. Our choice for the month is KH6ZZ/KH5. Here is a rare new island. Now you all have your numbers. Speak up quickly, in order, don't waste time. KH6ZZ/KH5 has the order in which you will appear and will check you off as you come in. He will acknowledge all check-ins, and all paid-up members will receive the usual beautiful scroll complete with Club insignia. Those of you sending an additional $5 will receive a recording of your call as it was received by this rare DX station. And those of you sending an extra $10 will receive my special tape offering of 'Great Moments in DX.' And now, are you ready KH6ZZ/KH5?"

"This is KH6ZZ/KH5. All ready, Master."

"Please, O.K., that's Master DXer. All right, tape recorder on and listen to the countdown — 5 — 4 — 3 — 2 — 1 — Call."

"This is W9BKL, Farmer City, Illinois. Number 1."

"This is W2TW, New Jersey, Number 2."

"This is Number 3, WGOA, California. Nice to meet you, Old Man."

"Faster, faster, no time for all that chit-chat. Call and number only. Speed it up."

*45 Laurel Street, Atherton, California

"Boy, am I excited. Almost to my number. Wonder if he can hear me. There's Number 76 — 77 — 78 —"

"Oh boy, oh boy, here I am — W6ISQ, Number 79. Gosh, that was exciting. Just think my little two-watter going out across the world — across oceans, over mountains . . . even into the great beyond, and on and on . . . and it's still going . . . ."

"This is the Master DXer speaking. That's the last one, KH6ZZ/KH5. Now please verify."

"Heard all but Numbers 17, 47, 79, and 207."

"KH6ZZ/KH5. This is the Master . . . ahh, DXer. I'm sure those stations transmitted. We can't disappoint paid-up members. You will assume 100% reception. Some of our stations were only running 2 or 3 watts. Kw.'s can't bag all the DX. We help one another in this Association — it's only fair. Beside, those QRP stations are paid up, you know. Most of them anyway — eh, 79?"

"Now, members, next month we have a really exciting DX station for you. W9BRD/mm, if we can complete arrangements."

"This is Number 79. What's so good about W9BRD/mm?"

"Number 79, if you would pay your dues, I'd send you the Bulletin and you would know what's so good. That 'mm' is Moon Mobile."

"I'll pay, I'll pay, Master."

"Now this may be a little difficult. First of all, we're not sure we can get BRD to take the ride. Secondly, he may take only one pass at the moon, so there won't be much time. Therefore, we are going to tape record all transmissions in advance and will play them to BRD at high speed. We can run through the entire Club roster in only a few seconds that way. If, I mean when, BRD gets back, he can acknowledge that he heard a nice crisp 'beep' from our Club. I will send instructions for this event to all paid-up members of the DX-of-the-Month Club. Got that, 79?"

"Yes, Master."

"Please, Old Boy — Master DXer."

June 1962

79
Navy
Space Surveillance
Antenna

That they sure grow them big in Texas can be attested to by this antenna located near Wichita Falls, Texas—it’s over one mile long! The antenna is part of the U. S. Navy space surveillance system that detects hostile satellites which might be silently crossing our territory.

The detection network consists of two main sections, one in the eastern part of the United States and the other in the western part, both located along a great circle path close to the 34th parallel. Each section is made up of two 108-Mc. receivers separated by 50 miles, with a 50-kw. 108-Mc. transmitter located equidistant between the receivers. A super-high-power transmitter (and the antenna in the photograph) is located midway between the east and west sections to fill the “hole in the middle.”

All of the transmitters feed antennas that favor the east-west direction with a very narrow fan-shaped beam. The receiving antennas have similar patterns so that when a satellite crosses the east-west line the transmitted signals are reflected from the satellite and picked up by the receivers. The position of the satellite is determined by measuring the angle of reception of the reflected signals, using interferometer methods similar to those used for Minitrack.

The transmitters operate 24 hours a day, and the information on reflected signals is sent by land line to a center where computers convert the data into orbit information.

The antenna in the photograph, which is located at Lake Kickapoo, Texas, consists of 9 end-to-end bays, each bay containing 72 dipoles. Nine 62.5-kw. transmitters feed the antenna system (which has a gain of 3400) for a total effective radiated power of almost 2 billion watts! The drooping dipoles (called “Breetz” dipoles for the man who developed them) are to help shape the antenna pattern. The dipoles are backed up by a wire-grid screen which serves as an artificial ground.

—E. L. C.

FEEDBACK

Woops! Re the “Gift Handbooks” letter on page 75 of the February issue, the correct signature should have been as follows:

--- Pete Smith, K9VRV/4, 1940 Richmond Road, Petersburg, Va.

Anyway, our advertisers are on the ball. The Hamcrafters ad on page 83 of March had the correct address.

---

We slipped a decimal point in giving the value for C₁ in Fig. 1, page 45, April QST (Norgaard, “Eyeball and Eardrum Doppler Tracking”). It takes 0.22 μ", not 0.022, to resonate with 118 mhz. at 1000 cycles.

---

The base connections for the 6DJ5s in George Hanerett’s modulator (February, 1962, QST, page 35) were those originally used when the tube was in the developmental stage. Production tubes use the following pin connections:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Grid No. 2</th>
<th>Pin 5 — Heater</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>2 — Grid No. 1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>6 — Grid No. 1</td>
</tr>
<tr>
<td>3</td>
<td>Cathode</td>
<td>7 — Grid No. 2</td>
</tr>
<tr>
<td>4</td>
<td>Top Cap — Plate</td>
<td>5 — Plate</td>
</tr>
</tbody>
</table>

Pins 8 and 9 are used for internal connections and the socket prongs should not be used as tie points.

---

There was an error in the location of holes for the 420-Mc. transceiver last month (page 14). The correct version is shown above.

---
New Apparatus

The Cushcraft Universal Matching Stub

One of the most useful devices for feeding a v.h.f. antenna is the corrective-stub matching system outlined in the v.h.f. antenna chapters of the Handbook and Antenna Book. Because it includes provision for either balanced line or coax, to feed a load of any impedance, the stub can be used in many matching situations encountered in v.h.f. antenna work. It is especially helpful when the impedance of the load is unknown, which is often the case. Its principal disadvantage lies in the fact that it may be a little involved to make up one that is mechanically rugged and electrically effective. This problem is now solved by the availability of a new Cushcraft item described herewith.

Basically, the Cushcraft matching stub is a section of transmission line 40 inches long, made of 1/4-inch aluminum rods spaced 1 3/4 inches center to center. The load to be matched can be any antenna or phase line designed for balanced feed, operating on any frequency from 144 Mc. up through the 420-Mc. band. This load is connected to the open end of the stub. Toward the other end is an adjustable short, and partway up the stub from the shorting bar are two sliding contacts for attachment of the feed line. Polystyrene blocks support the stub at each end, and these in turn are fitted with standoff mounts having stainless-steel clamping straps of the type frequently used in TV work. These clamps allow the stub to be mounted parallel to the boom of the array, or to the vertical support between stacked bays.

To use the stub, you merely adjust the position of the shorting bar and the point of connection of the transmission line for zero reflected power. Though two adjustments are involved, the procedure is simple, and you don’t have to know anything about the impedance of the load. The shorting bar tunes the whole system, and the position of the balun or balanced-line connectors takes care of the match. It could hardly be simpler, but some form of s.w.r. indication is a must, as it is in any matching adjustment where coax is used. The bottom end of the stub, or the shorting bar, can be grounded if desired. If less than the full length of the stub as supplied is needed, the remainder below the shorting bar can be cut off, once the proper adjustment has been made and the permanent location for the shorting bar determined.

— E. P. T.

Fig. 1—Sketch of the matching stub, with mounting clamps omitted for clarity. The shorting bar and taps for connecting the transmission line are equipped with set screws for making permanent settings. Points to be used for connections are equipped with double washers.

\[Strays\]

Just as we were putting the finishing touches on this issue, W8OLJ phoned to say that the SS Hope sailed for Peru on May 8. With a full complement of Hamcrafters gear, and signing W9AC, he said that the Hope will be on 7005 and 14005 kc., c.w. and RTTY, and on 7235, 14,345, and (perhaps) 21,445 kc., s.s.b. Much of the personal traffic from the ship will be via the modern RTTY gear furnished by the Teletype Corporation. Phone traffic will be limited to special occasions, although there will be plenty of normal s.s.b. activity.

June 1962
The Brass Fig Newton

BY R. M. CASE,* K4YNO

UNTIL his death a few years ago, I was the private secretary to the fabulously wealthy cookie magnate, John Barefoot Tiptoe. For nearly twenty years I lived on Copperock, Mr. Tiptoe's vast estate. During this time I had the opportunity to learn quite a bit about his private life. Very few people knew that he was an amateur radio operator. Even fewer knew of his campaign to bring the enjoyment of this hobby within the reach of all.

I distinctly remember one morning about two weeks before his death when I was summoned to the ham shack. I had been there several times before, but the vastness of this immense building never ceased to amaze me. I found Mr. Tiptoe in the twenty-meter room, listening to an extremely strong signal booming in over the usual QRM. We both listened until the station signed, then we looked around his frequency to see if any one had answered him. No one had. Mr. Tiptoe turned to me and said, "Mark, there is a fellow I really feel sorry for. With his reputation he will be doing well if he comes up with anything more than an s.w.l. card for the whole morning."

Naturally I agreed with him for I knew well the talk that went on about this guy at the local ham club.

"Mark," Mr. Tiptoe went on, "I am getting to be an old man, and I wouldn't want to think that I am heading for the last hamfest without having set up some lasting way of helping hams like that one we were just listening to achieve some status with the rest of the boys."

"Just what did you have in mind, sir?"

"I was thinking along the lines of creating a new series of awards. Something new and different, not just the usual run-of-the-mill certificates that the average ham pasters his walls with, but a trophy, something that can be displayed with pride. I am going to call it the Brass Fig Newton."

With that he produced from a drawer in his desk a beautiful trophy, a full three feet tall. It consisted of a polished ebony pedestal with a solid brass replica of a fig newton — in all its grandeur — placed upon it with a scattering of brass crumbs around the base. It was a truly breathtaking sight!

"What do you think of it, Mark?"

"Why it's just fantastic, sir. The requirements for winning it must be very stiff."

"Quite the contrary, my boy. We want this to be an award that will be given to only a deserving few. Nevertheless, the qualifications will not be so stiff that anyone who puts his mind to it cannot become a winner."

"That sounds rather complicated to me, sir."

"It's really quite simple, Mark. In order to be eligible for the award one must be nominated by a sufficient number of other hams or by the Federal Communications Commission. I have thought of several divisions that we could offer the award in to begin with, and probably after it gets going there will be many more areas which we will find we have overlooked.

"To begin with, the easiest area to win in would be the 'Worked All Neighbors' Televisions' division. To merit the Brass Fig Newton, the applicant must submit copies of at least six letters from the FCC pertaining to television interference, no less than two letters of recommendation from the TVI committee of his local community, and four from his neighbors. Hams applying for this award must do all operating from the same address, and mobile operation will not qualify."

"That sounds quite reasonable up to the last part. Aren't we being rather prejudiced against the mobile operators?"

"No, Mark. I have another area for them alone, called the Mobile Menace division. This is a competitive area and requires a little skill to win. However the extra requirements are justified, as we will give an additional trophy to the winner. It will be a miniature reproduction of the Brass Fig Newton, with a suction cup on the base for mounting it on the dashboard.

*105 N.W. 120 St., Miami 50, Florida
“In order to qualify for the competition, one must submit the usual letters of recommendation from the State Highway Patrol of any state in the United States. The more letters an applicant submits, the better his chances are of winning. Documentary evidence of accidents caused — such as photographs, court records, and revoked drivers' licenses — will also enhance his chances.”

“That sounds like a very good idea, sir. Perhaps it would serve a dual purpose and get more hams interested in mobile operation.”

“I thought you would say that, Mark. How about another division entitled ‘I Love Me’ division. This should be a natural for the fellow who is always diverting the conversation of the local rag-chews around to what his latest achievements in the world of DX are, and how much new and wonderful equipment he has. Also eligible for this award are the net control stations of the various social nets around the country who hold up the net ‘til all hours of the night by carrying on a long drawn-out QSO with one or two of their good friends. Hams will not apply for this award. They must be nominated for it by a petition of at least fifteen others who think they are worthy of it. You can see that will be a much coveted trophy.”

“It certainly will be, sir. This does indeed sound like a fine program. Are there any more divisions which you wish to establish now?”

“I think these will suffice to get it under way, Mark. There will inevitably be others interested, and I have no intention of trying to monopolize it. Once we get it rolling I plan on turning it over to some responsible organization along with sufficient funds to sustain it for quite a while. I want you to promise me that you will carry on this project in case anything happens to me.”

On January 21 the following equipment was stolen from the Newark (N. J.) Civil Defense Center. If you have any information regarding this gear, please contact Newark Police Chief A. J. Rauscher.

1. Halleracrfs Little Fone Model 22 IDS serial No. 4246.
3. Polsoner F3B transceivers, serial Nos. 91864 and 91865.
5. El-ronics Survey Meter Model SDB-1, serial No. 155.

On March 27 a Viking Navigator transmitter, serial No. 85,809, was stolen from W7GDV. A further identification of this rig is that the phonotype output jack had been replaced with an 80-239 coaxial fitting. Any info on this equipment should be sent to L. E. Randle, W7GDV, 1720-A Laurel Canyon Blvd., Los Angeles 46, Calif.

In early March the club rooms of the Canadair Amateur Radio Club (VE2EE) were broken into and a Collins 75A-2, serial 1340, was stolen. If you have any info on this receiver, please forward it to the club at P. O. Box 6087, Montreal, Quebec, Canada.

In March the following equipment was stolen from W6HJT.

- Collins 368-1 transmitters, serials 11932, 10143, 10345 (one number unknown).
- Collins 75S-3 receivers, serials 10118, 10211, 10438, 10354.
- Collins 516F-2 power supplies, serials 12273, 10338 (two numbers unknown).
- Collins 3125-4 speaker consoles, serials 52269, 52905, 52522, 52782.
- Collins 30L-1 linear amplifiers, serials 10298, 10277, 11329.

Contact the San Diego County Sheriff, or W6HJT, Cameron G. Pierce, 1100 Oak Grove Ave., San Marino, Calif.

A Hammarlund HQ-145X receiver was recently stolen from W9YB, the Purdue Amateur Radio Club. Serial number unknown. This receiver was the personal property of K9RLU, and had been on loan to the club. Contact the Purdue ARC, Box 518, W. Lafayette, Ind.

June 1962
Correspondence From Members

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

LEAD PIPE CINCH

I have just made an important discovery and, since I am a man of long standing I feel you should break the news to the quivering world.

For several years now the people delving into Radio Astronomistry have been unable to explain the large amount of radio radiation from some galaxies. Like man, I got it figured: these galaxies are older than some and, with the untold number of planets involved, it’s a lead pipe cinch that, at all times, two or more are having simultaneous DX contests.

Go ahead and take the credit — you will go down in history with Pasteur, Marconi or Mathias. — Don M. Wherry, W6EUM, Camarillo, Calif.

WN4AQV’s remarks on “Novice Acent” April QST: Must be a lot of old converted railroad operators like myself. A period in Morse comes out 7 in International — darn hard habit to break! — R. E. Johnson, K9QQO, Placentia, Calif.

I have just finished re-reading “Your Novice Acent” which I received when I first joined the League as a novice. It says something about the novice being “isolated” from the rest of the ham fraternity. I disagree with this. Any novice can move his dial a few kcs. and listen to proper practices. Maybe this will lessen the corrosion that has set in! — Kenny Ribe, W2A00L, Belle Harbor, New York.

SURE CURE

The cure for Mr. “No-lid” is as simple as turning off the receiver. Take away his attention and he’s lost. A dog barks and a small child throws a tantrum for attention. Ignore them and they’ll go over it quickly. Nothing will upset our friend in better fashion than to think he’s not getting out. He may be right in the middle of your QSO, but shut your eyes and let him deliver his time honored speech to himself. Nothing ruins his day more than to think you can’t hear him. With enough help from all of us. Mr. “No-lid” is destined to oblivion. — Dave Angel, KB8DZ, Kiryat, Marietta, Ohio.

AWARD ARITHMETIC

I read with considerable interest a letter from John Velamo, OI2FY regarding the “Certificate Industry” (April, QST).

May we assume from this that John is going out of the certificate-selling business; that he is now offering to sell his certificate without a list of other certificates or that his attempt to sell a book of certificate rules failed?

For some years John has been the Award Hunters Club and sold a 5 X 7 Certificate attesting membership in said organization to all and sundry upon receipt of $1.00 US or equivalent and a list of 25 awards held by the applicant, certified by another amateur. In addition to another dollar per year you could receive his “News Letter” ...

I point out the above only so that his wall competition in the Awards Field can be placed in the proper perspective. ... After all, it is still up to the individual amateur to determine how he will spend his time and buck. I know of no instance of an arm being twisted to “sell” an award. My W9PG DXCC means just as much to me as it would if it were the only certificate issued. The fact that I have over 50 other awards “does not change it.” — William T. Clark, K8WVR, exW9PG, exW7LZM, exW5RXC, Columbus, Ohio.

599 RATING

Your RST 599 hr in Central Valley, Calif. Due to your FH signal received here I was able to pass my Novice examination and received call letters W6EER. Just recently I passed my Conditional examination and now have call letters W4EEER.

I rate you a 509 because of your code practice schedules and fine books you have that helped me pass my examinations, especially the Handbook and the License Manual.

Thanks again and will be listening to your W1AW schedules. — Walter J. Wrobek, W1AWSB, Central Valley, Shasta County, Calif.

A few days ago, I took to work my copy of How To Become a Radio Amateur. A friend of mine at work became interested in the book and asked if he could take the book home and read it over the weekend. About Monday the friend told me that it was the most interesting book he had read in a long time, complete but down to earth. Thanks for publishing such a fine detailed book on amateur radio; keep up the good work at Hq. — Melvin Ray, W9TE, Minneapolis, Minnesota.

PHILANTHROPY

Received a letter from Oscar Kalmr, HA5DH of Budapest, Hungary. We have corresponded old and on for the past several years. I am certain you remember Oscar as he helped to clutter 14 Me. Quite a bit during the evenings before the sunspot cycle let us. It may be news to you, as it is to me, that Oscar has been off the air since some time during 1940. He tells me that his ticket was withdrawn (underscored) but did not say why. Knowing Oscar’s “open” style of writing it is possible that he may have opened up too much for the authorities.

He wrote in this letter, “I would be very happy if you knew for me somebody to take out a subscription for the QST and I could compensate for it by sending stamp series recently appeared.” It is possible that currency is not permitted to leave Hungary and his only method of paying is by means of postage stamps ...

... Do we have a philatelist among us who would be willing to fork over six bucks for the equal in the latest issue of Hungarian postal paper? — Harry R. Rechter, W2ANJ, 5000 Clinton street, N.E., Washington 18, D. C.

[Editor’s Note: This is just one example which illustrates problems facing fellow amateurs overseas.]

POWER SUCKER

Congratulations to W8YLU on his article “Clear Channel Operation” which appeared in April QST. I was so enthused over this new principle that I immediately adapted my rig according to OA Quitter’s instructions and I was really having a ball. That is, until last night, when another station came on my frequency and sucked me right off the air. Evidently he had also adapted to the “signal sucker.”

So, I doubt if this method will have a very bright future on the ham bands, since, as OA Quitter noted, it won’t work before everyone’s signal is sucked off the bands. — Tony H. Harpole, KA4WOL, Clinton, Kentucky.

I was one of the fellows he worked. During the QSO, I noticed that my receiver was sliding toward the back of the operating desk. After yawning it back to its normal position several times, I happened to look out of the window and saw something that utterly amased me.

My antenna was toging and swaying fiercely to the west, then suddenly coming to the ground. Not only was I suckin in all the power, but also the whole darned antenna system! — Anthony L. Sickel, W3YJM, Lancaster, Pa.

I thought that your April Fool article, “License Fee — or Tax?” was just too ridiculous and too funny. When such a relatively trouble-causing service as the Citizens’ Band would be taxed on almost the same level as the self-policing and monitoring Amateur Radio Service it is obvious that some services are loose somewhere.

On the other hand, I enjoyed very much the article, “Clear Channel Services.” I hope to have my system in operation as soon as I can get my superaudible oscillator superaudibly oscillating. It will be very helpful considering my QRO 75 watts. — Ted Levy, K3WLY, Manchester, Ohio.
I feel that Mr. Quitter has developed an excellent method for removing QRM. I have been using a similar system for several years, and find that it works very well. I might caution others to be extremely careful to keep the resistance precisely zero, to avoid broadbanding. A few weeks ago, I had too much negative resistance at the superaudible oscillator, and wiped out the entire twenty-meter band for several hours.


With regard to the article on clear channel operation by Mr. Quitter, I would like to point out that he has missed a very good bet. The tunnel diode exhibits a negative resistance characteristic which is independent of frequency (up to a point), unlike the power source which he appears to be describing in his article. Consequently a properly biased tunnel diode attached and tuned to his antenna would operate in the same manner he describes its operation at the frequencies at which the antenna had the proper resistance.

Further consideration of the principle employed leads to an examination of Maxwell's equations for the case considered, which prove that the clearing action of the antenna takes place only at the antenna itself. The effect will fall off roughly as 1/d for any distance d away from the antenna, and consequently the antenna must be infinite in length, area, and volume to totally clear the band. Given such an antenna, I rather suspect that one could even dispense with the tunnel diode. — Louis T. Fitch, W4JRV, Clemens, S. C.

The article you printed in the April QST entitled "Clear Channel Operation" by W8LJU really had me fooled at first, but upon more careful reading I see why for "More Sock for Counts" last April. — Dick Stutzen, K5JMF, Carlsbad, New Mexico.

... the Lick-Wilmerding High School Radio Club has made a drive to improve our experiments in the "Power Sucker" antenna of the type described in the article. We made our own "Power Sucker" antenna on which our experiments were conducted.

We discovered that the most critical part of the antenna is the crossover network between the Superaudible Oscillator (SAO) and the Transmitter Power Amplifier (TPA). The size of the angle (in degrees) and the length of the feed line from the SAO and TPA to the antenna is directly related to the power gain of the antenna.

The formula we derived for the antenna gain is as follows:

\[ \text{Power Gain} = \frac{1}{\log_{10} \sqrt{\frac{1}{\tan \theta}} (\log_{2} 2)} \]

where 
- \( a \) = length of feed line from SAO to antenna
- \( b \) = length of feed line from TPA to antenna
- \( \theta \) = size of angle of crossover


... I am wondering if a power sucker tuned to the ham-bands might act as a TVI filter when connected to a TV set? — Mike Cornel, WA6MRH, Burling Park, Calif.

... Prof. H. E. Dunnit has a small rig farm in Iowa and has been running a full gallon and blowing huge holes in the ham bands himself. Lately since the introduction to the Power Sucker into the field, every time he fires up holes in the bands, he gets clobbered by some sucker upper side. He has put aside his talent and years of experience to outwitting the Suckers.

His theory was to put such a concentrated beam on the air that it would overload the Suckers and render them inoperative. Having a round steel grain bin, he added another stage to his biz rig and fed it into the bin. After checking his work, he was ready to try it on some Sucker. Having been taken out by this Sucker before, he knew about where the boy operated, so loaded up and waited. It happened.

Now, what the Prof. wants to know is what did the guy do with that 1200 bushels of corn? — C. O. Bush, K9YTP, Forest City, Mo.

HELP THE MAILMAN

I have one pet peeve which I think should be brought to the attention of these careless stop signs who fall into the category. It concerns the addressing of QSLs. It appears that many small town hams have never heard of that architectural monstrosity called an apartment house. The one that I reside at, for instance, has 86 families. It is constantly receiving cards addressed merely to ARS W4ZFGQ and the street address. As strange as it sounds, my mailman knows me by my last name and not by my call letters. One bright fellow sent me a card and addressed it to "Toed" and the street address. In order to get the address, the cullbook must be used. The last time I looked, my last name was listed along with my address. Why isn't it used?

Let us all try to ease the lot of the hard-working mailman by using full names on cards. In that way, he will not be in doubt as to whom the card goes to. In cases where there are more than one farm in a building, this will be greatly appreciated by all. — Ted M. Marks, W4ZFGQ, Brooklyn, New York.

TRY 10 CROSS TOWN

I, as an amateur and ARRL member, am coming to you for any help you might be able to give our group in a problem which our membership cannot seem to see. With the change in the sunspot activity our amateur bands are changing so that now the 40-meter, 80-meter and even the 160-meter bands are the DX bands. The amateurs have become so used to using these frequencies for short distance communications that they are still trying to battle the QRM caused by the use of the 160-meter band at times that there is no QRM on the higher bands. Yet, I am sure that they all have to jam themselves into the already overcrowded low bands? — Clair Parker, K5HGA, Midland, Mich.

CQ K

I have forfeited a good QSO many times because I tuned in just a little too late to make certain that the OH7 was calling CQ. During procedures, which are OK; others AR; others AR K, etc., suddenly the idea struck me that if we signed our CQs with CQ K there would be no doubt in the matter! This seems like a trivial thing, but they mount up, you know! I think it would improve operating practice. — M. H. Schottstein, W3HDUP, Kingstown, Ind.

How many times have you tuned across a c.w. band, stopped and listened to a fine signal signing call letters two or three times, followed by a K7? Perhaps you wondered if the station had called CQ or was already in QSO. You may have waited to hear if there was an answer and heard nothing. Perhaps you called the station anyway, or not being answered, you may have moved on. How about adding an extra CQ just before the final call of the CQs and see whether they don't all have to jam themselves into the already overcrowded low bands? — Clair Parker, K5HGA, Midland, Mich.

... still around

I wish to state that recent reports of my death have been grossly exaggerated. It was with considerable dismay that I read my name among the Silent Keys, especially since I've always been a phone man. (The XYL, W3FG, regards the notice as an omen that this hobby will be the death of me yet.)

Unfortunately many of my friends saw the list too, and the resulting confusion can be easily imagined. Some, whom I have not seen for a while, were about to send flowers. Also the FCC enquires in almost all cases that I am still living, and that it would be wise to notify the Commission of the error in order to prevent my call from being reassigned. Worst of all, the League apparently feels I've no use for the remainder of my QSL subscription, since I have not heard on the propagation CQ for several months. If a friend had not been concerned about the welfare of the "widow", I might still not know I had died.

At a time when the League is plugging hard for new members, it hardly seems practical to do away with those of us who still have a few good years left. Here's hoping I can be returned to active membership; I'll try to be on the air enough to prove I'm still around. — Charles E. Clarke, K5BWS, Lansdowne, Maryland. Editor's Note: Our humble apologies, Mr. Clarke is still a lively Full Member—and one with an excellent sense of humor.
I.A.R.U. News

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately can be mailed to the bureau in the parent country: e.g., cards for French Cameroonians (FES) go to REF in France; cards for VP8s go to RSGB in England. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs under "ARRL QSL Bureau." Bold face listings indicate corrections or additions.

Algeria: D. Deville, FA09RW, Box 21, Maison-Carres, Alger
Angola: L.A.R.A., P.O. Box 484, Luanda
Argentina: R.C.A. Carlos Calvo 1241, Buenos Aires
Australia: W.I.A., Box 2611 W, G.P.O., Melbourne
Austria: O. v/S.V., Vienna I/9, Box 999
Azores: Via Portugal
Bahamas: Via ARRL.
Barbados: Arthur S.C. Farmer, Storms Gift, Branchons, Deaconos Rond, St. Michael
Belgium: U.B.A., Postbox 634, Brussels
Bermuda: R.B.R. P.O. Box 175, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: D. E. Yong, VP4YG, Box 325, Georgetown
British Honduras: L. H. Alpuche, VPIHA, P.O. Box 1, El Cayo
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 899, Rangoon (Union of Burma)

Canton Island: Charles Singletary, KB6HI, % F.A.A., USP 66-50,000, Canton Island, Phoenix Group, South Pacific
Ceylon: P.O. Box 907, Colombo
Chile: Radio Club de Chile, Casilla 761, Santiago
China: M. T. Young, P.O. Box 16, Taichung, Formosa
Colombia: L.C.R.A., P.O. Box 584, Bogota
Costa Rica: U.C.A.R. QSL Bureau, P.O. Box 7375, San Jose
Costa Rica: Radio Club de Costa Rica, Box 2142, San Jose
Cuba: F.A.R.C. QSL Bureau, P.O. Box 6996, Havana
Cyprus: Mrs. E. Barrett, P.O. Box 219, Limesos
Czechoslovakia: C.A.Y., Box 99, Prague 1
Denmark: E.D.R. QSL Bureau, Uenstrup
Dominica: VP2DA, Box 64 Roseau. Dominica, Windward Islands
Dominican Republic: RCD, P.O. Box 137, Ciudad Trujillo
East Africa: QV1, QV3, QV4, QV5: P.O. Box 30077, Nairobi, Kenya Colony
Ecuador: Guayquil Radio Club, P.O. Box 5757, Guayaquil
Ethiopia: Telecommunications Amateur Radio Club, P.O. Box 417, Addis Ababa
Rfij: S. H. Mayne, VR2AS Victoria Parade, Suva
Finland: SRAL, Box 306, Helsinki
Formosa: Hq MAAG, APO 63, San Francisco, California
France: R.E.F. BP 26, Versailles (S & O)
Germany (DL2 calls only): G. E. Verrill, G8IEC, 10 Seehorner Str., Gosport, Hants, England
Germany (DL4 & DL5 calls only): DL4 & DL5 QSL Bureau, % DLA4VJ Base MARC Station, APO 130, New York, N. Y.
Germany (other than above): D.A.R.C., Box 99, Munich 27
Gibraltar: E. D. Wills, ZBSI, 9 Naval Hospital Road

Ghana: 9G1CW, Hans Sues, P.O. Box 1945, Kumasi
Great Britain (and British Empire): A. Milne, 29 Keichill Gardens, Hayes, Bromley, Kent
Greece: George Zorantis, P.O. Box 584, Athens
Greece (Unlisted SVs only): MARS, 7206 Support Group, APO 233, New York, N. Y.
Greenland (OXs only): Via Denmark
Greenland (K0s only): KG1AA-K1EIZ and KG1AA-K1EIZ Via MARS Director, G033rd Air Defense Wing, APO 23, New York, N. Y.; KG1FA-KGIH: Via MARS Director, 408th AB Group, APO 121, New York, N. Y.
Grenada: VP2GCE, St. George
Guam: M.A.R.C., Box 445, Agana, Guam, Marianas Islands
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, NAS, Navy 115, F.P.O., New York, N. Y.
Guatemala: C.I.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d’Haiti, Box 945, Port-au-Prince
Honduras: O. A. Trochez, P.O. Box 214, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541, Hong Kong
Hungary: H.S.R.L., Postbox 185, Budapest 4
Iceland: Icelandur Radio Amatorar, Box 1058, Reykjavik
India: P.O. Box 834, New Delhi 1
Iran: Amateur Radio Society of Iran, MAAG, APO 205, New York, N. Y.
Ireland: I.R.T.S. QSL Bureau, 24 WICKLOW St., Dublin 2
Israel: L.A.B.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.L. Viale Vittorio Veneto 12, Milano, Italy
Jamaica: Ruel Samuels, VP5RS, 34 Port Royal St., Kingston
Japan (JA): A.A.R.L., Box 377, Tokyo
Kenya: R.S.E.A. QSL Bureau, P.O. Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 102, Seoul, Korea
Kuwait: William N. Bursos, 9K2AZ, % Kuwait Oil Co., 14—5th St. North, Kuwait, Persian Gulf
Lebanon: K. A. I., Amoudi, AX6, 3245, Beirut
Liberia: Ken Bale, EL4A, Le-Tourneau of Liberia, Roberts Field
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg
Macao: Via Hong Kong
Madagascar: P.O. Box 567, Tamatave
Madeira Island: P.O. Box 267, Funchal
Malaya: QSL Manager, Box 777, Kuala Lumpur
Malta: R. F. Galea, ZB15, "Casa Gales," Railway Road, Birirkara
Mauritius: Paul Cauchos, VQ8AS, Box 407, Post Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico 1, D.F.
Midway Island: KM6BI, AIRBARNSON Two Detachments, Midway Navy 3000, P.O. San Francisco, Calif.
Monaco: 3A2CN, Anderhals Pierre, 49 rue Grimaldi
Monasterray: VP2MY, Plymouth
Morocco: A.A.E.M., P.O. Box 2090, Casablanca
Mosambique: Liga dos Radio-Emissores de Mosambique, P.O. Box 812, Lourenco Marques
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles (Aruba): Verona, Postbox 392, San Nicolas, Aruba
Netherlands Antilles (Curacao): Verona, Postbox 383, Willemstad, Curacao, NW 1
New Guinea: Rabaul Amateur Radio Club, P.O. Box 170, Rabaul, Territory of New Guinea
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington City
Nicaragua: Club de Radio Experimentadores de Nicaragua, Apartado Postal 925, Managua
Nigeria: Dr. M. Drenstall, 5N2JKO, Regional Research Station, Samaru, Zaria, Northern Nigeria
Northern Rhodesia: N.R.A.R.S., P.O. Box 332, Kitwe
(Continued on page 169)
Contest Operating. V.h.f. operators at one time had to be coaxed to get into anything that suited their fancy. Not so these recent years. The V.H.F. Sweepstakes is right up there with all the other major activities. The June V.H.F. QSO Party, our next challenge, is high opportunity to be on the air to make new contacts, work some new states and have a whole of a good time operating. Each such contest is a chance to put your station on the map. There are new results even if you get in only a little while. Beyond this it’s a test between you and other operators in your ARRL section to see which can win the section award. The Activity is mostly from home stations but on June 9-10 it’s a chance to operate from the hilltops in a month that is often good for v.h.f. DX. Working as many bands as you can helps both in the number of contacts you make and in your multiplier (sections). See page 60 for full details on the V.H.F. QSO Party, June 9-10.

The Greatest of Them All Comes June 23-24 — The ARRL Field Day. Some may dissent, if they have never operated Field Day before, but from the standpoint of sheer number of operators enjoying the big annual field exercise, this tops every other form of operating activity in amateur radio. Testing emergency equipment is always the prime objective. Field Day runs under flexible rules embracing club groups, a single operator, or a pair of operators. Club entries are classified by number of transmitters to fit big clubs and little ones. The rules for this year’s Field Day are on page 28. We hope every amateur will meet the challenge to better his operating ability and set up operation in the field. Small portables and hand-carried equipment, battery powered, is fine gear to have in the station during the whole year, as well as on FD. Remember, too, that there’s a class for mobile entries. We encourage clubs in addition to their club score to have their members report individual mobile contacts for an aggregate mobile score to show mobile capability within your club.

Perhaps Field Day is primarily a club exercise, but every amateur who goes it alone, or as part of a club operating team, who can make even one emergency-powered contact, has carried out the spirit and meaning of Field Day.

Versatility in Operating. Over the years changes in equipment and technique have done much to further the desirable goal of being versatile in our operating. We band switch to take advantage of conditions. With a little care to provide simple but effective antennas, we can efficiently pass a message on the section net on 3.5-Mc. c.w. and a few minutes later be working DX on 14 or 21 Mc. A switch to h.f. voice and we can polish off the evening with a satisfying local rag chew, or a switch to v.h.f. and we are in an AREC or RACES drill.

The more we take part in all kinds of amateur work the more fully we reap the pleasures and benefits. Humming is a field of diversified activities. Let us investigate the up-to-now untried possibilities. If one confines himself to building and experimenting and never rag chews, he is probably missing general contacts and friendships that could mean so much. Likewise if one chews the rag all the time, he is missing something valuable too. The skilled amateur also is familiar with message forms and procedures. Be equipped and skilled to use both voice and c.w. operation. Such skills add to one’s prestige as a true communicator. Avoid the “formula” contacts.

Another thought — the public service record of the amateur, participation in emergency work in natural disasters and traffic handling services, reflect great credit on amateur radio. We all share in the pride. Register in the AREC or report regularly into your section net to share in the responsibility. Strive toward versatility in your daily amateur operation.

— F. E. H.
In an obscure corner of the Emergency Communications Manual there appears the following sentence: "Some of the most useful equipment has not been used." Probably, to be realistic, this should be rendered as: "Within the limitations of available equipment, . . ." and to "mode" we should add "band," so that the statement will read: "Within the limitations of available equipment, and band, we must select the mode and band to suit the need." Or, to put it in simpler terms, "Use what you've got, but use it right."

We wonder, sometimes, if all of our ECs follow this philosophy faithfully. We voice the same because in emergency after emergency most of the big noise is made on 75-meter phone, the most crowded band we have and not by any means the best suited for the average emergency purpose. The band probably least used is 80 meter c.w. once the least crowded and for many purposes the best. In one recent emergency there was considerable activity on 20-meter phone, and much publicity was generated therefrom—and yet, how can effective emergency communication be carried out on this band under normal circumstances?

We realize that it is not always possible to consider the need first, then deliberately set about acquiring the equipment and operators to accomplish it—it is the logical way to go about organizing. All too often, in our amateur radio emergency work, the disaster finds amateurs on the scene partially or totally unprepared, and hundreds of amateurs suddenly finding themselves in a position where none of them have operators to offer their "help," although they have taken no part in preparation. The loud-talkers read the publicity (both good and bad) while the real emergency work is quietly being accomplished in pre-organized v.h.f. or a.m. groups; sometimes, without the knowledge of the operators, we wonder how the amateurs over achieved such a position of respect in emergency communications and consider how much more we could offer if we concentrated on organizing and developing our considersations until we could conscientiously feel that such a service was being rendered.

We hope the above paragraphs won't offend anyone who have rendered effective service on 75 meters c.w. and often has been done—and if ARES members use 75-meter phone and nothing else there is little else you can do until equipment can be acquired for better bands. The thin lines have its edge in a nest already full, and new amateurs will flock to the band were they have lots of company. We want lots of company in emergency work, too, but not casual company (this is just too much QRM). Our purpose is better accomplished on an empty band than on a crowded one, because we believe in the principle of selecting the band to suit the need, we would inevitably put 75 meters at the bottom of the list for any purpose, short, medium or long distance. For short distances, the v.h.f.'s (2 and 6 meters) are ideal, preferably toward the high-frequency end of the bands. For the next few years, 10 and 15 meters will be local rather than DX bands, so here's a chance to organize some ARES nets utilizing the DX stations with such capabilities who do not use the v.h.f. For medium distances, beam antennas can take the place of general coverage radiators to do the job in most casts; perhaps in the west, where "medium" distances are measured in hundreds of miles rather than in multiples of ten, 80-meter c.w. can best do the job.

There is not too great an application for long-distance communication in the average emergency, but where it becomes necessary it is best accomplished on 40-meter phone. Ten meters has little or no emergency potential, even during the high part of the sunspot cycle. If there is no c.w. ability in your ARES group (can such things be?), 75 meters would be the ideal band for medium distance if you could get through the QRM. In such a contingency, s.a.b. is far superior to a.m. For high-speed point-to-point, how about RTTY?

A great deal more can be said on this and allied subjects. We already have gone on too long in our length. In commercial fields it is usually possible to acquire equipment, capability and frequency space to accomplish the desired objective in the most efficient manner. We amateurs aren't in the business, so we have to make the best of what we have. This is restriction enough. Let's not restrict ourselves further through consideration for things other than the job to be done. — W1NJM

During a flood disaster in Idaho, Feb. 12-10, telephone communication facilities at the Red Cross chapter in Pocatello proved inadequate to convey the load. So, KI WTC-GO was called upon for assistance. Within the hour, three mobiles were in operation, one acting as control station and the other two on patrol. Later, K7CVB was set up at Red Cross headquarters and W4LQ at the Idaho National Guard armory, manned 24 hours per day by volunteer amateurs. Before the flooding condition was over, 22 amateurs had been in action, including ten mobiles on patrol on the dikes, reporting the armory the location of the workers on the dikes such as sand, bales, food, and also reporting conditions in the various critical areas along the Portneuf River. Two other stations in Pocatello assisted in handling welfare messages. The following additional stations are known to have been active: W71A ALO CQ GGA GSO CXX EQQ HEV MLJ MLK NEY GCE W74 DLO GGV YBA UA UGI HDB VPS BNJ CDA GCO.—W7CGO, EC Bannock County, Idaho.

In all, some 32 amateurs in the Tidewater Area provided assistance, sixteen of these mobile. C.D. headquarters stations K4SDB (Richmond), W5AIY/4 (Virginia Beach), W4MFA (Hampton) and W4WFF (Elizabeth City, N. C.) also joined the net, and W4MFX operating on emergency power at Manatee on the outer banks provided the only communication to that area. Many amateurs in other states remained on standby service, and several were able and needed. K4MSB set up six-meter gear at c.d. headquarters for tie-in with Norfolk Area V.H.F. Net. Portable stations were provided by K4TSJ and W4MIR to assist at evacuation centers. The combined and fixed station net, with radio be be hands-only to W4QDY, remained in operation until 0200 Mar. 8, when radio was released to standby status, subject to immediate recall. A very nice job by both AREC and HACES groups working together in the Norfolk area.

On Mar. 5, after the Baltimore Area Emergency Net had completed its regular drill at 2100, it was reactivated for an emergency brought about by heavy snow conditions. The net relayed much needed information for the Department of Transit, state police, county police, Gas & Electric Co. and the State Road Commission concerning road conditions, fallen power lines, traffic tie-ups, drifting conditions and weather reports. Four stations went mobile in the blinding snow to get information on road conditions from areas the road commission could not reach by truck. Four different stations received N.C.S. during the N.C.S. out of amateurs resulted purely from the habit of the local ARES gang in monitoring the a.c.c.-upon-emergency frequency. Those taking part: K88 MDI, NAS LJB RCD OQA LEN P2B EYE QAT E4R DKX, W84 BOK TAL TRU USW H2O NAE.—K2KZP, EC Baltimore Area, Md.

On the evening of Feb. 3, 1982, two very angry mothers, neighbors of K1AUN of Middletown, R. L., asked for help in locating their respective sons, aged nine and eleven, who had previously threatened to "leave home." K1AUN was activated on the mobile frequency. W1XTL coordinated activities between mobiles and fixed stations. Three hours after the alert, the boys, tired and hungry, returned home of their own accord, having discovered that distant pastures were not as green as they thought. Other amateurs participating in the search activity, all on six meters, included K4 AUN RBD TPK K3 JED QSY SXY and NJT.

Members of the Naval Air Station Amateur Radio Club in Pensacola provided communication in early January for a woman whose baby was stranded at a lookout point on the Florida-Cuba border. The baby had a heart attack. Word of the need went to K4FOG, secretary of the club, and she, with the assistance of K4EYL and club station W4NBI, succeeded in contacting KG4A in Guantanamo. Several schedules were kept between Pensacola and Guantanamo for continued reports on the man's condition.—K4STI, EC Pensacola, Fl.
Virginia SCM WA4QDY reports extensive operation by RACES and AREC members in the Norfolk area, as reported by WA4BCP. The presence of an emergency condition took place on the morning of March 7, when a leak was discovered at the high water on his way to work along West Ocean View. (He never did make it to work.) WA4DZH, Norfolk radio officer, activated the Norfolk CD Radio Net and KA4KKT was dispatched to assist in evacuation of the Norfolk High School. WA4BVP had net control for Norfolk C.D. Other mobile units were dispatched to other designated evacuation centers, WA4UJ/mobile at Bayview, WA4QO/mobile at Stuart, KA4KKT at Ocean View. The lines were disconnected and the amateur net was the only continuous communication for Red Cross and c.d. Relief at the latter locations was provided by KA4GW and KA4KQX. When commercial power failed in the East Ocean View area, WA4BCP was there with his trained CORE mobile generator to render service within 15 minutes. WA4DIZ reported into the net from c.d. headquarters, and Red Cross and c.d. reports of evacuation procedures flowed directly to headquarters officials. Because of antenna damage at c.d. headquarters, WA4BCP retained control until 1600, with relief from WA4CCG. At this time, operation on 75 meters was abandoned because of the high QRM level and shifted to 29.6 Mc. The Virginia Phone Net continued on meters under the direction of WA4YGO.

A wintry gale whipped up the Atlantic Seaboard in early March, causing high tides and extensive flooding and wind damage. We have reports of amateur participation from North Carolina, Virginia, and New Jersey. Operation was normal throughout all AREC and RACES hams except SCM WA4RII gives us the details in North Carolina. Communication was knocked out early in the storm and c.d. headquarters was activated at Raleigh with W4s PNM, UQA, PDV and KA4KDV doing the operating. Contact was established throughout North Carolina and adjoining states with KA4KLJ, GFG, CPX, W4s FCN, LCV, SIJH, TFA, TMA, WA4FHY, W9OWD/4, K9HIG/4. Over 200 official messages were handled at c.d. headquarters, plus many personal welfare messages. The Tar Heel Emergency Net was also in session beginning at 1000 EST on March 7 and ending at 2200 EST March 13. Many amateurs left their homes help in the emergency. W4IYFD, from Chapel Hill, moved into Atlantic the morning of March 8 and then went on to Avon, operating continuously, except for a few naps, until 2200 March 11, handling over 200 messages. WA4LQY operated continuously for 114 hours, handling an estimated 1000 messages. KA5MA also operated some 72 continuous hours. W4TJM and W4TLM moved to a rig to Kitty Hawk and worked from there for 72 hours. K9HIG/4 operated portable at Edenton and W4KQO was in operation at Atlantic. After the storm, K4QJQ controlled the net for a solid 28 hours; others spending long hours as NCS were KA4LW, WFG, GDX, W4s ZEK and YMI. Among the outstanding assist were W4NF, GNG, W9LV, W4B 113, N6, WA4GFO, W4LQ for FFX QC and W9BHIK. Many of these participated in both the RACES and Tar Heel Nets. — WA4RII, SCM North Carolina.

On March 7, WA2OZQ, on his way to work in Atlantic City, found that the road was blocked by high water caused by high tides. He was in contact with K21AJ in Pleasantville and K2ZZY in Northfield.Returning home, he set up his two-meter rig and started monitoring the c.d. frequency of 146.9 Mc. It wasn't long before he heard the expected emergency plan from WA2KWF for mobiles: WA2QOQ and WA2QOQ. He also heard the beaconing set, K4s KWF and QOQ. He was at the bridge heading to Ocean City, talked their way through the police blockade and drove into the flooded area. WA2QOQ set up at the armory, WA2KWF at the school. WA2KWF had c.d. headquarters and WA2QOQ at the high school, where plans were being made to take care of refugees, of which over 100 were already on hand. WA2QOQ's first message relayed a need for blankets, and then K2ZZY set up a second c.d. that night, so that running back and forth to the armory would be unnecessary. Because the indoor antenna would not reach c.d. headquarters, WA2QOQ relayed from his car outside the building. Traffic was completed by the firemen to pass out food, water, and other supplies. The most urgent need was water and food. WA2QOQ relayed all information on water contamination and utilities. One notable message was about a body floating down 15th street in Ocean City, which turned out to be that of a person drowned in Beach Haven, 70 miles distant. By 2000, conditions at the high school seemed to be under control, but nobody could leave, so WA2OZQ stayed until 0230, when he, WA2KWF and WA2QOQ secured for the evening and drove through two feet of water to reach the bridge back to Somers Point.

During the operation, WA2DOU and K2CCR monitored the frequency and often stepped in to relay when the going was too tough. WA2QOQ became the C.D. coordinator and was in charge of pouring in order to keep communications open. Mobile units from out of town helped, too, WA2TII, WA2QKX and W2LY were active, the latter bringing down a mobile trailer unit for use in the Wildwood area. In closing his report, WA2QOQ, E4 for Atlantic County, N. J., states that all who took part were AREC members, coordinating their efforts with c.d. in Ocean City, which supervised all operations, and that "the dedication, cooperation and willingness to serve at personal sacrifice were in keeping with the best traditions of the Amateur Service."

February SEC reports were received from thirty sections, an increase of one section over the same month last year. AREC members represented totalled 14,132, an increase of about 2,000 over last year. The highest number of AREC members represented in SEC reports any month in any year. We now have five sections reporting an AREC membership of over a thousand: NYC-LI, Mich., Ind., Ohio and E. Fla., in that order. South Texas lassen't far to go with 940, and E. Pa. is not far behind. This is heard from in Feb. Tenn., Okla., W. Fla., Alta., S.N.J., E. Mass., Minn., Maine, San. Valley, N.C., Iowa, Ariz., N. Texas, Wash., Colo., Utah, W. Mass., Nevada, W. Pa., S. De., Ore., Ala., Los A.

RACES NEWS

Latest word from the Office of Civil Defense indicates that things are still pretty much upside down, but RACES is still in business, with Leo Hajesm, W8SKA, still at the operational helm. Some 1360 RACES plans are now on file at OCD, as of April 1.

In July of 1960, we attended a private OCD conference at Battle Creek to discuss the national radio emergency plan and the RACES frequency plan with officials of OCDM and USCDARA. This was reported in this column in Sept. 1960. Later, as a result of this conference, we received an advanced draft of the new frequency plan, reported in this column in May 1961 QST.

We now have a finalized version which we understand is available from the Communications Operations Division, Office of Civil Defense, RACES Branch.

One thing about this plan (Appendix 1, Annex 15 — Communications, National Plan for Civil Defense Mobilization) (or just ask for NP-15-1) which we would like to call to the attention of all RACES radio officers is the section entitled "Modification Requirements," in which it is stated that after Jan. 1, 1963, RACES plans which do not conform to the particulars set forth therein will be cancelled, and approval of subsequent plans received at OCD will not be given unless they comply. Meanwhile, presently-approved plans may be used, but if modification is necessary be ore Jan. 1, 1963, the entire plan must be brought in compliance with NP-15-1.

In other words, OCD expects the new national frequency plan for RACES to go into full effect on that date. Most states have already submitted modified plans, and it is expected that others will soon fall in line. At local levels, RACES plans should be reviewed to be sure they follow the national frequency plan prior to Jan. 1.

What about OPAL-267 According to our latest word, there are no plans to have one this year — not on a national basis, anyway. However, Texas Division of Defense and Disaster Relief is sponsoring a contest on FD week end, similar to the FD itself, in which all RACES members are invited to participate. Sorry, we don’t have room for the details, but a note to Frank Cox, K5TRY, Communications Officer, Texas Division of Defense and Disaster Relief, Austin, will bring you all the dope.

The Charleston (S.C.) RACES Net was activated on March 3 during severe weather conditions which knocked out

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normal power and communications in neighboring Dorchester County. Damage was particularly severe in the Summerville area with icing conditions knocking down power and telephone lines. Charleston County officials were taken to Summerville by W4ZKII and communication established with Charleston on 2 meters. Message traffic handled by W4QPL, mostly on emergency power, and W4ZAW, enabled e.d. officials to communicate with key officials in Charleston and Columbia. As a result, emergency power equipment and disaster facilities were obtained quickly for the affected areas. National Guard aid was also obtained through network facilities. State e.d. headquarters at Columbia was manned by W4CE and W4HAG. Traffic picked up on two meters was relayed to Columbia by W4ZAW on the telephone lines. Charleston and its vicinity located 85 fire departments, police departments, Red Cross, Salvation Army, hospitals, the newspaper and radio TV stations.

For the first day and part of the second the only communication to Summerville was through the RACGS network, which was maintained until normal channels were restored. Courtesy by casual amateurs on 3993 kc. and veiciss was excellent. — KA2JEL.

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### DX CENTURY CLUB AWARDS

#### Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent receipts received as of the end of the last day of the month of March, 1962.

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### From March 1, to April 1, 1962 DXCC Certificates and Endorsments on contacts with 100 or more countries have been issued by the ARRL Communications Department to the amateurs listed below.

#### New Members

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### 90 QST for
March net reports. Listing in this column is available to any net not a part of NTS which has greater than section (usually state) coverage. Submit the information in the tabulation below.

<table>
<thead>
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<th>Net</th>
<th>Sessions</th>
<th>Check-ins</th>
<th>Traffic</th>
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<td>44</td>
<td>1695</td>
<td>744</td>
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<tr>
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<td>246</td>
<td>276</td>
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<td>20 Mtr. L.S.S.B.</td>
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<td>601</td>
<td>1215</td>
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<td>1228</td>
<td>330</td>
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<tr>
<td>Northeast Area Backwoods</td>
<td>-</td>
<td>918</td>
<td>12</td>
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<tr>
<td>All Service</td>
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<td>25</td>
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<tr>
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<td>15</td>
<td>13</td>
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<td>Eastern Area Slow</td>
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<td>147</td>
<td>32</td>
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<td>East Coast Traffic</td>
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<tr>
<td>Mike Paradil &amp; T</td>
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<td>528</td>
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National Traffic System. The annual statistical comparison of NTS region nets for 1961 shows that the Ninth Region Net (9RN) takes first spot, just outing by a hair a net which never placed higher than third before and was seventh in 1960. 9RN is the Net for the region now. 9RN, which has had a terrific upsurge of activity during the past year, was third, with 2RN and RN9 tied for fourth. The following table shows how the region nets "placed" for the year. The following table shows that several categories were entered to arrive at the final standings, and will serve to show the principal weaknesses in each net:

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<th>Net</th>
<th>Sessions</th>
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<th>Ave</th>
<th>Rep.</th>
<th>Standing</th>
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<td>7</td>
<td>3</td>
<td>9</td>
<td>2</td>
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The tendency is for the five categories to balance each other out so that a net has to be good all-around in order to place at or near the top. Note, for example, that 9RN and 2RN place far down in two different categories, but each fell down in representation—in which category 3RN excelled to the extent of successfully competing with both of these midwest regions.

This is the fourth time 9RN has placed highest statistically since we started keeping these records in 1951. Prior to 1956, a different net was statistical champ each year, then 9RN won it three years in a row; after a lapse of two years, 9RN is on top again. Congrats to W9Y1K and his gang. Starting in 1951, here's how the championship has gone: 4RN-RN9-TEN-9RN-RK9-9RN-RK9-2RN-9RN.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

June 7: CP Qualifying Run — W6OWP
June 9–10: V.H.F. QSO Party
June 16: CP Qualifying Run — W1AW
June 23–24: Field Day
July 6: CP Qualifying Run — W6OWP
July 14–16: CD Party (c.w.)
July 17: CP Qualifying Run — W1AW
July 21–23: CD Party (phone)
Aug. 2: CP Qualifying Run — W6OWP
Aug. 22: CP Qualifying Run — W1AW
Sept. 2: CP Qualifying Run — W6OWP
Sept. 13: Frequency Measuring Test
Sept. 15–16: V.H.F. QSO Party
Sept. 20: CP Qualifying Run — W1AW
Nov. 10–12, 17–19: Sweepstakes Contest
March reports:

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<tr>
<th>Net</th>
<th>Session</th>
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<th>Rate</th>
<th>Average</th>
<th>Representation (%)</th>
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<td>.457</td>
<td>11.1</td>
<td>100.0</td>
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Sections § 1140 0602 6.3

TCC Eastern 126 485
TCC Central 168 637
TCC Pacific 1937 652

Summary 1857 10251 EAN 7.8 13RN 8/9 CAN/IN

Record 2007 26011 0125 13.0 100.0

1 Region net representation based on one session per day. Others are based on two or more sessions per day.

Section net reporting: MDSS & MDD (Md.-Del.), WIND, WNN, WMB & BEN, (MBB); BUN (Utah), ILL (IL), NJN (N.J.), Virginia SBR (Mich.), NEB (Nebr.); GSN (Ga.); VN & VSN (Va.); SCN (SCG); GEM (Idaho); AENP Eve, AENT, AENM, AEND, AENO & AHR (Alaska); GSN (GEO); QGN (Ont.-Que.), JPN (Calif.); RBN (Ohio); CCW (Colo.); GBN (Ont.); MJN, MSN, MSNP Noon (Minn.); QKS (Kansas); TN (Tenn.); CPN (Conn.); CVSNN (Calif.); WSN (Wash.); KISPN (Kan.).

2 TCC functions reported, not counted as net sessions.

We hope that March will be the last of the poor-condition months until next fall. Of course we’ll have QRN to contend with this summer, but that’s nothing new. Come October, 1962—watch out! Better get that 160-meter rig working, since we’ve already had three zero reports on the side bands.

March reports:

<table>
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<tr>
<th>Area</th>
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<th>% Successful</th>
<th>Traffic</th>
<th>Out-of-Net Traffic</th>
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<td>485</td>
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<td>93.6</td>
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Summary 353 80.6 3650 1774

The TCC roster: Eastern Area (WISMU, Dir.)—W4S AW EMG NJM OBR SMU, WMATA, W4AB HPY OHK, K22FT, W4EM LAF WRE, K4S IMR XRQ, W4S DLA PFB, W4S OBE WRY W4X KVL, Central Area (W4X, Acting Dir.)—K4AAR, W4S JZI DGV CXY ZYK, K4UQY, W4S DUA SCA, K4VQ, Pacific Area (W4TX, Dir.)—W4XHH, W4S KOT KNE RC, K4S YZK LKD, W4XEX K5D, W4XHO X4X GZM ZB, K4S NWP, W4S KFE X MWE KQ, K4S EDR DTK EDH.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for March Traffic:

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More-Than-One-Operator Stations

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Results of Frequency Measurement, September 1967

QST for
CLUB COUNCILS AND FEDERATIONS

British Columbia Amateur Radio Association, David Gilmour, V6TIY, Secy., 1159 Connor St., Vancouver 5, B.C., Canada.

Central California Radio Council, Jeri Rey, W6QIO, Secy., 3714 Athens St., San Francisco, Calif.


The Ohio Council of Amateur Radio Clubs, Ernest E. D'Angelo, K8J3JN, Secy., 3134 Ontario St., Columbus 21, Ohio.


ARRL AFFILIATED CLUB

HONOR ROLL

Information on which our Honor Roll is based comes from studies of the Club Annual Reports. The League's Board requires 51% or above League Membership of any club for initial and continuing affiliation. The HONOR ROLL is for those affiliates that come up with 100% ARRL Membership; we think that special recognition is deserved. Besides the QST when we shall shortly send the 100%ers certificate to each club so named.

As questionnaire forms are returned from additional affiliates indicating 100% ARRL membership, those clubs will be in line for an additional listing later this year. Clubs reporting valid results of ARRL membership drives being conducted currently can also be included in this further Honor Roll if they qualify.

Abington Amateur Radio Club, Clark’s Summit, Pa.

Aeronautical Center Amateur Radio Club, Inc., Oklahoma City, Okla.

Amateur Radio Technical Society of St. Louis, Mo.

Amateur VHF Institute of New York, Massena, L.L., N.Y.

Athens Amateur Radio Club, Athens, Ga.

Hamhoppers Radio Club, Inc., Port Orange, Mo.

The Casper V.I.F. Society, Casper, Wyo.


Chicago Radio Trailblazers Inc., Chicago, Ill.

The Cleveland Twist Drill Amateur Radio Society, Cleveland, Ohio

Coffee Dunkers of Detroit, Mich.

Decatur Amateur Radio Club, Decatur, Ala.

Enid Amateur Radio Club, Enid, Okla.

Experimental Amateur Radio Society, Rockford, Ill.

Fontana City Radio Club, Knoxville, Tenn.

Harbor Radio Club, Harwoodmont, Mont.


The Loudon County Amateur Radio Club, Lenoir City, Tenn.

Maui Amateur Radio Club, Kahului, Maui, Hawaii

Medford Amateur Radio Society, Medford, Ore.

Meridian Amateur Radio Club, Inc., Meridian, Miss.

Mike & Key Club, Inc., Greenville, S.C.

Millivart Mobilers Amateur Radio Club, English, Ind.

Norfolk County Radio Association, Norwood, Mass.

O.B.P., #1 Radio Club, Rock Hill, Mo.

Orlando Amateur Radio Club, Inc., Orlando, Fla.

Port Jervis Civil Defense Radio Club, Port Jervis, N. Y.

Prince Amateur Radio Club, Inc., Chalesburg, III.

Radio Focus Association, Petersen, N.J.

Radfones, Lancaster, N.Y.

Rhodesendorn Swamp VHF Society, Medfield, Mass.


St. Louis Amateur Radio Club, Inc., Valley Park, Mo.

Saltgit Amateur Radio Club, Benton, Wash.

South Lyne Beer, Chowder & Propagation Society, South Lyne, Conn.

South Coast California VHF Radio Club, Norwalk, Calif.

Southwest Missouri Amateur Radio Club, Springfield, Mo.

Sunrise Radio Club, Inc., Elmont, L.I., N.Y.

The Thirteen Amateur Radio Club, North Burnaby, B.C., Canada.


Windblowers V.H.F. Society, Inc., Wyckoff, N.J.

ELECTION NOTICE

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

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

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

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

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

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

Communications Manager, ARRL, [place and date]

38 LaSalle Road, West Hartford, Conn.

We, the undersigned full members of the ARRL Section of the [Section name], hereby nominate [candidate's name] for the [Division name] Section of [Division name] for the two-year term of office...

--- F. E. HANDY, Communications Manager

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections completing their election in accordance with regular League policy, each term of office starting on the date given.

North Carolina

North Dakota

New Hampshire

New Mexico

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**NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)**

<table>
<thead>
<tr>
<th>Frequency (KC.)</th>
<th>3550</th>
<th>3875</th>
<th>7100</th>
<th>7250</th>
</tr>
</thead>
<tbody>
<tr>
<td>14,050</td>
<td>14,225</td>
<td>21,050</td>
<td>21,400</td>
<td></td>
</tr>
<tr>
<td>28,100</td>
<td>29,640</td>
<td>50,500</td>
<td>145,250</td>
<td></td>
</tr>
</tbody>
</table>

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

The following are the National Calling and Emergency Frequencies for Canada: 3535, 7050, 14,050; phones — 3765, 14,160, 58,250 kc.

**SUGGESTED RTTY OPERATING FREQUENCIES**

3620, 7040, 14,000, 21,000 kc.

**GMT CONVERSION**

To convert to local times subtract the following hours:

- ADST +8
- AST +4
- EDT +4
- EST +5
- CST +8
- MDST +6
- MST +7
- PDT +7
- HST +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 June 16 at 0130 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7050, 14,100, 21,075, 28,080, 50,700, and 145,800 kc. The next qualifying run from W6WOP only will be transmitted June 7 at 0400 Greenwich Mean Time on 3600 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, 0130 GMT June 16 becomes 2130 EDT June 15.

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 used. 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 0130 GMT on all frequencies listed above with speeds of 15, 25, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 11, 10, and 13 w.p.m. on 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 first, try to send in step with W1AW.

**W1AW SCHEDULES**

*June 1962*

**Operating-Visiting Hours**

- Monday through Friday: 1 p.m.–1 a.m. EDT.
- Saturday: 7 p.m.–2:30 a.m. EDT.
- Sunday: 9 p.m.–10:30 a.m. EDT.

**The ARRL Maxim Memorial Station welcomes visitors.**

The station address is 235 Main St., Newtonville, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request.

**Operating Frequencies**

G.W.: 1820, 3855, 7050, 14,100, 21,075, 28,080, 50,700, 145,800 kc.

Voice: 1820, 3945, 7235, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800 kc.

**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.

G.W.: Monday through Saturday, 0000; Tuesday through Sunday, 0100.

Voice: Monday through Saturday, 0100; Tuesday through Sunday, 0200.

**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:

<table>
<thead>
<tr>
<th>Time (GMT)</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>0300-0900</td>
<td>14,280</td>
<td>3555</td>
<td>14,100</td>
<td>14,100</td>
<td>14,100</td>
<td>7090</td>
<td>14,100</td>
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<tr>
<td>0900-1500</td>
<td>14,280</td>
<td>3555</td>
<td>14,100</td>
<td>14,100</td>
<td>14,100</td>
<td>7090</td>
<td>14,100</td>
</tr>
<tr>
<td>1500-2100</td>
<td>14,280</td>
<td>3555</td>
<td>14,100</td>
<td>14,100</td>
<td>14,100</td>
<td>7090</td>
<td>14,100</td>
</tr>
<tr>
<td>2100-2700</td>
<td>14,280</td>
<td>3555</td>
<td>14,100</td>
<td>14,100</td>
<td>14,100</td>
<td>7090</td>
<td>14,100</td>
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<tr>
<td>2700-0300</td>
<td>14,280</td>
<td>3555</td>
<td>14,100</td>
<td>14,100</td>
<td>14,100</td>
<td>7090</td>
<td>14,100</td>
</tr>
</tbody>
</table>

1 Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on w.w. at 0000 and 0100, on phone at 0100 and 0300.

2 Operation will be on 21,075, 21,330, 28,080 or 29,000, depending on band and other conditions.

3 W1AW will listen for Novice Class licences on the Novice portion of this band before looking for other contacts.

94 QST for
ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breen, W3EQI—SEC: DUL, RAI—EML, PAM: K3BUU. VHF, PAM: SAO. New appointees are G3R as OQ and K3LBD as ED. The first activity card from K3LBD shows he is using an Apache and operates all bands 80 through 10 meters. He has a nakagi style antenna, 144 torches and 80 meters short.
WQMI and WQPK are the new call letters assigned to interests FM station. WQMI is operating in the 88-90 MHz band, while WQPK is operating in the 108 MHz band. The new calls will provide increased signal coverage for listeners in the area.

The station is owned by the American Radio Club (ARC), a non-profit organization dedicated to promoting the enjoyment and appreciation of radio as an art form. ARC has been in operation since 1945 and has a long history of providing quality programming to its listeners.

In addition to its regular programming, ARC is known for its annual Holiday Music Festival, which features a wide variety of music genres and performers. The festival attracts music lovers from all over the country and has become a popular annual event.

WQMI and WQPK are expected to join the lineup of other popular FM stations in the area, including WQPK and WQMI. Listeners are encouraged to tune in and enjoy the new programming.

Please join us in welcoming WQMI and WQPK to the airwaves and supporting ARC as they continue to provide quality radio programming to the community.
DUAL LOOP AVC

Automatic Volume Control — We should all be aware, of course, that AVC is utilized in most radio receivers, some with AVC disabling switches for CW reception. (This is generally accepted as necessary for copying CW).

The AVC circuit regulates the gain of the R.F. and I.F. amplifier tubes to provide a constant level of output signal over a wide range of input levels.

Usually the AVC control voltage is developed by a rectifier system connected into the last I.F. stage of the receiver. This system has limitations, however, as strong signals within the receiver’s selectivity curve can develop AVC voltages and reduce the receiver gain to a point where weak signals cannot be copied.

Dual loop AVC is used in the Hallcrafters SX-115 to minimize this situation. It is accomplished by taking the first AVC loop signal out at a point of medium selectivity, amplifying and rectifying it and using it to control the gain of only the R.F. stage. This allows the R.F. stage to operate at maximum sensitivity as all the AVC control voltage for the I.F. of the receiver is developed by the second loop. When the signals increase to a level over a few microvolts, the first loop takes over and holds the overall gain at a nearly constant level through the entire receiver. This dual loop system gives the advantage of improved signal to noise on weak signals plus greatly improved intermodulation characteristics and the ability to handle input signals up to 2 volts without overload.

Dual Loop AVC is only one of the many extra features found in the Hallcrafters Model SX-115.

— R. W. Drobish, W9QVA

[Signatures]
VIKING TRANSMITTERS
YOUR BEST BUY... AND
HERE'S THE REASON WHY!

Excellent dollar value... solid power... dozens of convenience features—just a few of the many good reasons why you get much more with a Viking! Yes, dollar for dollar, a Viking is your best buy... and that's why Viking transmitters are "first" choice among the nation's amateurs!

10 METER "MESSENGER"—For base station or mobile use! Instinctive selection of five crystal frequencies in range of 29.4 to 29.7 mc., within a 300 kc. segment of 10-meter band. 10 watts AM input—10 tubes (including rectifier). Superheterodyne receiver—excellent sensitivity and selectivity! ANL, AVC, and "Squelch". With tubes, microphone and pair of 29.640 kc. crystals. 115 VAC, 115VAC/6VDC, or 115VAC/12VDC models.

Cat. No. 242-201-202-203
Amateur Net. From $129.75

10 METER "PERSONAL" MESSENGER—1 watt for extended range or 100 milliwatts for shorter range. 11 transistors, 4 diodes, Super-heterodyne receiver—two-stage transmitter, ANL, ACV, and "Squelch". Rechargeable nickel cadmium battery and other accessories available.

Cat. No. 242-103 100 milliwatt (less penlight cells) Amateur Net. $109.50
Cat. No. 242-104 1 watt (less penlight cells) Amateur Net. $129.50

RANGER II—Now! A new version of the popular 75 watt CW or 65 watt AM "Ranger"! Also serves as an RF/audio exciter for high power equipment. Self-contained—instant bandswitching 160 thru 6! Built-in VFO or crystal control—high gain audio-timed sequence keying—TVI suppressed! Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No. 240-162-1 Kit Amateur Net. $249.50
Cat. No. 240-162-2 Wired, tested Amateur Net. $359.50

INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Installs on all bands! Using 80 thru-10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and 100 watts AM (25 to 30 watts output—immediate band and carrier). Built-in VFO—exclusive RF controlled audio speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-tie 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—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 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. $1229.00

HIGH POWER CONVERSION—Take the features and performance of your "Invader", add the power and flexibility of this unique Viking "Hi-Power Conversion" system—and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net. $619.50
Built-in provisions for use with SSB adapter... increased communications power... VFO designed for outstanding stability so vital to SSB operation!

Newly restyled—and offering many new operating and performance features, the "Valiant II" gives you outstanding flexibility and performance in a compact desk-top rig! Completely bandswitching 60 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 for increased communications power. Differentially temperature compensated VFO operates in the 1.75 to 2 mc. and 7.0 to 7.45 mc. ranges—provides the extreme stability necessary for peak SSB operation. High efficiency pi-network tank circuit will match loads from 50 to 600 ohms and tunes out large amounts of reactance—final tank coil is silver-plated. Other features: complete TVI suppression; timed sequence (grid block) keying; high gain push-to-talk audio system for use with high impedance crystal or dynamic microphones; built-in low pass audio filter; self-contained power supply; and single control mode switching.

**AS AN EXCITER**—The "Valiant II" will drive any of the popular kilowatt level tubes, and will provide a high quality speech driver system for high powered modulators. The 9-pin receptacle on the rear of the transmitter brings out TVI filtered control and audio leads for exciter operation... Also permits the "Valiant II" to be used as a filament and plate power source, as well as a modulator for auxiliary equipments such as a VHF transmitter.

**SSB OPERATION**—New in the "Valiant II" are provisions for plug-in SSB operation with no internal modifications necessary. Rear panel coax fittings are provided for VFO output and SSB input, and a 5-pin plug, also located on the rear panel, provides connections for remote control of the final amplifier bias and VFO keying through the VOX control of the SSB adapter.

Available completely wired and tested or in a complete kit.

**Cat. No. 240-105-1** Viking "Valiant II" Kit with tubes, less crystals. AMATEUR NET $37500

**Cat. No. 240-105-2** Viking "Valiant II" wired and tested with tubes, less crystals. Amateur Net $495.00

---

**New Catalog**

E. F. Johnson also manufactures a line of higher power transmitters; SSB equipment; amplifiers; station accessories; keys and practice sets... all described in detail in our newest amateur catalog. Write for your copy today!

---

**FACTORY AUTHORIZED SERVICE** Instead of shipping to our factory, equipment to be serviced may also be sent to:

- Electrosonic Corp.—Empire State Div. 65-37 Queens Blvd. Woodside 77, New York
- Park-Armature Co. 1218 Columbus Ave. Boston 20, Mass.
- Heights Electronics, Inc. 1145 Halsted Street Chicago Heights, Ill.
- B & S Electronics, Inc. 6326 W. Roosevelt Rd. Oak Park, III.
- Radio Comm and Engr. Pinheurist Place Charlotte 9, N. C.

---

99
Heathkit® puts you in the SSB drivers seat... economically!
HEATHKIT HX-20 SSB MOBILE TRANSMITTER...
A SENSATIONAL VALUE AT ONLY $199.95
1. Easy-to-read, edge-lighted, slide-rule dial 2. Relative power output indicator for ease of
   tuning 3. Spot function for zero-beat or talk-on frequency setting 4. Fixed 50 ohm loading
   for easy tuneup 5. Bandswitching 80 through 10 meters with crystals furnished 6. Full gear
   drive vernier VFO tuning 7. Mode switch for LSB, USB or CW 8. Hermetically sealed crys-
   tal bandpass filter 9. VOX or push-to-talk operation 10. External linear amplifier cutoff
   bias 11. Built-in antenna relay plus external antenna relay control 12. 8145 for 90 watts
   P.E.P. input. Automatic level control for maximum talk power, low distortion Crystal con-
   trol, dual conversion, heterodyne circuitry. Frequency stability 100 cps overall, after warm-
   up, 50 db carrier suppression, 55 db unwanted sideband suppression.

SSB Portable, fixed station
or mobile
less than $395.00
with power

All the features you want and need for top
mobile performance. Handsomely styled
with die-cast panel, chrome-plated knobs.
Units require only 1 cubic foot of space for
easy installation in auto. Rack mounting
allows easy removal for fixed or portable
use. Operates with Heathkit HP-10 or HP-
20 power supplies. Here's quality, economy
and versatility that can't be beat anywhere!

HEATHKIT HR-20 SSB MOBILE RECEIVER...
MANY EXTRAS FOR TOP PERFORMANCE $134.50
4. Crystal controlled BFO for selectable sidetube reception 5. 30-1 gear drive vernier tun-
ing 6. Antenna tuning control, 1 kw sensitivity on all bands 7. Full coverage 80 through 10
500 ohm output for anti-trip circuit or headset 11. Die-cast control panel & knobs. Product
detector for SSB & CW, diode detector for AM. Fully compatible for use with HX-20. Ex-
cellent mechanical and electrical stability.

FREE CATALOG!
Send in today for your free 100-
page catalog.
Over 250 kits
in this most
complete catalog
of kits. Every
piece is top
quality...save
up to 50% off

HEATH COMPANY
Benton Harbor 9, Michigan

Please send my FREE 100 page 1962 Heathkit Catalog
Name___________________________
Address________________________
City_________________State_____

101
NOW... PROOF OF DX PERFORMANCE

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input. Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589). I have also worked enough stations for my WAC, WAS, WJAD and ADXOC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gobbert, K6INI (Ex-T12TG)

OR IS K4ZRA THE NEW CHAMP? Read his letter, and see his diagram of a typical installation and what it achieved:

K4ZRA'S INSTALLATION THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL

FREE
Send a card for our valuable catalog of 50 different antennas with specifications and characteristics. Gives bands and frequencies covered, element information, size of tubing used, boom length, shipping weight, feed line used, polarization, and other data.

OLD-TIMER K4XKR (ex-W2JAY) SAYS:

"The all-band operator is best equipped to serve his community in emergencies. A Gotham antenna is the key to many life-long friendships. To get QSLs by the thousand, and make your call letters known all over the world, use a Gotham antenna."

GOTHAM
2539 Christie Place
Owensboro, Kentucky

Gentlemen:

During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WA, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military AR-7 (Hallcrafters reboxed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield.

Daniel F. Orley, K4ZRA
WHY
THE GOTHAM V-80 IS
THE BEST ALL-BAND ANTENNA

● If K6INL can do it, so can you.
● Absolutely no guying needed.
● Radials not required.
● Only a few square inches of space needed.
● Four metal mounting straps furnished.
● Special B & W loading coil furnished.
● Every vertical is complete, ready for use.
● Mount it at any convenient height.
● No relays, traps, or gadgets used.
● Accepted design—in use for many years.
● Many thousands in use the world over.
● Simple assembly, quick installation.
● Non-corrosive aluminum used exclusively.
● Multi-band, V80 works 80, 40, 20, 15, 10, 6.
● Ideal for novices, but will handle a Kw.
● Will work with any receiver and xmitter.
● Overall height 23 feet.
● Uses one 52 ohm coax line.
● An effective modern antenna, with amazing performance.

Your best bet for a lifetime antenna at an economical price. ONLY $16.95.

DO YOU KNOW

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WISCONSIN—SCM: Kenneth A. Engrt, KG65C—SEC: W9BDC, PAM: W9NFL, W9NGT, W9SAA, RAI: W9VNP, W9VYK. New appointments: K9YKL as QSM. Renewed appointments: W9QV, W9WPT, W9KFG, K9HPL, K9LDR, K9LFT, W9NRP, W9VYYP, W9CB, K9JUJ, W9ZZU, K9QDA, K9KQG. W9DYG says he has been visited by 24 out-of-town traffic men in the past 4 months. The ARAC will have the north and south side against each other Field Day. W9QKR's DX is at 100 worked and 94 confirmed. W9WNO's new antenna system paid off with 93 per cent of all DX hunks worked. W9HNN is building a ground plane for 40 meters. W9KJK has his new 2-meter rig on the air. New in Kenoshawisconsin is W9DWP. ARRl affiliation has been granted to ARRRW's of Whitewater, the north Shore Radio Amateur Club and the Washburn County Radio Club. The WNA Picnic will be held July 8 at Hartford. W9GFL says that second harmonics on 7.3 Mc. get too bad they QRM each other. W9VHF is there... this is his first month that all NCS reports were in by the end of the month. BPL for March went to W0YDY, W9SOA, and W9WT. Traffic showed on KSC: W9BN 977, BEN 272, WIN 146, W9RJ 37, W9WNT is rebuilding its rig, K9UJL is working DX on 40. Traffic: (Mar.) W9DYG 514, W9RXA 594, W9BN 583, W9QYVZ 582, K9UJT 570, W9CB 569, W9KN 484, K9QG 44, W9NCT 44, W9VYK 33, W9BZ 28, K9HS 24, W9MTL 20, W9NP 19, K9QCF 16, K9G 15, K9WJL 14, K9DOL 13, W9IMN 12, K9QKE 12, W9VLF 11, W9MW 11, K9QAC 11, W9WWJ 9, K9HDL 9, W9VIP 8, W9T 8, W9QQ 8, K9QKU 4, W9SD 4, K9KQG 3, W9WYKZ 2, K9ZCH 2, (Feb.) W9WKN 2, K9HS 14, K9HDL 12, (Jan.) K9HS 5.

DAKOTA DIVISION

NORTH DAKOTA—SCM: Harold A. Nenno, W0HVA—SEC: W0CQ, PAM: KOTYY, RAI: KQWY, K0LQG is now operating on the Transcontinental Corp. K0VDY reports interest in a 6-meter net in Minot. The Goose River Net report for March: 8 sessions, 110 check-ins, 2 formal messages, 2 informal. The North Dakota C.W. Net report: 12 sessions, 88 check-ins, 3 maximum check-ins handled. The North Dakota 73-Meter Phone Net report: 32 sessions, 669 check-ins, 48 formal, 54 informal messages, 15 relays, The Fargo High School Radio Club, and the NDSU Amateur Radio Society are now ARRL affiliated. The NDSU ARRL elects W0QBG, pres., K0MHC, vice-pres., K0QTY, sec.-treas.: K0OJP, QSL Sec.: W0RRW, faculty advisor. Traffic: (March) K0VQY 230, K0QPY 13, K0TPT 39, K0GHH 26, W0YCL 16, W9KKT 8, K0OJP 6, K0TYY 6, K0KTM 5, W0AQR 4, K0AYV 4, K0KBV 3, (Feb.) K0RBA 8.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RWN—SEC: W6GRT, K0QNYY is now stationed on Okotoks, COHOD has a Viking II when an AES crashed while in a helicopter, was seriously injured, and is making a slow recovery. K0BES has completed his mobile station. K0HMA reports Harding County ARRL held a successful drill with six stations participating. W0SWM built an electronic keyer. W0VNN has an HA-4 keyer. A new call is K0XAP, W0ZWL closed the South Dakota Weather Net Apr. 14. K0RGD and K0LJX passed the General Class exam. K0ZTY is now an OBS. K0DQZ has a 6-meter beam on a 35-ft. tower. K0DGL was re-elected president of Radio Researchers, Inc. Also re-elected were Robert Munnell, vice-pres.; K0BIC, sec.-treas. The Amateur Radio Club of Springs is now affiliated with ARRL. Traffic: W0ZWL 747, W0SCT 292, K0MBO 124, W0VBY 83, K0AE 58, W0WLP 58, K0ZMN 58, K0YY 58, K0EJ 58, W0AX 58, W0CQY 58, W0XT 58, W0KCI 58, W0KWS 58, K0HPS 4, K0YNS 4, W0DLY 3, K0TWT 3, K0LZV 3, K0WEN 2, W0VYP 2, K0ZBZ 2, K0TAM 1.

MINNESOTA—SCM: Mrs. Lydia P. Johnson, W0RJJ—SCM: Charles Ahlstrom, W0ALW, PAM: Lyle Stahl, W0EP, K0CGR, K0EPT, RAI: W0KLG, K0AKM. These hams assisted the Red Cross in St. Paul with flood work. K0B MYF, PML, DYT, QPH and W0KDR. The following did likewise in Rochester: K0G, CPAW, SBB, JRN, UKE, AKM, A0Z, EWA, AID, XBR, PS1, W0KWT, K0QGPH, MISPEN secretary, reports that the St. John's Radio Club, established in 1919, is building a 55-ft. s.s.b. transmitter and is using a Drake B-2 receiver. (Continued on page 108)
Serving **all** the needs of the amateur, **all** of the time, is one of the responsibilities of leadership in communications equipment. That is why there are 37 different Hallicrafters models available today...three more just around the corner...and seven more on the drafting board.

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KNOJFB, age 13, is on the air with an HT-10 and an S-187. WOJBT applied for AEEC. The Worthington ARC elected AOMZKR pres. and W7VIP, vice-pres. KOZID, seen-times, OESKVL, with KOJMY, is gathering TV equipment for amateur TV on 400 AIR. OGG KOTVQ now belongs to the "Flops N' Cans of Wales" which has a world-wide membership of approximately 700. WOURQ built an s.s.b. exciter using a 41AF in the final and a 500-watt input with a pair of 811-A's. To prove double frequency super-regeneration, KOMGT and WOKLS are building the "Transmatch" from Nov. OBT. Ten MSA members are using electronic keyers. MVE RCMA3X in Hawaii has been heard to be heard on MSIP (phone). KNOJFJ and WNOAKW are new net members of the MSA, KESKE, who has a fantastic mobile gear ($15,000 worth) in his Cadillac, spent an evening at your SCM's shack. KBBF, sponsored for Class IV OQ and KOKRF applied for Class V. Director WOBBL attended a meeting in New York and stopped in at West Hartford ARRJ Headquarters. KOKRF has a DX-20 and an SX-HD receiver with a RX-25, a long wire antenna. New on KTTY are WBOB and KOSL, EC KOCNL has a new HQ-18C receiver. WNOAVT passed the General Class exam. KOKRF has ordered a new TRW-3, 600 WOKG boxed 36 voltions, and WQWMA new. New OPSs are WOOGC, KOIOI, WLV, VPJ, ZKR, KOWZK has arranged a radio club in Park Rapids. She uses a Drake SA receiver. EC KOCPLW spoke on amateur radio at the Zumbro Valley Citizens Band Radio Club. Trafiler WOKJ 213, WOKI 27, KOOTK 201, WOLSP 81, KOTOFP 104, WOKLG 99, WSHEN 83, KQZK 76, KQBC 79, TQDE 57, WQY 14, WXMA 14, WQCR 38, KOAKR 52, WATQ 32, KOROB 23, KOTJ 19, WQMC 19, WQDEZ 13, KORF 13, WQTY 14, WQSK 13, WQABU 12, KQUB 12, KQIF 10, WQOMO 9, KTOE 8, KQTV 5, KQIV 4, WMBAD 3, KOTV 3, KQHFF 3.

DELTA DIVISION

ARKANSAS—SCM, Odia L. Musgrove, KSCIR—SEC: KSSPS, PAM: W4DYL, RM: KSTYF, WOJST, WJ. Summer time is almost here and with it comes the ham season. We should all check our emergency power supply and power plants and make sure they are in good working condition. Six-meter activity really is picking up now, and this should be good for the next two or three months with some DX possible. We have some 42 counties in Arkansas which do not have an EC. Anyone interested in the appointment should get in touch with KSSPS. KSCIR's 60-Hz tower was struck twice by lightning during an electrical storm but no damage was done to the relay feed line was disconnected. Trafiler: KSTYF 27, KSSPS 20, KSSF 12, KSFEP 12, KSYCM 10, KSAE 8, KSCIR 2, KSTYF 2, W6TMF 2, KQIMU 2.

LOUISIANA—SCM, Thomas J. Morgan, WEFMO—Plans are moving along nicely for the Delta Division Convention to be held at the Jung Hotel, New Orleans, Labor Day week-end. We lost a good traffic man when W5EAMU moved back to Columbus, Georgia. KSDC, W5UJE, KSDJF, KSDGJ, The Tulane University Club station, W5YU, was issued an OPS appointment. W7QJQ had some hard times due to a power failure. W3EGA had a modulation transformer in the DX-100B go out. W5JUL and the Lafayette ARC are working on Field Day plans. KQXX should have his beam up by now. W5NDV and his ART-12 are regulars on 28-meter phone. 80-meter e.r-w. and on MARS. KSYTW reports that the Lafayette Club is sponsoring two certificate classes, W.A.L.L. (worked all Lafayette, LA), and a W.A.L.F. (worked all Louisiana parishes), W3CEZ, Route Manager for Louisiana, checks into some six or seven nets daily. K5QXV is busy handling traffic with his HT-27 and Drake 2B receiver. W8HNS has been active on the 72-ko.c. net. The Westside Club is working with its 10-meter emergency net. KSCIR has a 4 meter final using 2 4X150A running about 300 watts. Recent applicants for AEEC includes WA4ACW, W5QO, and K4SWQ/K5QVR, OPS appointments are, active on several nets including 4th Army MARS. K5L3E is busy at school. Trafiler: W6TMF 37, W6QXY 27, W5QWV 27, W5MS 81, W3SMS 10, W3NDV 10, W6EA 2.

MISSISSIPPI—SCM, Floyd C. Teetson, WSMTUG—The Biloxi Club announces its Annual Hamfest will be held June 30 and July 1. The Biloxi Club reports a 100 percent increase in membership, K8DMX reports a net of 299,530 points in the recent DX Contest, W8CXY reports a score of 255,000 points. The Jones County Club is considering sponsoring an Explorers' Day event. K8GCD is operating a station with a 400-watt output and a SWC-FW, W4WSY is on from New Albany with a Viking Invader and SX-HD. K8GCD has been out for spring foot ball practice but is always ready to work - the key. W6GAFL is on from Canton with an HX-11 and an HQ-125K. K8FMT has been heard on the air interfacing W4JHS and his W4JHN, the latter has regained their health. New appointments: K8FYA as (Continued on page 110)

108
The Model SD-150 Jaypole is a stacked antenna, designed for commercial applications, developing 9.5 dB gain in one favored direction, with 6 dB gain to the rear, or 6.1 dB gain omnidirectionally, with equal orientation of the Jaypole positions. Extremely broad band response is maintained with optimum performance for simplex, duplex, multi-frequency or mobile relay operation. Construction is designed for weatherability, ease in assembly, and operational reliability. All metal surfaces are iridium treated to maintain frequency and operational qualities. Overall length, 21 ft, Wind load, 20 lbs. at top clamp. Freights at 100 lps. 159174 mc, 159175 mc and special frequencies available to cover 145-159 mc. The commercial line also includes mobile whip antennas for the 150 mc frequencies. Complete technical information available from Hy-Gain on request.

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OPs and K5RGR as OHS and K5RSY was a recent visitor to the hospital. The Jackson Hamfests will be held July 29 at Legion Lake. Traffic: K5WYX 17, K5PPY 72, K5GAD 33, K5GDL 5.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—SEC: K4UK, PAM; W4OPP, G. K. KAP, London. Reports that the new call W4FSZ is that of the YL of K4WRY and K4WRY; and that new members include K4KLJ, K4LLQ, K5SSA, W4KXY, W4AQN and K4TVZ. New officers of the Jackson Club are W4WTF, W4HUN and W4TBCT. W4UVI is putting up a tower to support 90-90, 20-, 6-, and 2-meter antennas in addition to satellite beams on 108, 106 and 145 M, W4RVE has a new tricolor beam, W5NIGAX is a new call in Oak Ridge. K4PUS is back home in Oak Ridge, K4LTA and family enjoyed a trip to Florida. Reappointed new: K4PZU as 6O. Reports were received from W4LPO, W4RHO, K4RIN, W4ABC, W4RMS, W4GNO, W4OSA, K4LAX, W4TVT, OHS W4JW, W4SGI, W4QOG; nets W4POP, K4KAP, W4UHO; clubs Chattoneoga, Oak Ridge, Loudon County, Jackson. In this, our last monthly column, I would like to thank those who have worked with me faithfully and made their reports. Traffic: (Mrn) K4- K4UJF, W4PIF 428, W4NF 428, W4GNO 176, W4M 134, W4POP 121, K4WUY 60, W4UHO 34, W4JW 36, W4LTT 24, W4TVT 19, W4TVY 11, W4WNY 10, W4TVS 10, W4KLY 2, W4TVZ 1, W4TVT 1, Feb. W4 POP 105, W4TVS 10.

GREAT LAKES DIVISION

KENTUCKY—SCM, Elmer G. Lischman, W4BF—SEC: W4ZL, PAM; W4DKD, RM; W4CD, V.H.F., PAM; K4LQA. "New slogan: 'ELK' will be published later, by the Blue Grass Amateur Radio Club, Lexington, S Send your submittions to K4FKQ 105, Vine Avenue, Lexington, Ky. New appointments: W4SEF as OES and OPS. He is on with a JX-100, a homebrew SE, on an IQ-990 and an assortment of low-power gear. Antennas include a four-element beam and a seven- element collinear. K4HHK is on with a new Invader, is reworking the Alaska and getting up new antennas. K4KWQ is on 50 meters with portable/amateur gear plugged in, and c.w. Give Pontiac its 9HM traffic. K4LQA is trying for the state net on 6 meters and works west to Henderson. Try going east via Lexington and Ashland. K4LQA, on 50.8 Mc, W4UJU has a heavy school schedule and keeps in touch via OA work. W4AAB is very active on 6 meters—via OA (MARS) and $17, Mc, using a transistorized modulator and power supplies for mobile. Route Manager W4CDA asks NCOS to contact him for special maps of Kentucky. The Blue Grass Amateur Radio Club again will sponsor the State Convention with the tentative date Oct. 13. An organization meeting of the Kentucky Radio Clubs will be held during the convention. An Eastern Kentucky Amateur Radio Society (ERS) has been formed to run the 3rd Annual Breaks Picnic, June 10. W4JFY is founder, K4Ipx, pres., K4VNO, secy., and VP from each county. Traffic: K4KQF 101, K4KSC 70, W4- RZ 69, W4CDA 63, W4JFK 29, K4OZG 24, K4TOZ 23, W4SFL 14, K4VJY 13, K4KIP 10, W4- TVY 6, K4KSC 8, K4HSB 5, K4ZQ 4, W4AAB 2, W4FNP 1.

MICHIGAN—SCM, Ralph P. Theute, W8F—SEC: W8IOLX, RM; W8EEG, W8QOQ, W8WQ, W8KMK, PAMS; W8QQU, W8UQO, V.H.F., PAM; W8PTE, Appointments: K8AAM and W8QMQ; K8QMC as EC; W8KMC and K8QMK as OHS; W8KCD as K8WAM. W8KCD and W8MFK as OPS. The Oakland Co. AHS meets the 1st Tue. of each month at Ann Arbor, 517 vomiting. Pontiac. The City Council is sponsoring a successful night at Greenfield Village with speakers W8KOM, W8IPT, W8CSM, W8RZ and W8FMN scheduled. W8QMQ finally cleaned up 25 years of junk. W8QQQ works England on 160! K8OSW also gets E8JX finished up a new "Valiant." W8BBN is on 6-meter work. Ask W8PBT what he thinks of the General. W8CSM gave a nice talk at the Ford ARL meeting. New officers: Huron Valley ARA—K8OOG, pres.; K8IPT, vice-pres.; W8PTZ, treas.; K8DFU, JDM, trustee. Kent RC—K8WRI, pres.; K8HUG, vice-pres.; K8TFX, secy.; W8YU, treas. The V.H.F. Mobile League—K8GK, pres.; K8OOG, secy.; K8IGE, secy.; W8AOG, treas.; W8MPX, net, Wayne State U., RC—K8AP, pres.; W8FKH, vice-pres.; K8NCO, K8COC, K8WZL, K8RAS, treas. New XYLs in the W8QMQ are K8CZ, TGP and W8CSC. W8YV has a new Heath HX-10, K8TDDJ sleeps on the Wolverines Net. on c.w. K8RTM worked the USS Randolp while Gove was "shut." More 90-Mc., a.b.b., W8PZC and K8RTM. K8- JUG is "back to life" with a mobile. WP8CY moved to Warren, Mich. W8FZK sold his WP8G, 25.M, probably quite old for our museum! W8OQK got the Germanium Award for 91, W8RXZ and his YL took first prize for roller skating. New mobiles and transceivers: WP8PW, W8HH and W8FOL. W8HBB puts cut outs on 1018 kc, c.w. starting at 0050Z. W8FIRL finally reports that 5/5 is up. K8QMC has its 1st nets on 91 and K8REDE has 103. W8YV replaced the transformer so is back on. W8SEM is now a.b.b. on 50 and 144 Mc. Ex-
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Scales are calibrated for 50 ohm line (simple multiply reading by 1.4 for 72 ohm lines).

Continuous duty—may be left in line as RF monitor.

WSHZ (KTAOL) is coming back to Michigan, KSFA went to the hospital for an operation, WS8BCH is now a Major Rev. HPLers: K3RJC, K5LOC and K5JDC, tuned up the final plate trans-former, K3RFV put up a new beam. Traffic: (Mar.) KSFBQ 202, KSHHR 240, KSJCF 312, W8TCQ 91, W3VQW 99, W8ZHT 97, K5TL L 78, K5BZW 71, W8MIX 89, W8FX 61, W8WQG 60, W8FE K3RFV 62, WS4FD 41, KE2EP K3RFV 24, WS8LT 22, K3RFV 22, WS9F 26, K3RFV 20, W8BEZ 17, K3RFV 14, K3RFV 12, W8MIX 10, K8JED 10, W3ZFT 9, W3VQG 8, K5JGC 7, W3BBL 7, W3TPV 3, K3RFV 3. KS80 3 (Feb.) W8ACW 36.

OHIO—SCM, Wilson E. Weekel, W8AL—Ass't SCM; J. C. Erekston, W8DAE, SEC; W8HN, RMs; W8BZK, W8DAE, WT8F, K8CZQ, Greater Cincinnati ARC's The Mike and Key inform us that W8QJF gave an informative talk on "Converters: Past, Present and Future," and that K8QJF is now KS8ST. The Fort Hamilton AIA's Bulletin announces the start of amateur contest for the attainment of Novice Class license coordinated with the local YMCA, Canton ARC's Feeding cover picture pictures KS8TM and other contests which K6KV, K8ZBM and WASOQ are new Technicians; KS8K, General Class, has a new H'T-78; KS8A received a certificate for placing second in the N.J. QSO Party. Seseca RC heard W8RM talk on antenna construction. Dayton ARC's K-5 Carrier states that W8FXR told of helpful hints on Matching and Tuning Antennas; W8YCF spoke on TVI—Its Causes and Cures; K8KKH became a Silent Key; W3QOZG was in the hospital. Mention U. ROTO RC's officers are KR3WZ, K8NYMJ, secy-treas.; Paul Baekeroot, corr. secy. The club has a new QSH-100, Warriner and Dukes 26. Toleda's Ham Shack Group names W8ZIK as its July Dinner-Month; WSHQZ is in the hospital; WSTL and W8SFV have a new baby girl; the work brought a baby girl to KS8EKK; W8RFPJ has a new baby girl. Inter-CRC RC's ARC Averet Bulletin says Mr. K8AMG is on service on servicing receivers and transmitters; the club has 95 enrolled in its theory class with W8JYF and W8LJU as instructors; KS8QJGA is on 8 meters. The writer hopes that W8VEO is obeying the doctor's orders and will be back with us in B.N. W8UEX has the right idea; Former RC's IRC Bulletin advises that W8PAK spoke on micromonitors; KS8UQ received the Century Award; the Greater Cleveland V.H.F. Club's officers are W8JPP, pres.; K8RX, secy.; WSBM, corr. secy.; W8YRJ, treas.; Inter-CRC RC's ARC Averet Bulletin says Mr. L6H was in the hospital and states that W8XRM received her CP-80 n.p.m. award. Thank you, Western ARC, for sending us your Ham Flash and we note that Mr. Kreibitz, of Brush Instruments, spoke on semiconductors. The W8LT Log of the Arc of the Ohio Union states that W8MAF spoke on the physics of capacitors, K8DDG on the performances of microwave and KS8F on tunnel diodes. From the Smoke Signals from the Indiana Hills RC we note that K8JSTF has a new Lafayette HE-50; W8ABE has a new 80-meter dipole; K8QJU is on 2 meters, OH-4Y-7N V.H.F. Radio Society's Q'Jooker informed us of his General Class license; W8UPB, our Great Lakes Director spoke to the club; W8HEN is a new W8NTU. Springfield ARC's QST says that Courier Navigation and Guidance Lab at Wright-Patterson AFB, spoke on the role—hander or v.h.f. (namely crystal oscillators); K5s AEW, DC, WB2FPO wants TVI for your antennas in the ice storm; K8QJU/8 was live for a month stay in Europe, Tusca RC's Beam reports that W8NBK is in the hospital; K8RMN is new net, mgr. of the Ohio Phone Net News were received. The net operates on 3800 kHz, at 1630 EST, W6A BKC, BTH and CVI are new hams, K8s DOV, HGT, JLG and LIJ, Akron U. students, work out solutions to their math problems on 80.3 Mc. The Buckeye Rateheweers Net No 9, with 52 members on our list, issues two certificates for working ten of its members and the other for 100 contacts by hams outside Ohio with Ohio amateurs of five. For these citations are K8QJU, K8DHC, K8MAJ, K8MAJ, K8MAJ, G. S. McNeal, Jr., March BPLers are W8DAS, W8UPH and K8QJU. The Ohio Council of Amateur Radio Clubs' officers are K8NCY, chairman; W8FA, corr; K8QJU, secy.; W8AL, treas. Traffic: (Mar.) W8DAE 952, W8UHP 856, W8CIT 332, W8HSW 308, W8JAN 258, K8QOK 1, K8QOK 181, W8BGO 133, K8JPD 4, K8QMV 35, W8DZ 31, W8AL 32, K8MBS 32, W8CNN 12, K8QYF 17, K8PQJ 13, W8B1X 12, K8RKN 12, K8QOK 11, W8QZ 9, W8FY 8, W8JIT 7, K8CQ 7, K8QJU 5, W8OUU 5, W8HJ 5, K8DDB 2, KS8K 2, KS8KT 1, (Feb.) W8QMV 34, K8QOK 5, K8QOK 4, K8KLU 2, K8MAJ 2, K8PDZ 1.

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0000 QMT; NYSPTEN on 3925 kc, nightly at 2300 QMT; ESS on 3500 kc, nightly at 2200 QMT; MHT (Novice) on 3718 kc, Sat, at 1800 GMT; Inter-club on 3090 kc, Mon, at 0430 GMT; Appointment; WY2XQ is one of the QSOs. New officers of the Ulster County Club are WY2S, pres.; K2RXV, vice-pres.; W2XI, treas.; W2FQV, sec.-treas.; W2YX, 1st Asst. treas.; and K2KG, directors. Its members had a tour of the Kingston Telephone Exchange. W2QWQ is looking for stations to handle traffic on Dubuque QSO Club, 1194 Beach St., Dubuque, Iowa. This is a new club, and all rules have been established. Open house was held Apr. 15, W2AFL entertained the Albany Club with movies of his recent contacts. An Albany crystal bank is operating under Chairman W2BEXL. WDX, of ARRL, spoke to the Schenectady Club on "Receivers." W2YU, New Rochelle, now W2YU, Vice-Director of the Hudson Division, who discussed S5 DX, was guest. W2ZAM is listed on W2AUSC, who also is considering $5000. Our congratulations to K2SJO and others who worked hard on the license plate bill in the Legislature. The State Civil Defense Control Center is nearing completion in Albany. All clubs report active Field Day plans. Don't forget that message to the SCAM for extra points. The Western Washington Field Day will be THE 176. W2DOW 90, W2EU 80, W2PXR 54, K2TP 49, W2AID 41, K2SBN 37, W2UPR 29, W2QMA 14, W2YVE 13, K2MBK 6.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke, Jr., W2BOU—SEC; W2ADO, RM; W2WPL, PAM; W2UGS, V.F.H., PAM; W2W, Section nets; NTL, 3600 kc, 0700 GMT, Mon.; 141.5 kc, W2XCH, Fri., 2000 GMT, 1500 GMT, Fri.; 7308 kc, at 2300 GMT nightly; V.F.H., Traffic Net, Tues.-Wed.-Thurs., 145.8 Mc. at 0100 GMT and Fri., through Mon. 140.25 Mc. at 1500 GMT, Sun.; 7238 kc, at 1700 GMT; All Service Net at 1800 GMT Sun., on 7220 kc, BPL certificate were earned for good traffic-handling during March by W2KBJ, W2BZ, W2EQG, W2N6, W2GZQ, W2AOPG and W2AZQT. W2AZQT has been made area. The Mike Farm Net, K7T, 1700 GMT section, received a new station, 7249. He also worked 100 new countries in the recent DX Contest, K2HCU and K2AT at the ACB Station of the Week

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NORTHERN NEW JERSEY—SCM: Dan H. Earley, W2APEP—SEC: K2ZJL, RM: W2AQG, PAM: K2ZLQ, V.H.F. PAM: K2QRL, M. The section nets are N.J. only at 6600Z on 3969 ke (NPJN) Mon., 2300Z, Sun. 2300Z, and 3000 ke; the NJ 632 Thurs. and Sun. at 6600Z on 3515. Me.: Wed. and Sun. at 3000Z on 147.175; N.J. Marine-band traffic: NJN, 31-390-205; NJN, 31-375-156; NJ6, 31-238-27. New ORs are K2BHZ, W2ITZ, W2KRC, W2PWL, W2WNC, W2QY, W3NQY. The Union County ARA extends a welcome to new amateurs. The UCARA meets the 2nd and 4th Fri. at 8 p.m. in the Roselle Civic Police Building, 400 Chester St., Roselle, K2UIK, still is very busy laying YLs in. Her address is in the call book. W2ARNH has hit troubles. The W2ATC Award was won by W2JM, W2KBD did a little traveling through the standard states. Guess K2AJQ's finally got the shack finished. W2ARNH has hit troubles. The W2ATC Award was won by W2JM, W2KBD did a little traveling through the standard states. Guess K2AJQ's finally got the shack finished. W2ARNH has hit troubles. The W2ATC Award was won by W2JM, W2KBD did a little traveling through the standard states. Guess K2AJQ's finally got the shack finished.
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NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, Jr., W1-CHR—SEC; EOR, RM; KYQ, H.L.F. P.A.M.; VJH, V.H.F. P.A.M.; FHP. The virus squeezed QV's chances in the second half of the DX Contest. NTLX was temporarily forsken traffic to chase DX and build an 800-watt linear. OJR is now an OTC member. WRK has an s.s.b. rig going. KEB is nearing 200 contacts worked. WX is on 3.5-Mc. e.w. with QHR BP-474. KUO's traveling makes his CN presence intermittent. EEF got his KTVY gear on the air again. ZFZ is rebuilding his v.h.f., s.s.b., l.f.v. plans to be married in Sept. KIBX is back on 6 meters. KNIRVII has little luck trying to QNI MHT. KQPN got his 20-w.p.m. certificate and has been operating mobile with KIWH. KIHTY now has 102 contacts. KTVV passed the General Class exam. KNVVE and V11 were tuning in the new Haven Avenue Novice. ADW is enjoying a new (to him) 341-3. BDI struggled to replace his 2-meter rotor atop a pipe plus tower piece plus house wiring by braiming himself, the house or the beam. The Sub Base Medical Reserch Lab. Club is now ARRL affiliated. KIQTG reports that 1-Conn.'s TVX handle traffic for students and provides operators for the state c.d. The Waterbury ARC's station, LAA, is active using a 1X-10. Officers are EQV, pres.; KH7T, vice-pres.; KIOVF, secy.; GTE, treas. PHT is on 40-meter e.w. at his new QTH in Cheshire. HJG lost a charge on his 2-meter jobs and forgot it behind his house for two miles! KIQAL, while in the hospital, tried a 6-meter Gosset but it came through the hospital's p.a. system so he switched to 3 for the contest. NMN with 159 meters in the CIW contest, is ARRL and hammers hubbing. NIM conducted the N.E. Division meeting for SECs and AsMs called by EFW at the Swampscott Convention. Officers are elected on all matters. Contact your local EC, SEC or SCM if interested in emergency work. OHR enjoys s.s.b., along with his theory car. Traffic: (Mar.) K1GGG 259, POM 255, W1AW 238, KYQ 187, KFIJ 172, W1YB 150, ZK7G 147, KI1JAD 122, W1NXM 120, BDI 113, OHR 91. K11PV 89. KI1VZ 69, AOE 69, PUG 52, DGE 50, W1FNS 48, RFJ 47, KIMBA 38, K1INSUM 31, KIHTV 15, W1U1CH 12, BNB 10, V19 5, K1IEN 5, W1ITT 1, (Feb.) K11PV 30. W1KUO 8.

MAINE—SCM, Albert C. Hixson, W1BCB—Results of the Maine QSO Party are in and they reflect little success with only eleven out-of-state reports received. KIS1/6, with 2400 points, and E13H, with 1260 points, were leaders but no logs completing contacts with all 16 counties were received. Of the Maine stations reporting, G1VY reported 34 contacts on 80- and 20-meter e.w., Newcomers in Oxford County are KISU, KISUT, and K1YOR, Communications Officer for the county is ACW. In Presque Isle, Radio Operator is IBF, assisted by W1LEN and TCF and K1LFG. BRI and CTJ. JPN is at home in Mass. KIARC is now 8DBT and is looking for marine contacts. The Windham ARC station on 2 meters with the call KICUB. KIADY is a grandpa. JFS is wondering if he is the oldest active ham in New England at age 93. He says he should have died around his age. The Sixth Annual Augusta Hamfest, sponsored by the Augusta Radio Club, will be held Sun., June 17. Get those mobiles ready. At the ARRL N.E. Division Convention in Swampscott your SEC, GHG, showed the best EC reporting activity for New England and deserves your support in AREC Traffic: K1GBP 65. W1GRC 30. ISO 29. K1QZ 21. W1WTW 16. K1AOX 5. CNY 4.

EASTERN MASSACHUSETTS—SCM, Frank Bailey, jr., W1ALP—SEC; A0G. New appointments: AAU Deihlman, NZR; Greston as E17X; and K1N6J as OBB. RHI as 00: KITGB and KIVYR as ASB. AVP, APY and MIP are Silent Keys. UXN moved to Florida. MMV and W1N are on 10 meters. KIUL has applied for OBB appointment. KQF presented the King Philip AHS in Sudbury with their charter of affiliation with ARRL, EAE and ALP were present. The Nemasket ARC of Middleboro, KI2AD, secy.; the Earl C. Bartlett BC of NO. Atlantic, K1TKW, secy. and the Middlesex ARC of Newton, K1YOA, secy. are now ARRL affiliated. The Old Colony Radio Club elected OJL pres.; KIMO, vice-pres.; K1HKL, secy.; KIOVA, treas.; K1LUI, property officers. The Hingham ARC's officers are KP, pres.; K1NTH, vice-pres.; ZKV, secy.-treas. OQA, vice-pres.; MD, trustee of VPR. Lexington High School ARC's officers are KIQV, pres.; KI1SV, vice-pres.; KI1MS, secy. KI1OSH, act. mar. K11Q is the club tail and K11QW is trustee. KL1RL, RNE, JVN and K1CR are members. The Framingham Club had a talk on Radio Control of Aircraft Models by Ray Thelenbrook. Our sympathy to D1X on the death of his mother. The Milton Club had Lee Chusman speak on antennas. The QRA had a CDX Communications Night with K1QFR.

(Continued on page 122)
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402-B $ 99.75

13-30 MC LOG PERIODIC

The Hy-Gain Co-Planar Dipole Type Log Periodic system was originally developed for the U.S. Air Force Global Communications Network and is now available for commercial or amateur use. This system operates without hiatus over its entire frequency range. VSWR is less than 1.5:1. Average front-to-back ratio 20 db. Forward Gain averages 8.5 db over isotropic source. Power handling capabilities — 2.5 KW AM, 5 KW P.E.P. Mechanical construction meets mil specs. Technical information available. *Model LP-1330.

Model RBX-5 commercial rotating system delivers 5,000 in. lbs. rotating torque and 20,000 in. lbs. breaking torque. Turns at 1 rpm. Subsyn controlled indicator.

"HY-SEVEN" 40M MONOBANDER

This lightweight Hy-Gain beam uses no lossy loading coils; efficient reduced size 40M operation possible through linear loading. Boom 16'x2' OD; longest element 48', all aluminum. Irdisite treated hardware. Element spacing .13 wave lengths. Adjustable Beta match. SWR 1:1 at 50 ohms. 5.2 db gain. Front-to-back ratio 15-30 db. Net wt. only 20 lbs. Complete technical information available.
FOR THE HAM ON THE GO!

COLLINS KWM-2 FROM ART BROWN

By now almost every ham knows the Collins KWM-2 is a superb transceiver covering the amateur bands 80 thru 10 meters with 175 watts PEP SSB input. It is almost universally recognized as the ultimate in portable/mobile amateur equipment.

KWM-2 less power supply $1150.00

The KWM-2A is an extended frequency version permitting the use of 14 additional bands, each 200 kcs. wide, outside the U.S. amateur frequencies within the range 3.5 to 30.0 mcs.

KWM-2A less power supply $1250.00

The fact that the KWM-2 is a part of a carefully integrated amateur communications system should not be overlooked. Each of the purposefully conceived accessories is readily available and contributes substantially to utility of the KWM-2.

516-F 115 volt AC power supply $115.00

480-F Extension cable for 516-F or PM-2. $17.00

MP-1 14 volt DC power supply for mobile applications. $198.00

516E-2 28 volt DC power supply for mobile applications. $400.00

PM-2 Lightweight (15 pounds) 115 volt AC power supply for portable applications. $150.00

CC-2 Carrying case accommodates KWM-2 and PM-2 permitting inclusion of portable station with other luggage. $85.00

CC-3 Carrying case for 312B-4 or 312B-5 and MP-1 plus spares. $107.00

399B-5 Novice adapter for CW operation meeting requirements of Crystal Control less crystals. $46.00

312B-4 Speaker console, incorporating directional wattmeter and station controls. $195.00

312B-5 VFO and control console, permits individual control of transmitter and receiver frequency as well as other station control functions. $350.00

398C-1 VFO and speaker without station controls. $164.00

315D-2 Mobile mount for quick and easy mounting and demounting of KWM-2 in mobile installations. $320.00

351E-4 Mount for table top location in vehicular use. $24.00

351R-1 Relay rack mount $32.00

136B-2 Noise blanker for electronic reduction of ignition noise in mobile installations. $124.00

MM-2 Comfortable combination earphone/microphone for "no hands" voice communications. $39.00

MM-3 Mobile boom microphone $27.00

TD-1 Portable antenna $152.00

BL-1 Dummy load $36.00

This is only a partial list of the functional accessories available. Write for Collins brochure No. 056 066800 for complete information on the Collins Amateur Radio Equipment Line. If you would like to trade part or all of your present station for new Collins equipment, we will be pleased to make you a quotation. Time payment terms readily available.

BROWN electronics inc.
1032 Broadway • Phone A-3381
FORT WAYNE, INDIANA
**Communication ANTENNA SYSTEMS**

—mean CERTIFIED PERFORMANCE!

**Base Station Corner Reflector Advanced Design Antenna**

(10X-Unidirectional Gain)

**Cat. No. 161-509, Frequency Range 450-470 MC**

Cat. No. 161-509 Corner Reflector Antenna is designed for use in the 450-470 Mc band. All reflector screen components are manufactured of high-strength aluminum alloys, all mounting components are fabricated of hot-galvanized steel and all radiating components are fabricated of aluminum. The above combine maximum strength, optimum electrical performance and minimum weight for the first time in an antenna of this type.

This lightweight aluminum antenna is ideal for use in multiple corner arrays.

---

**Electrical Specifications:**
- Nominal input impedance: 50 ohms
- Forward gain: 10 db
- Front-to-back ratio: 20 db
- Maximum power input: 250 watts
- Internal feedline: RG-8A/U
- Flexible terminal extension: 18" of RG-8A/U
- Termination: Type N male with Neoprene housing
- VSWR: 1.5:1
- Bandwidth: ±3%
- Lightning protection: Direct ground

**Mechanical Specifications:**
- Reflector (size per side): 2' x 2'
- Reflector material: High strength aluminum alloy
- Radiating element material: High strength aluminum alloy
- Radiating element diameter: 48"
- Rated wind velocity: 100 MPH
- Lateral thrust at rated wind: 16 lbs.
- Torsional moment on mounting pipe: 16 ft. lbs.
- Weight: 8 lbs.

Stainless steel hardware supplied to mount antenna on 2" IPS pipe.

**Communication Products Company, Inc.**

MARLBORO, NEW JERSEY—Telephone: HOpkins 2-1880 (Area Code 201)

LOS ANGELES 65, CALIF.—Telephone: CHapman 5-1143 (Area Code 213)
MAIL YOUR ORDER TODAY
HORNET ANTENNA PRODUCTS CO., INC.
BOX 808, DUNCAN, OKLAHOMA

Please rush the Hornet Antenna indicated below for a 10-day trial. If not satisfied, I agree to return the antenna prepaid within 10 days without obligation.

- I prefer shipment to be c.o.d. 25% is inclosed.
- Payment in full is inclosed.
- I wish to use your Time Payment Plan.

Name
Address
City

SATISFACTION GUARANTEED

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tr>
<td>MB 1000-4</td>
<td>Cash Price $12.50</td>
<td>Only $10.50 per month</td>
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<tr>
<td>MB 1000</td>
<td>Cash Price $8.75</td>
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<td>MB 750</td>
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<td>MB 500</td>
<td>Cash Price $5.59</td>
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UWY, CHJ, JZW, BIX and KME, Missoula is doing an FB job in erecting masts for the out-of-state hams that pass through at fair time. The boys in Anaconda are going for 5 and 6 meters. They have 8 members listed. The Glasgow Park Hamfest to be held July 21 and 22 at Grasshopper Park is pretty well shaped up. UWY reports an activity of d-h-f activity in the Flathead Valley. RZ7 and CHA are on with a five-element beam on 21 Mc. Traffic: K7HLY 21, E2V 216, BAI 103, WTVX 49, KT0FG 21, GJK 18.

OREGON—SCM, Everett H. France, W7AJN—KGC; WKP, RMI; M7T, PAM; NJS. New appointment: K7JLY for Klamath County, MAO as OBS. Endorsements: K7CNZ and N7X as KEC; N7X as K7JLY as KEC; OF8s: HRG as OO; K7EZV as OBS; T7YV, Multnomah County EC, has appointed two Vst. ECs: K7OWF for the 75-meter Phone Net, K7QZP for the CW Net. The Oregon State Net (OSN) reports: sessions 17; attendance 229; traffic 59, BRAZ awards to AIN, W7B, M7T, MT7, K7FW and MAO for 100 QNL. The 6-meter AREC Net had 8 sessions with a total attendance of 105, K7CBJ, OBS, has been keeping regular three-hour schedules on the AREC Phone Net. K7RZP, LaGrande EC, reports the starting of a 2-meter net with base stations HTL, LWM, K7KRP, K7OAA, also have new base stations. K7KRP sends in a report of 29 signals heard with various type discrepancies in the ham bands. K7TRW is a new ham in Idaho. K7FM1R has a new Hammond 100 receiver. ADR is on 2 meters now and has contacted K7RR and K7KBM, both of Seattle Wash. Traffic: (Mar.) W7ZBH 120, 12B, W7REY 2, 22B, K7HLY 10, W7B 4, DEM 19, K7CNZ 17, W7AJN 14, MAO 10, K7CBJ 3, DTV 2, (Feb.) W7BDU 32, ZB 30, K7EHP 18, W7ATW 19.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—SEC, HMC, RM: AIB, PAM, LFA. The Puget Sound Council of Amateur Radio Clubs held its first Annual Banquet at the Waller Grand Ball near Tacoma with 250 attending. JK1 was the top prize winner. The Radio Club of Tacoma held its banquet with 44 attending. K7JO2 of Seattle, gave a talk on the Russian hams at the Tacoma meeting. Mary, K7TDJ, is visiting the different clubs in the Puget Sound Area, she will be the American Radio Relay League operating manager at Century-21 World's Fair in Seattle. IK9G has a new EC-300, K7TRW is getting married July 1 and is going to the USAF in Aug. A new radio club has been formed in the Marcus Whitman Junior High School in Seattle. A new, active Novice in the Seattle Area is K7QYQ. K7QOM is using a 3-trio-band Antenna. K7KBM is on 2882 kc. K7QZP is being monitored by the 10-meter band. K7KRP, K7OAA and K7QZP, both of Seattle are on 2 meters and have been contacted K7HLY and K7KBM. Traffic: (Mar. 23) 120, 12B, W7REY 2, 22B, K7HLY 4, W7B 4, DEM 19, K7CNZ 17, W7AJN 14, MAO 10, K7CBJ 3, DTV 2, (Feb. 14) W7BDU 32, ZB 30, K7EHP 18, W7ATW 19.

PACIFIC DIVISION
NEVADA—SCM, Charles A. Rhines, W7TVU—The State Centennial Commission has been approached regarding a Nevada Centennial Certificate for next year. Plans for such an award are now being completed. K7BIX has a new HO7NE three-element beam up, but it has had some transmitter troubles, K7CW and his XN are moving to a new QTH. MAH visited the Reno (Continued on page 128)
Establishing A New Standard of Frequency Stability!

The Barker & Williamson Model 6100 Transmitter has been engineered and built to give the discriminating operator the ultimate in SSB and CW operation.
The crystal lattice filter method of sideband generation is employed. Excellent sideband suppression, advanced ALC circuitry, and many other features are included in this ruggedly constructed transmitter.

Delivery: September .... Price $875.00

DROP US A CARD (DEPT. 16) FOR COLORFUL, DESCRIPTIVE BROCHURE!

BARKER & WILLIAMSON, Inc.
Radio Communication Equipment Since 1932

BRISTOL, PENNSYLVANIA • STILLWELL 8-5581
Has the finest Mechanical Construction and Hardware Available Today!

* Continuous Coverage 3.5-30 MC
* 52 Ohm Feed Impedance
* HAM BANDS — MARS — CAP
* Radials Not Required
* Mounts Anywhere
* No Traps
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* 23 ft. Overall Height
* Takes Full 1 KW AM (2 KW PEP)

Non-corrosive aluminum with heavy corrugated base insulator. All hardware galvanized and iridite plated. Band change by special base switching coil tapped for desired band; with tap supplied, simple clamp on 1/4" pipe driven into the ground or mount on side of house.

Same as WVG except supported by side insulators supplied. Base clamp not included. $14.95

Save $20.00 TUNABLE 6M CONVERTER

BRAND NEW!

GONSET No. 3275

WRL PRICE $54.50

Factory Sealed Box SELLS FOR $74.50 ELSEWHERE

WRL Exclusive

Only 12VDC. No high voltage! Complete coverage — 40/84 MC. Just plugs into car radio. Built-in ANL (simple connections). Streamlined, size: 6x8x4". Shpg. wt.: 5 lbs.

TRIPLE CONVERSION W/CAR RADIO

FULL 90-DAY WARRANTY

NO MONEY DOWN

With Our CHARG-A-PLAN

All Items FOB WRL

SAN FRANCISCO — SCM. Wilbur E. Bachman, WB6IP

—Don Norzenda, ex-W2KUZ, now WB6MH, spoke on "Theory and Practice of SSB, for the Amateur" as guest speaker at the San Francisco Polytechnic Society. From Confidentials to W4JKX on the death of his YXL, W4KHC is reporting a new Gonet G-76. Those who took part in the recent DX contest W6OK, W6NG, W6ATO, W6ERS, W6GHD and K6HJ1, Vem reported fine openings to Europe both on 14 and 21 Mc. W4JWF reports that the Red Cross Station on 1550 Sutter St. opens at 7 P.M. Thursdays, no 10 a.m. Thursdays are welcome to participate and learn a lot from MARS operators.

The other Red Cross station, W4K, located on Van
Here's the VHF Receiver you've dreamed of—CLEGG'S new INTERCEPTOR for 6 & 2!

Clegg's new Interceptor Receiver for 6 & 2 meters introduces revolutionary new concepts in VHF receiving techniques. Now you can realize the benefits of engineering features that are years ahead of their time!

Just imagine, for example, a receiver so free of cross modulation, images and noise, and so sensitive that it's possible to work duplex (on antennas separated by no less than 60') with stations transmitting within 25 kc of your own frequency. Imagine, too, tuning in SSB with the ease of amplitude modulation ... selecting any CW signal from the "pile-up" at will.

Take a look at all of the advantages you get with this great new receiver:

- Extremely low cross modulation.
- Maximum rejection of spurious signals and responses.
- Nuvistor RF stages that give minimum noise figures on both 6 & 2 meters.
- Stability equal to exacting requirements of SSB and CW.
- Hermetically sealed 10.7 Mc crystal lattice filter that provides optimum selectivity for both AM and SSB. Selectivity 3.1 kc at 6 db points; 8 kc at 75 db points.
- Sensitivity of better than .1 microvolt.
- Frequency tuning accuracy of less than 3 kc in calibrated 1 Mc ranges.

And that isn't all! Here are some other great Interceptor features — ones that will help make your station second to none:

- Input provision for 220 Mc, 432 and other UHF converters.
- A slide rule dial with full electrical band-spread and flywheel loaded, no backlash tuning makes it easy to separate the weak ones.
- Maximum hash suppression with specially designed noise limiter.
- Output terminal for Pan-adapter and monitoring scope.
- Tuning meter calibrated in both S units and db above reference.
- Cabinet and panel matching the Zeus transmitter.

No doubt about it — if you are a serious operator on 6 & 2, don't wait!— see the Interceptor at your Clegg dealer's today. Or write for complete information!

Amateur Net Price: $473.

Clegg LABORATORIES
502 RT. 53, MT. TABOR, N.J.
* Oakwood 7-6800
USING A HEAVY TRI-BAND 10-15-20 METER BEAM

Assembled Weight—40 lbs.
Wind Surface Area—5.7 sq. ft.
Wind Load—14 lbs.
Maximum Element Length—28’
Boom Length—14’
Turning Radius—15.5’

OR

61 MPH, with your heavy Tri-Bander at 45° and a GIANT 40 Meter Beam at 40°

Using our special design motor mounting cage.

Boom—20° OD x 1.12 wall x 20°
Maximum Element Length—44”
Turning Radius—24”
Antenna Weight—58 lbs.
Wind Load—(EIA Standard)—200 lbs.

WORLD’S FINEST

SUPREME COMMUNICATION TOWERS

*Certified by Reg. Prof. Eng.

$239.50

Model 40-1

WITH HEAD MOUNT F. O. B. PLANT

Bracket Mtg. Kit HEAVY DUTY Cage $14.50
8 ft. Mast $93.50
9.50

Tills over on a heavy base plate for access to motor and array.
Horizontal and diagonal bracing throughout.
Buy direct from manufacturer or Your Local Distributor.
NUVISTOR PREAMPLIFIER
for 27, 28, 50, 144 or 220 MC.
Lower noise figure
Over 20 db gain.
Model PV—
Uses 6CW4 Nuvistor. Im-
proves gain and
noise figure of
present con-
verter or rec-
iever. Specify
frequency.
Model PV Wired & tested $13.95
Model PW—Uses 6G6S tube—for any
frequency or ham band, 2 to 27 MC.
Wired & tested $13.95

MOBILE CONVERTERS
Require only 12 volts
R-F. Crystal con-
trolled. For any FM
or AM frequency or
band from 2 to 54
MC. Model CLB—for
6 meters or citizens
band. $24.95
Add $1 for any other
frequency.
Model CLB
SquelchANLimiter
A combination squelch & noise limiter.
Requires only 12V B+. Model...SNL
12 for 27 or SNL-6, for 6V, $17.95.
Note: Limiters alone, Model ANL-6 or
ANL-12. $7.95

COMPACT 6 thru 80 TRANSMITTER
The TX-6 can handle 90 watts input on CW and 90
watts peak input on phone on all bands. It uses a
12BY7 osc., a 6BQ5 buffer and a 6146 final modu-
lated by a 12AU7 and a 6AG5 using a new low dis-
tortion modulation circuit.
- Phone and CW
- TVI Suppressed
- Mobile or Fixed
- Extremely compact (5"x7"x7")
- Push to talk Mike jack.
Model TX-6K, complete KIT $ 89.95
Model TX-6W, WIRED & TESTED 119.95

NOVICE CW TRANSMITTER
for 40 & 80 meters. Includes heavy duty power supply &
Pi-Net output cct. Crystal Controlled. 15 watts. Uses
6V6 & 6X5. Keying is clean &
chirp-free.
Model AC-1 Kit (less tubes)
$17.95
set of tubes $2.30

EASY TO UNDERSTAND AMECO BOOKS
Amateur Radio Theory Course $3.95
Amateur License Guide $1.50
Radio Operators' Lic. Guide, EL 1-2 75
Radio Operators' Lic. Guide, EL 3-6 75
Radio Operators' Lic. Guide, EL 4. 1.25
Amateur Log Book 50
Radio Electronics Made Simple 1.95

NOVICE CW TRANSMITTER
for 40 & 80 meters. Includes heavy duty power supply &
Pi-Net output cct. Crystal Controlled. 15 watts. Uses
6V6 & 6X5. Keying is clean &
chirp-free.
Model AC-1 Kit (less tubes)
$17.95
set of tubes $2.30

CODE PRACTICE MATERIAL
Ameco has the most complete line of code rec-
cords, code practice oscillators and keys. Code
courses range from start to 18 W.P.M. and are
on 39, 45, or 78 r.p.m. records. Model CPS
oscillator has a 4" speaker and can be converted
to a CW monitor.
Code courses on records from 4.95
Model CPS-Code oscillator, KIT 13.75
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Write for complete details on code courses and other ham gear.
Ameco equipment is available at all leading ham distributors.

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DEPT. Q-6
Here is a straightforward approach to the problem of preventing electrons from returning to the screen region of a transmitting tube. When channeled into beams like those below, electrons reach the anode, where they do their useful work. Penta's exclusive, patented vane-type suppressor grid does the trick.

The characteristics of Penta tubes employing this electrode geometry approach those of the theoretically perfect beam tube. Plate current is practically independent of plate voltage. Kinks and wiggles are absent. Plate voltage can swing well below screen voltage without appreciable loss of current.

The result is outstanding linearity, efficiency, stability. Penta's PL-172, for example, delivers 1000 watts of Class AB1, useful output at only 2000 plate volts...more than 1500 watts at maximum Class AB1 ratings. Introduced in 1955, Penta tubes with vane-type suppressor grids are in important equipment the world over, and their use in high-quality linear amplifiers is growing daily.

You too can enjoy the advantages of this years-ahead design by specifying the PL-177A, PL-175A or PL-172 for 100-watt to 1.5-kilowatt power output applications. Detailed, factual data sheets are available for the asking. Ask also for your copy of "Transmitting Tubes for Linear Amplifier Service," which explains how and why this exclusive Penta design provides outstanding performance.

PENTA LABORATORIES, INC. 312 North Nopal Street Santa Barbara, California
UTEH—SCM, Thomas H. Alliler, W70W/VI—Ass't SCM: John H. Sampson, Jr., T9C. SEC: BRL, K7HYV was awarded the Rocky Mountain Division Junior Achievement Award by OCQ, Vice-Chairman of the division. Officers of the new Bountiful ARC are K7ERR, press.; VP: F7E, vice-pres.; ZJ7, exec.-treas.; CW: net mgr. IK was named chairman of the Interference Committee. The Ouray ARC in the Kearsarge Area has a ladies auxiliary called WDO, (Widows of Ham Operators). OCQ, OCX and K7MPQ; PPB and K7EQ elected BRAT AVC's. BUX, OCX also earned one on TWN. W7QG held qualified for the Grand Master Traffic Handler Certificate (GAPT), Officers of the Beautiful, suit Lake, Country and Hercules Clubs had a dinner meeting to organize the Utah Council of Amateur Radio Clubs. It is anticipated that the Ogden club will be represented at the next meeting. Traffic: (Mar.) W7OCQ 84, W7QH 16, (Feb.) W7PTD 8.

NEW MEXICO—SCM, Carl W. Franz, WMHIN—SEC: W7IBR, Pam: W7JU, V.H.E., Pam: W7FBR, RM: K7GCO. Net schedules: Tue., 2735 ke, 7 a.m.; Wed., 2835 ke, 7 a.m.; Thursday, 2335 ke, 7 a.m.; Friday, 2835 ke, 7 a.m. The Albuquerque Chapter of Commerce presented a membership plaque to the Caravan Club Apr. 25, W7JXN, Gallium, received a Director's Citation. K7FMP is a new ORS in Carlsbad. Club, Chapter #1 spent Mar. 16-18 at Four Corners and made over 260 QSOs. 90 of which were DX. W7LRF, W7C5 and K7LWP were the operators. They hooked JAVX, PY900, V2RDK and many others. The Albuquerque RACES group will run its SET last week end in May to check out survival gear and communications. W7HO1 and W7AVY are logging some nice DX here in Clives. Glad to hear from you fellows. W7B7A sends word practice on 3910 ke. each Tue. at 9 p.m. MST. The Los Alamos ARC heard a talk on their given by WS7QZ at its March meeting. Plans are in the making for New Mexico RACES/Red Cross net. Those interested should get in touch with W7ZLN. Traffic: W7UBW 58, K7FMP 21, W7JXN 6, W7WZK 4.

WYOMING—SCM, Lial D. Branson, W7AMU—The Pony Express Net meets Sun., 0630 MST on 3920 ke. The Y.O. Net is n.w. net on Mon., Wed. and Fri. 2000 MST on 3910 ke. AREC stations in Cheyenne have 2-meter antennas installed on both hospitals for emergency work. K7ONK's XYL is in Albuquerque for three months. HST left Laramie for San Francisco to take the first class radiotelegraph license examination and will go to Alaska Radio, HDS, Lakin. Interim State RACES Officer, K7GLH has been appointed Assistant Director for Wyoming along with BXS. K7OOP has gone sick leave, AMV is in charge and will look for the dentist for new "China Clippers". Traffic: W7DXY 25, OZG 44, BTR 49, AMU 26, HLA 20, HH 33, HDS 9, IBU 5, CQL 4, GB 3, LKQ 2, MIA.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Harveil T. Tilley, K4HPH—SEC: W7POQ: RA: K4YUD, PAM: K4KPT, K4FMP, B8 S.: K4K5KJ. We welcome W7N4A4, W7N4AK and W7N4A5 to the AEND. New appointees: K4AOZ and W4AAMV M.B.: K4PEW as Ops: K4PEW, Talledega and Clay Counties, K4DSO Central Alabama and FM 8 Southeast Alabama as ECs. Congratulations to the following new AECs: W4AAMV, W4AAMV, W4AAMV, W4AAMV, W4AO, W4P5K, WMG6GBC. The Morgan County AERC has elected the AEND, meets Mon. and Sat. at 2000 CST on 50.7 M. K4EC is N.M. K4I7Y is getting good results with his new beam, K4HM is using a brand new EDI, W4AAMV will be on 20 M. W4AAMV has a new transmitter built by W4G5C. K4AOZ is on 52.4 Mc. f.m. (State (Continued on page 138).
If your receiver has a nervous cough, unnettle it with a Waters Q-Multiplier/Notch Filter. Enjoy a clear signal, the signal you were meant to hear, with the Waters Q-Multiplier/Notch Filter... available in 2 models, the 337-S1 and the 337-M2. These filters are designed to eliminate heterodynes and other undesirable signals in the i-f pass-band of the Collins 75S-1 receivers and KWM-2 transceivers. Tunable over a 5KC range, 2.5 KC on either side of the 455 KC center frequency, they require very little power from the Collins equipment: .3A @ 6.3V, and 1.4 mA @ 140 V. (275 V. in the KWM-2). The notch depth is greater than 40 db. Either Filter comes completely assembled with easy to follow instructions for installation and connection.

Amateur Net: $33.95
Available at leading distributors

WATERS MANUFACTURING, INC.
WAYLAND, MASSACHUSETTS
**ATTRACTION — NO GUY WIRES**

- **4-Post Construction for Greater Strength!**
- **Galvanized Steel — Will Last a Lifetime**
- **SAFE — Ladder to Top Platform**
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- **Withstands Heaviest Winds**

**SMALL DOWN PAYMENT — EASY TERMS**

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality Vesto towers:

- 25-ft. $159
- 26-1/2 ft. $194
- 35 ft. $236
- 44 ft. $313
- 55 ft. $362
- 65 ft. $408
- 81 ft. $469
- 100 ft. $512

Towers are shipped to your home trucked down, F.O.B. Kansas City, Mo. 4 ft. chain freight. Prices subject to change...so order now! Send check or money order...or write for free information.

**WESTERN FLORIDA** — SCM, Frank M. Butler Jr., W4KRC—SEC: W4MLE, PAM: W4WBE, RM: KAUBR. About 150 operators work for 800 local frequencies, over 5000 messages during the Milton tornado. K4H0X did an outstanding job in Milton, Perry: W4KGC hears DX on his new receiver. K2EOH (for WPNN) was back on the air with a Villanc. Tallahassee: W4AJZ is mobile on 10 meters. W4DFV has advanced to Conditional Class. Panama City: W4FPB is the net control for WPNN Sun. KA6WA won first place in the Science Fair. W4QJG is now in Ascot, ET. The PCARC is working on 2-meter hams and Big Wheel antennas for cut-out. W4MHF/4 in Panama City is a new Technic. W4MDP is active in PCARC Secretary, F. W4LON: W4HDW received an RN certificate for commercial traffic activity. W4HGD: 2-meter stations have been prepared. W4INDT was elected ARS president. W4GGS, W4CS8, and W4PLK are hunting DX on 2 meters. Pensacola: The VHF Club is now a new member of the 1000-member group. The new club call is W4UAC. W4KWH has been transferred. Traffic (Mar.) K4MBG: W4MWH 14, K4DBF 48, W4WBE 48, W4HGD 47, K4WHR 33, W4KWH 10, W4LON 15. (Feb.) K4CY 23, W4MLE 135, (Jan.) K4CY 219.

**GEORGIA** — SCM, James A. Giggio, W4LQG—SEC: W4TRJ, PAM: W4LKE, RM: W4WDY. The GEC meets on 8000 kc, at 1900 EST Thu. and Thursday on GGN meets Sun., at 0800 EST Sun., at 1600 EST Mon. through Sun., at 1900 EST Sun., and 2000 EST Thu. The Georgia Cracker Mobile Net meets Sun., at 1500 EST, at 1300 EST with W4LQG as QN; the

(Continued on page 198)
YOUR GERTSCH FM-3 FREQUENCY METER CONVERTED TO MEET FCC REQUIREMENTS

— factory conversion provides direct reading of all allocated channels in the 150-170 mc band

All Gertsch Model FM-3 frequency meters can now be factory-converted to measure and generate all assigned channels in both 150-170 mc, and 450-510 mc bands ... with ±.0003% (3 ppm) accuracy. Instrument features a single 1-mc crystal which is easily standardized against WWV.

Converted units can also be operated as standard FM-3 instruments through 20 to 1,000 mc, at .001% accuracy.

Conversion includes: an all transistorized converter module, a new front panel and carrying case, and a built-in amplifier (with speaker). Also, a front-panel jack allows input of external audio signals, such as those from a Gertsch Model DM-3 deviation meter. Space for a DM-3 is provided in the case.

Compact size — only 13½” W x 11½” D x 13¾” high.

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Send for literature on FM-3A series.

Gertsch

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GPYL Net each Thurs., on 7200 kc. at 0000 EST with K4KIH as NC; the GPYL Roundtable each Wed., at 1830 EST with K4HRU as net manager; the Atlanta Ten-Meter Phone Net on 13.8 Mc. at 2200 EST each Sun., with W4BGE as net manager. On 58 Mc. Net Mon. through Sun. on 3973 kc. at 2200 EST with K4ZL as net manager; the North Georgia Graveyard Net every Thurs. and Fri. at 2200 EST on 5025 Mc. with K4USM as net manager; the Fourth Region Day Net daily on 7125 kc., with W4PIM as net manager. The Atlanta Radio Club Hamnet will be held at Fabulous Lenox Square. All hams are invited. K4WVV has a new homemade rig working FB on 30 and 80 meters. K4USM reports good DX with a "Lae H" at 14.2 Mc. on 6 meters. Congratulations to the Confederate Signal Corps and the Atlanta Radio Club on their excellent club publications. The Flag and The Atlanta Ham. The Greater Atlanta VHF Society conducts trans-mitter hunts every Monday night. Traffic: K4YV 314, W4DDY 195, W4PIM 106, K4RYY 78, K4SG 26, K4QD 48, K4QF 38, K4QD 20, K4BVD 23, KH8D 24, KAYRO 15, W4BZ 4, K4HRU 4.

WEST INDIES—SCM, William Werner, KP4D—C.D. Radio Officer, MIC, QSL Mgr.; VP, W6T received as OPS. BAY is a new OPS at Ramsey AFB, CR. CH is OHS for 50 Mc. CH is OHS for 7 and 3.5 Mc. Officers of Radio Club Directors are HIFR, pres.; W6WPO, vice-pres.; APT reports from Cornell that he operates W2XCM on 14-Mc., s.s.b., daily from 2200 to 2300 GMT. CH is Acting NCS of the C.D. Net on 3970 kc. at 2130 GMT Mon., Wed., Fri. RA's YXL is on 6 meters with a Clegg 99er. RA has added a Collins 2035 ke. to improve reliability of 14-Mc., s.s.b. Drake at 14200 ke. has been appointed P.R. coordinator for Osan satellite project. AIP is now General Class, BDU is on 10-meter phone. DJ reports to the C.D. Net 2705 kc. at 1700 GMT. RA and AET are members of the Ramsey AFB Radio Club, DEA has ordered a Ham- mondian electronic keyer. Radio Club Directors and others are working on 1381 kc. using a BC-243 receiver. DJ has another 40-meter dipole running N/S: the other runs E/W. VT is practicing on 12-Mc. VFO and is awaiting a new 80-meter call. CHQY is at breakfast. The following calls are on 10-Mc., s.s.b. with a 1000 kHz and a Drake 2B and has a receiver for stand-by use. The W4D, W4Q, W4GQ members sent a protest to the FCC re Docket 14500. K46B returned from Dew-line and is on 14-Mc., s.s.b. with a 10A/marine tri-band and a Drake 2L, GAB has ordered the Bellaurbares HT-10 and SX-100 combination, K1CQA is the first C1B to be awarded a WPR3S Award certificate by the PRARC. Traffic: K4BVT 69, APL 3.

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3 Elements

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SOUTHWESTERN DIVISION

LOUISIANA—SCM, Robert F. Holl Jr., W4QJD—SEPT: K4GYY, K4RA; W4BGE, W4ROM, PAM; W4OH, K4FZM. The following stations earned BPL for the month: W4GYY and K4FZM. Congrats. K4KHER has moved to a new QTH in W4ZR. K4QI is QRL with traffic messages at the Southwestern Division Convention. K4KRP is working on a 29 Palms Motorcycle Run. W4WHR is going to be there re 2nd session of the C.W. DX Test. New officers of the Salvation Army Disaster Net are K4YDD, pres.; K4KEQ, vice-pres.; W4WHR, secy. W4WHR is trying to replace DX cards that were lost during the shack move.
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to the garage! W6GXE sure got around the state and now has a mobile in the new Chrysler. No word has been received from W6BUK for a long time. What's cooking, Olinie? The XYL of W6RKA has been quite ill. We wish her a speedy recovery. The Associate radio amateurs of Long Beach had a nice trip to the Goldstone Tracking Station near Barstow. W6MKO reported 10 meters is opening very nicely. W6DOL is the new Corona Area EC. The San Fernando Valley Radio Club's Annual Hamfest will be held June 17, 1962, at the new location of Northridge High School. It is hoped that all will be at the Southwestern Division ARRL Convention at Dallas on June 1, 2 and 3. Support your section nets. On this side, the Southern California Net (SCN) meeting at 0200 GMT daily on 50.6 kc; on Thursday, the Southern California Net (SCN) meeting at 0230 GMT on 50.4 kc. Traffic: (Mar.) W6GK 371, K2UST 386, W6WPF 470, K2OOG 370, K2MDG 340, W6QBE 325, W6DML 325, W6KVY 119, W6BOK 98, K2QJX 53, W6AFCR 58, W6WAO 79, W6AUG 20, W6AQMC 28, W6AUS 26, W6AWE 19, W6AWE 13. (May) W6AWE 7, K6NPH 4, W6BXY 4, W6WSE 4, W6VJO 5, K6ORS 2, (Fed.) K6WTY 39, K6WJP 30, W6AFCR 41, W6AUF 48, W6BXY 15, W6BXY 4, K6KCR 2.

ARIZONA—SCM, Kenneth P. Cole, W7QZ/2—Asst. SCM/SEC: George Martin, K7NIE. SCM, RNL: LND. The Copper State Net meets at 1300 MST Mon. through Fri.; the Grand Canyon Net meets Sun. at 0800 on 3980 kc.; the Tucson AREC Net meets Wed. at 0800 on 3980 kc.; the Cochise County AREC Net meets Sun. at 1400 MST on 2600 kc. A c.w. net, the Arizona Inter-State Net, meets Mon., through Fri., at 1800 MST on 3980 kc. Arizona needs a c.w. net. The phone bands are crowded. Band conditions are not too good. Get out your keys and bands and check in. The Phoenix Drug Company, Tucson, is the point of distribution for Sabine Virus vaccine in Pima County. Distribution of the vaccine was handled by Tucson ambulance personnel. These participating were DBU, HWX, TMJ, LJZ, SQX, UCX, XFC, K2CET, CRO, GYP, HBY, OCG, W6WCI, UEA, W6MD, W6CPO, W7OZC, W6LA, K7SC. New members of the Southern Arizona ARC are K7NC, KG6WY, K7NHS, and Bill and Sophie Luptak. Your SCM wishes to thank the many amateurs who have contributed to the amateurs of Arizona for the privilege of allowing them to represent the ARRL for another two years. Traffic: (Mar.) WTMN 21, KTRU 7, (Feb.) WTMN 13, KTRU 4.

SAN DIEGO—SCM. Don Stansfield, W6RBU—W6LIU made BPL for the first time. Both W6WNN and W6KFO are on 0 meters with s.s.b. K6KGR, in Orange County, sent in a traffic report of 84, all on 144 Mc. Chief operator at W6YDK is K6MTB. The 100th meeting of the Newport Amateur Radio Society was held in late March, and a special banquet was held in April with Director Ray Meyers. W6MLZ, as special guest speaker. W6ABO/W6YPP was another speaker. As a General, many locals added WACFR, Franz Josef Land, on s.s.b. recently. W6RCD spent Easter in New York on business. KE6PT now has all QSL Bulletins on QSL. W6ABU-xerated from Pt. Loma High School with top honors. Besides being a bright student, "Carol" had interests in photography and completed his DXCC during his senior year. New members of the San Diego DX Club include K6QW and K6SR. W6QUB, long-time c.w., DXer, is now operating on s.s.b. with 8/Line equipment. All clubs are reporting Field Day planning, with the San Diego Council sponsoring activity between local clubs. There is good activity in Orange County already evident. Our newest ARRL affiliated club is the Anaheim Amateur Radio Association in Orange County. Your SCM will be handling his duties via remote control until September from his cabin inMono County. All mail will be forwarded and answered, and, for c.w. e-mail, all bands signing W6VJU from that rare area for the WACC award. Haynie run on Field Day, Traffic: K6KPH 2909, W6YK 1391, W6BXY 2279, W6BXY 380, K6KL 159, K6KGR 85, W6MD 77, W6DPE 42, W6BXY 37, K6KPF 18, K6KGR 17, K6KGR 2, K6KCR 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM. L. D. Rabin, WS9NG

SCM, RNL: E. C. Pettis, W5RJ. SEC: W5AYX, RM: W5LR. Once more I had the pleasure of attending a hamfest in the West Texas area, this time at Midland. Being only 1000 MILES on 3980 kc. I never had the opportunity of attending one of these gatherings you have been missing something. There were 350 registered for this one. The Allhams were well complimented for its efforts in putting on a fine hamfest. W5MW, our 1st Vice-pres., and W5QKF, West Gulf Division Director, were present and gave very interesting talks on the League and the future of the ana-

(Continued on page 127)
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teur, W8NFO reports that West Texas hams have been able to get their antennas back up after the 85-m.p.h. winds in March blew them down. W3OHE is doing a fine job in net control for the N.W. Texas Net. KSWND is instructing a group in theory for General Class exams. WN5AHG, WN5AH, WN5AHF, and W8ABH hope to become General Class so re-painting his efforts. K5ISN has been in the hospital because of a heart attack. K5LBG has a new NC-100. New officers of the Ft. Worth KC Club are K4HEM pres.; K5IDQ vice-pres.; K5MOO, secy-treas. Congratulations to the Arkansas State ARC and Permian Basin ARC on becoming affiliated with ARRL. W3HR 173, W3IG 102, W3HEK 311, K5QQ/5 98, W5- GNF 46, K5HTI 42, K5PVX 19, W5EUY 15.

OKLAHOMA—SCM, Adrian V. Reda, W5DRZ—Congratulations to the Enid Amateur Radio Club, which is fast becoming one of the best clubs in the nation. K5WZG has 25-w.p.m. Code Proficiency certificate. K5CWR is looking for his K5IFC has a new beam. K5JSV, K5KIN and K5LOD are getting new equipment ready for spring storms. New officers of the Electron Senders Club are K5ZCQ pres.; K5EYT, secy-treas.; W5GKD, W5GKD, W5GKD, W5GKD.

The new club call is W5OK. W5TFT is back on the air with K5NJP. W5KPYV is building a new station at Hamilton, the Weather Bureau. Baxley, the guest of the Tacon, NC, Sill Clubs at special meetings. Another club bulletin, The Quarterly, is to be published soon. K5ZEP. Two members is taking Oklahoma; the latest list of 2-meter stations includes W5KAF, W5KWO, W5KGO, K5JCH, K5JWU, and W5LZ, an old-timer on 2 meters. Another new Offical Bulletin Station is K5HQB. W5RWH is a new amateur at Anderson, K5AM, W5KJH at Hugo. Thanks to W5WLW, W5IZ, W5KFW and W5CWR for news from individuals; also to the club representatives and correspondents for their help. Traffic: W5DZJ 76, K5AUX 72, W5JWQ 75, K5PWW, K5ZCJ 33, K5QCX 32, W5FW 50, K5KLCP 27, W5KFL 26, W5KIB 25, W5KIB 24, W5KIB 23, W5KIB 16, W5KIB 15, K5JIA 14, K5JEP 13, K5BLW 12, K5WGR 12, K5KZB 10, W5RQJ 7, K5RUJ 7, K5BUQ 6, W5EHC 5, W5EFC 5, K5KUS 4, W5AF 4, K5QHE 4, W5VW 4.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, W5MB—Ann. SCMs: A.E.W. Street, VE1B, and H. C. Hilliard, VO1CTZ, Congratulations to ARH and his XYL on the arrival of a new jr. operator. New calls include AE1 and AG1. ES has a DX-100 transmitter. Ed also is a member of the old Timers' Club. The NBARA announces, in addition to the WNBRO Award (Working New Brunswick Counties), a WANB (Worked All N.B.) Award. Details are available from APA and MZ. The first WNBAC Award was given to AGE with 28 others waiting to qualify. The Annapolis Valley ARC announces the establishment of a new award open to VSI stations participating in the Annual ARRL Field Day. Details are available from AGA, P.O. Box 199, RCAF Station, Greenwood, N.S. TM and AAR have joined the ranks of s.s.b. operators. They report completing the new Award of Distinction on the SCM post. I would like to thank the many who have so faithfully and kindly assisted during the past six years of office. Please continue to support the morning SCM. He certainly would appreciate it. Traffic: VE1ADH 26, OM 7, AEB 2.

ONTARIO—SCM, Richard W. Roberts, VE3NO—The St. Thomas ARC has five members ready to try their efforts. The North Bay ARC is open to all hams. The Shallow Lake Exhibition of Arts & Crafts. The Scarborough ARC held its Annual Dinner in Toronto and from all reports it was a sellout. The London ARC is open to all hams. W5TIC is open to its area. The Scarborough ARC, last year's winner of VFD, was presented with the Trophy at its Annual Dinner by Canadian Director of ARRL. DIH vacation in G-Land. ARF and DVM are in Arizona while DTE is in Y5-Land. K5 has returned from the Arctic. Roy has returned from Florida. My Section Emergency Coordinator wants every EC to report each month. A radio message, Form 3 or postcard will suffice. Certificates for endorsement by the SCM or SEC should be made at the annual date . . . send them. Carleton Varsity at Ottawa is a member of the Eastern Canada University Net. W5E, W5G, W5H, W5J, and Thurs. BCR, V5W, CDX, BC. 2V, 2VL, 2ATI were all at the S.S.B. Dinner in New York City. We regret the passing of O.Y.P. and more than 2 meters. The Newmarket ARC is in with EMO. The summer of the year, the Lakehead ARC, are now on one. AGQ has RTTY and RTTY are looking for their WAS. BIV has received his RCC. BLD is on 2 meters. CUA is taking a course in the use of the RXN. ECN and family are off to Israel for two years. EAO

(Continued on page 144)
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Field Day Rules
(Continued from page 49)

dependence-of-mains” multiplier (multiplied by the “battery power” multiplier, if applicable.) Where different multipliers apply during the Field Day period, points are multiplied by the multiplier in effect at the time the points were earned.

11. Club Aggregate-Mobile Scores: Entries under Class C may be combined to form a “Club Aggregate-Mobile Score.” The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the club territory, may contribute to the aggregate-mobile club listing.

12. Reporting: All reports or entries must be on or before July 18. Reports must show starting and ending time of FD operating period, bands used, dates and contact times, calls of stations worked, signal reports sent and received, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, number of transmitters in simultaneous operation, location of station, number of persons participating, class of entry, and score computations.

A Transistor Transceiver
(Continued from page 49)

will re-open the squelch.

In aligning the transmitter, check the oscillator operation with a receiver, then check the tuning range of the tanks with a g.d.o., being sure that the 17.5 volts is applied. Using two No. 48 bulbs in series as a load, align all tanks and the loading capacitor for maximum brilliance. Modulation can be checked by listening to the transmitter second harmonic in an f.m. broadcast tuner.

The handy-talky has been in use for months, and has proved itself quite well. Range, using its vertical antenna, is about five miles to a fixed station, although at times this can be exceeded when a good ground plane, such as a car body, is available. Two such units can communicate for about two miles over fairly open terrain. The high-power version can reach stations 10 to 15 miles away.

Perhaps you now have visions of transistorized equipment running through your head. Forget about bulky, fragile, power-hungry tubes and give it a try!
Bullseye Buys at ARROW!

American Geloso V.F.O.'s
Wired, tested, calibrated, ready for use. Mod. 4/104 for driving one 807 or 6146 final in AM or CW under Class "C" conditions. Mod. 4/102 for driving two 807's or 6146's final. Has 5 bands. Supplied with Mod. 1640 dial ass'y. Mod. 4/103 for 144-148 mc band. Combines VFO primary freq. of 18 mc with xtal fundamental freq. of 12 mc. Supplied with Mod. 1647 dial ass'y. Mod. 4/104, 4/102 or 4/103 less tubes and xtal, each $29.95.

Precision Planetary-Vernier
for exceptionally fine tuning
Amateur Net $1.50 ea.
10 for $13.50
shown approximately actual size

Precision Ball Drive Dial
Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard 1/4" shaft. For that velvet touch...
Amateur Net $3.95

Versatile Miniature Transformer
Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 500 ohms, 5200 ohms, 22000 ohms. (By using center taps the impedances are quartered.) The ideal transmitter for a 55/8 transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2 1/2" h. x 3/4" w. x 3/4" d. New and fully shielded.
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3 for $3.49
10 for $10.75
Arrow Authorized distributor of Heathkit equipment

American NuVistor Converters
Choice of separate models for 50, 144 or 220 mc bands. Output frequency easily changed for present and future requirements. Three RCA 6GW4 NuVistor used, two as RF amps, one as mixer with 6J8 oscillator. Noise figure 2.5 db for 50 mc model, 3.0 db for 144 mc, and 4.0 db for 220 mc model. Image, spurious, and IF rejection better than 70 db. Power required: 100-150 V @ 20 ma, 6.3 V @ 1 amp.
Specify desired IF output for converter model selected.

Kit: CN-50K, CN-144K, or CN-220K, each
Wired & Tested: CN-50W, CN-144W or CN-220W, each

American Geloso Pi Tuning Coils
Units have 6 posители, tap switch mounted on ceramic coil form. Mod. 4/111 is designed for use with two 807's or 6146's (in parallel). Freq. Range 3.5 to 20.7 mc. Mod. 4/112 is designed for use with single 807 or 6146. Handles up to 60 w. Range: 3.5 to 23.7 mc.
Mod. 4/111 or 4/112, each $4.95

American NuVistor Preamp
For 50, 144 or 220 mc. Over 20 db gain plus a lower noise figure, 2 tuned ckt's, 6GW4 NuVistor completely neutralized. Noise figure is 2.5 db @ 50 mc, 3.0 db @ 144 mc and 4.0 db @ 220 mc. Power requirements: 100-150 v, @ 8 ma, and 6.3 v. @ 13 amps. Specify frequency desired.
Also available for 27 mc Citizens band
Mod. PV, wired and tested

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Send for Arrow's New 1962 Catalog FREE
A Transistor Power Supply

is quite low, and this supply has far more output than is needed. However, the extra capacity is handy. For example, a practical transistor circuit may call for two or more voltages, ordinarily obtained from taps between cells of the battery. With a single voltage source a voltage divider has to be used, and it should have as low resistance as possible. With this supply you can usually afford to put a fairly heavy current through a low-resistance divider, and still have plenty left over for the transistors.

The adjustable output voltage is useful not only for "sneaking up" on normal operating conditions when first trying a new circuit, but also for determining the limits of voltage at which a piece of equipment will operate.

The gadget can even be used for tube circuits — for example, as a d.c. supply for the heaters in the early stages of a high-gain audio amplifier. It will easily handle two 120-volt, 150-ma. heaters or one 6.3-volt, 450-ma. heater. It is thus useful for helping to localize hum troubles in testing amplifiers or oscillators.

Finally, unlike flashlight cells, it's always fully charged and ready to go, just as long as there's an a.c. outlet within reach of the plug!

No-Holes Installation

such undecorative appendages of mobile hammering don't help much in this respect. It's nicer to shed the cumbersome mobile array now and then, just to experience a brief respite from the "Hey — look at the ear with television!" that rings in every v.h.f. mobile enthusiast's ears.

Chances are you won't leave the ear unadorned, however. Once you've experienced the noise reduction and relative freedom from better that horizontal antennas provide on 6 or 2, you're not likely to be satisfied with vertical whips for long!

V.H.F. SS

(Continued from page 4B)

| W1VNH 9430-205-13 |
| W1GWJ 0948-144-14 |
| K1BEL 1832-114- 9-B |
| K1JQ 3218-117- 9-A |
| W1WLR 2570- 16-11-B |
| K1RIG 3789- 16-7-A |
| W1DRY 2455- 16-5-8 |
| K1LSB 1529- 16-5-4 |
| K1HRE 2500- 16-6-6 |
| W1JMQ 2589- 16-7-A |
| K1PHT 1700- 16-5-3-8 |
| W1JWR 1470- 16-5-8 |
| W1WAL 1730- 16-5-3-8 |
| K1IY 1200- 16-5-5-
| W1PY 1208- 16-4-7-4 |
| W1FTR 1100- 16-4-6-8 |
| K1PA 948- 16-5-6 |
| K1QY 658- 16-5-5-8 |
| K1HML 680- 16-4-5-8 |
| K1HJ 720- 16-5-5-
| W1 applicants 720- 16-5-5-8 |
| W1BLS 672- 16-5-5-8 |
| W1WML 650- 16-5-5-8 |
| W1WUV 658- 16-5-5-
| W1CHB 490- 16-5-5-8 |
| K1JAL 216- 16-5-5-8 |

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SOLAR ELECTRONICS CORP.
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BROOKLYN 7, NEW YORK

(Continued from page 184)
YOUR BEST ANTENNA VALUES—AT HARVEY

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(KIT FORM)

Hy-Gain Multiband Doublets are guaranteed to equal or exceed the performance of any full-size doublet system and are adjustable for either phone or CW operation. These high-efficiency doublets are designed for one feed line, offering a low SWR of 2:1 or less at resonance on all bands. Four top models to choose from, all of 7-strand No. 23 copper clad steel. Models 5BDT, 4BDT, 2BDT offer a fanned dipole arrangement; Model 3BDT is a one section of wire using four trap circuits. Fanning distance between all doublets vary from 4 feet to 35 feet. Trap doublets accept power up to 500 watts AM 1 KW PEP. Model 2BDP will accept 1 KW AM, 2 KW PEP. All models are characterized by easy, flexible installation.

Model 2BDP — 15, 40 & 80 meters $19.95
Model 3BDT — 10, 15 & 20 meters $17.50
Model 4BDT — 10-40 meters $24.50
Model 5BDT — 10-80 meters $34.95

NEW HY-GAIN

DUO-BANDER

FOR 20 AND 40 METERS

This is the most important new antenna system of the year, designed especially for the popular 20 and 40 meter amateur bands. New design advancement eliminates use of inductance and capacity traps; exclusive “Beta Match” permits maximum gain and low standing wave ratio into a single 52 ohm coaxial feed line. Weight of new DUO-BANDER is 54 lbs.; boom length, 24 ft.; longest element length, 40 ft. Power capability is 5KW PEP, 3 KW AM. This is a real Harvey value!

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Oregon
W7/THE 6 72- 29-5-A
NW7/AM 401- 16-4-A
K7AEU 330- 15-1-A

Washington
W7/TIDAH 3460-116-5-A
W7/ZE 11657- 95-4-A
W7/TAC 1162- 6-2-A
W7/TAD 1320- 55-2-A
W7/AMP 1278- 88-3-A
W7/TAC 11656- 4-4-A
W7/291 760- 33-2-A
W7/4700 1362- 2-2-A
W7/2977 776- 9-9-A
W7/4727/ 748- 2-3-A

PACIFIC DIVISION
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W0RDN 760-216-5-A
W0RRM 760-216-5-A
W0NMR 200- 15-3-A
W0M/6A 1972- 4 opra

K15/6A 2760-246-5-A

El Dorado
K6/710 100-75-3-A
W6/10 1442- 52-4-A
W6/10A 304-15-4-A
W6/10X 380- 12-5-B

San Francisco
K6/727 670-95-3-B
W6/10F 670- 95-3-B

Inverness
W6/10G 1510- 75-4-A
W6/10M 1200- 40-5-B
W6/10P 1100-70-4-B

San Joaquin Valley
W6/10K 2200- 95-3-A
W6/10Z 1725- 70-3-A
W6/10V 1600- 50-5-A
W6/10Y 1912- 26-3-B
W6/10D/6/8/10/6/10G/WHOLG 2206- 81-3-B

ROANOKE DIVISION
North Carolina
W4/10M 2206-111-3-A
W4/10N 2206-111-3-A
W4/10K 2206-111-3-A

Carolinas
W4/10L 1976- 75-3-A
W4/10D 1976-75-3-A
W4/10C 1976-75-3-A
W4/10B 1976-75-3-A
W4/10G 1976-75-3-A
W4/10F 1976-75-3-A
W4/10E 1976-75-3-A
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(Continued on page 108)
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TECHNICAL MATERIAL CORP.
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GP890 w/Spk. Excel. Cond. $350.00

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SX62A Rec. ......$269.50
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S108 Receiver ......104.50
S110 Receiver ......129.50
S111 Receiver ......229.50
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KWS-1 ......1095.00

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Valiant Xmr. ......350.00
Viking I—Xmr. ......125.00
Ranger Xmr. ......195.00
Pacemaker SSB Xmr. ......250.00
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100 Watt VHF 2 or 6 Meter Trans.

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We have more beams and verticals at very special prices—write us about your needs and we will quote.

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New Items—Overstock and Discontinued
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per 600 ft. 34.75
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All individually boxed except where noted in bulk.
Reg. Each Dozen
6H6 ......$3.50 $10.50 $11.50
6A7F ......3.75 1.15 12.65
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1962 Calendar and Schedule Pad Free with purchase of 5 Receiving Type Tubes.

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AF-68 TRANS-CITER
6 thru 80 meters—VFO
all bands—65 watts AM, and CW.

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6 thru 80 meters plus broadcast band.

M-1070 POWER SUPPLY
Operates from 6 or 12 volts D.C. and 115 volts A.C.

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Hamfest Calendar
(Continued from page 10)

Mississippi — The Biloxi Amateur Radio Club will hold its 5th annual hamfest on June 30 and July 1 at the Community House, Biloxi. There will be club-station activities and a dance Saturday night, and individual and mobile contests, dinner, etc., on Sunday. For further info, contact the Biloxi ARC, 2307 Miller St., Biloxi.

Ohio — The 3rd annual Lancaster hamfest will be held at the County Fairgrounds in Lancaster from 1000 to 1700 on Saturday and Sunday, June 16-17. Technical lectures, equipment displays, and an outstanding family program. Registration $1.00. For further info, contact Robert Skidmore, K8NYC, 9, the Lancaster and Fairfield County Amateur Radio Club, P.O. Box 3, Lancaster, Ohio.

Pennsylvania — The Penn-York Hamfest Association will hold its 4th annual hamfest in the Ingersoll-Rand Recreation Hall, Atkeson, Pa., on Saturday, June 16. Program will include speakers, contests, awards, and dinner. Special program for the ladies during the afternoon. Reservations at $4.00 per person ($5.00) at the door includes everything. Plenty of free parking, with police protection. For more information, contact Penn-York Hamfest Association, 2, CARA, P.O. Box 301, Cornw, N.Y.

Pennsylvania — The annual ARRL Eastern Pennsylva- nia Section (details will be held on June 17 at Pavilions 7, 8, and 9, Hershey Park, Hershey, Pa. (Note — more space reserved than previous years.) Registrations begins at 0090. Program includes speakers, swap and auc- tion, award presentations and elegant banquet by W5NMB, ARRL's National Emergency Coordinator. Bring your own picnic lunch. Registration is $1.00 per amateur call, and may be made in advance with George Powell, K3CAH, Church and Picklav Ave., Spring City, Pa.

Tennessee — The Memphis hamfest will be held on Sunday, June 21, at the Overton Park pavilion, on East Parkway North. Registration begins at 1000 and activities will wind up about 1000, Mobile talk-in on 50.5 Me and (Continued on page 125)
LEO SAYS

"NO MONEY DOWN"

ON THESE Comet-Kits

TC6A

New! Improved!

TC6-A 6 METER TRANSCEIVER
Smallest unit anywhere with these features:
5 watts input, open regular 8 mc crystals, push to talk vocal, plate modulation, 52 ohm coax output. Full superheterodyne receiver tunes all of 6 meters (49-54 mc) with vernier. STABILITY EXCEEDS 0.1% AFTER WARM-UP, R.F. stage, noise limiter, 20 kc selectivity, built in speaker. Requires 285VDC @ 115MA and either 12V or 6V filament power as available from our Model TCA and TCD-12 supplies.
Kit $39.95
115VAC Power Supply Model TCA, Complete $15.95 Kit
12VDC Power Supply Model TCD-12, Complete $24.95 Kit

"Multi-Pak" A.C. POWER SUPPLY

THE MOST VERSATILE A.C. POWER SUPPLY AVAILABLE TODAY

The PSA-63 is a universal power supply made with any transmitter, receiver, amplifier or other similar equipment. It delivers 600V DC at 300 Ma., 200V DC at 600 Ma., or both voltages at 210 watts max. The "Multi-Pak" also provides 115V AC at 120 Ma. and filament voltage of 12V AC at 4 amps or 6V AC at 8 amps input. 117V AC at 275 watts max. Heavy 11x4x4-1/8" box. Supplied with 15A fuse.
Kit $24.95 Wired $39.95

CUSTOM MODELS:
Available kit or wired. Custom made for Comet G76, Swan, Heath MT-1, Limey AF-67-AF-08, Wired for Swan only, $49.95.

LOWEST COST EQUIPMENT IN THE FIELD TODAY

SS-3 SIGNAL SLICER $15.95 Kit

0 Multiplier with highest "Q", reliable, selectivity 300-10,000 cycles, 50 db rejection null. Tunes 4 1/2 KC. For 1550 K.C. just plug into Comet 758-1/2 KW32 and others.Has internal 115V AC power supply permitting use on AC/DC sets. 4 lbs.

ANTENNA TUNER Mini-Matcher MM-100

Only $10.95

For any Xmatch, of input power 100watts max. W/ 7500 ohm or less. Matchs "Xmatch" to high impedance antennas. Unbalanced input and output. Steel cabinet. Complete self-contained, 5x4x4".
Easy instruction manual.

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10-80M Vertical ....................................... $14.95
6-Meter Beam ........................................... $12.95
Colinear 8M Vertical ................................... $29.95

40 & 80M Duo-Doubllet ................................ $7.95

40 & 20M Duo-Doubllet ................................ $7.45

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WLR is the nation's best source for reconditioned equipment. Each item is carefully aligned and tested just prior to shipment, carries a 90 day warranty, 2-week trial, and a 90-day full credit trade back plan. Write for our latest listing up to 1,000 pieces.
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153
VERSATENNA the semi-permanent mobile antenna with magnetic base. No mounting holes required. Magnetic base allows ready removal for use on the other cars. Self leveling magnets hold securely even at high speeds. Models for VHF and UHF. 50 ohm cable included.

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"Little Monster" AM-824-557 Battery powered. 3 Mile NO tubes, NO transmitters NO warmup 20-45 WPM Straight, semi, FULL auto HIGH or LEFT hand SEL calling, interlocking. Prototype tested on the air FOUR years $29.95

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Peak Triband performance on 10-15 & 20 M with Skyline Quad...HIGH Gain, EXCELLENT 8'8", WNR 1.1 at resonance, pre-cut, pre-tuned, rugged fiberglass bamboo, turn with TV rotor & light weight.

$59.95 to $99.95

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FOR "DO-IT-YOURSELFERS"...Flight Fiberglass spreaders, drilled, with hardware $59.95 Flight bamboo spreaders, drilled, with hardware $16.95 Two aluminum end spacers one aluminum center casting. 26.50 Complete Assembly Instructions FREE

Write Dept. A for free literature

SKYLANE PRODUCTS 406 Bon Air Drive Temple Terrace, Fla.

2850 kW. No admission charge. Bring your own lunch or buy your lunch at one of the two near-by restaurants. Soft drinks, ice cream, and coffee available right at the hamfest site. For further info contact Clayton Elam, K1FZJ, 1417 Merrycrest Drive, Memphis.

Oregon — Portland is having a big July 4th celebration, and among the activities scheduled is a mobile hunt for hams. Other events will include a motorcycle hill climb, horse show, scottish dancers, square dance, art show, and fireworks. Mobile talk-in on 3850 kW. For further info contact Mary Lee Knottingham, K7QCN, Box 167, Port Orford, Oregon.

Saskatchewan — A hamfest on Saskatchewan is held at the Bonanza on June 30 and July 1. For further info contact VE5GSO, transmitting bulletin about the hamfest. No other info available.

Washington — The 8th annual family picnic of the Royal Order of Hoot Owls (a 6-meter amateur radio society) will be held June 18 and 17 at the Seattle World's Fair. For further info, contact Lee Singeltery, W7YIE, 1114 Fielding Rd., Seattle, Wash.

Wisconsin — The Wisconsin Nets Association will hold its annual hamfest and family picnic (formerly the BEN family picnic) on Sunday, July 8, at East Park, Hartford, Wisconsin (about 30 miles northwest of Milwaukee). Refreshments, contests, awards. Registration begins at 9:00 A.M. for those flying in, with transportation to and from the field. For further details contact Mrs. Ralph (Bara) Potter, W9YIE, 610 Wisconsin Ave., North Fond du Lac, Wisconsin.

Strays

For several years we have heard the rumors about the toxic effects of Teflon, and a Stray that we published about this a number of years ago brought in a great deal of correspondence. Now we have a little pamphlet sent to us through the courtesy of W2YFG, which is entitled The Anatomy of a Rumor. Written by Dr. John Zapp, Director of the Haskell Laboratory for Toxicology and Industrial Medicine, it states that there is no evidence that the fumes from Teflon have ever caused anything but a temporary discomfort which passes away within a matter of hours. There is no evidence, says Dr. Zapp, that Teflon fumes have ever caused the death of a human.

Receiver Design

(Continued from page 21)

Transistor stage gain by lowering the emitter to collector voltage, will provide better cross modulation performance than the conventional "reverses", e.g., which controls gain by varying the base bias to reduce collector current in a manner similar to the bias control used with remote-cutoff pentodes.

Even better results can be obtained with a.g.c. systems where the controlled element is separate from the transistor stage. An example of this would be some form of a bridge or "T" network using a voltage variable capacitor controlled by a.g.c. voltage.

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(Continued from page 86)

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Paraguay: R.C.P., P.O. Box 512, Asuncion
Paraguay: VIP QSL Office, P.O. Box 291, Port Moresby
Peru: R.C.P., Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, 67 España Extension St., Quezon City
Poland: ZKZ QSL Bureau, P.O. Box 260, Warsaw 10
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Strays

What Am I?

I've broken barriers of language, religion, customs, and government greater than any other method known to man.

What am I?

I span continents, oceans, mountains, rivers, and valleys at the speed of light.

What am I?

I have within my ranks more than 200,000 people in the United States alone, and more than 18,000 in other countries.

What am I?

I have saved lives, made lasting friendships, brought scattered families together, cheered lonely soldiers, and brought the world's people close together.

What am I?

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What am I?

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Room is 1¼" OD aluminum; elements 7/16" OD, factory preassembled. Net wt.: 8.4 lbs. 

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For instance, each month for the past 46 years QST has printed information vital to every radio amateur. Yet there are many hams who do not receive this important hobby aid.

For 48 years radio amateurs have been joining the American Radio Relay League and acting as a single voice to promote and protect our wonderful hobby. Indeed, without the ARRL amateur radio might not exist. Yet some amateurs are not even aware of the existence of the League. These same people just seem to take their privileges for granted. Sounds fantastic, doesn’t it?

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EVERY MEMBER GET A MEMBER—(see page 64a April ’62 QST). How about a helpful push?

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A "HOW-TO-BUILD-IT" ARTICLE ON A NUVISTOR RIG

The unquestioned superiority of RCA nuvisor tubes in VHF receivers is a well-known fact. Not so well known, however, are the advantages of the tiny nuvisor in VHF transmitter applications.

The article in the Spring 1962 issue of Ham Tips shows how to build a sturdy, compact nuvisor transmitter for "2". This stable three-stage rig (crystal oscillator → tripler → p-p final) uses two type 7586 and two type 7587 nuvisors. It can be powered from a receiver-type power supply—takes 7½ watts plate input at 240 volts!

Announcement to Amateurs

For complete story, get a copy of this issue of Ham Tips today—from your RCA Industrial Tube Distributor, or write Section F-37-M, RCA, Commercial Engineering, Harrison, N. J. This issue also gives details on a new subscription plan.

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Board Meeting Highlights

HERBERT HOOVER, JR., was unanimously elected President of the American Radio Relay League by the Board of Directors at its 1962 meeting on May 11 in Hartford, Connecticut. A prominent national figure, Mr. Hoover served as Undersecretary of State from 1954 to 1957. He is well known to amateurs as K6ZH/W6ZH after nearly fifty years of ham activity. The July issue of QST will carry a more complete story on our new President for the information of members.

Retiring President Goodwin L. Dosland, W0TSN, was nominated for re-election but regretfully announced his decision not to accept because of continuing heavy demands of his law practice. The Board expressed sincere appreciation for his distinguished and dedicated service to the League and amateur radio, and conferred the title of President Emeritus.

Other League officers were re-elected, and Directors Denniston, Doyle, Eaton and Kahn were named to the Executive Committee.

Directors approved the Housing Committee report and accepted the lowest bid for construction of a new Headquarters, subject to concurrence of the architect. The new building should be ready for occupancy in about one year.

The Board voted to strongly oppose any proposal for fees for amateur license applications; supported the FCC proposal to remove power restrictions from the amateur 420-Mc. band; rescinded its 1961 request for U. S. amateurs to avoid using 14,335-14,350 kc.; appointed a special committee to study the usage of 14 Mc.; and referred to its Planning Committee the question of Technician use of 28 Mc.

The Board expressed its gratitude to Senator Barry Goldwater and Representative Elford A. Cederberg, and their staffs, for their efforts to obtain reciprocal licensing privileges for amateurs. Thanks were also given to the Project Oscar Association for its achievements in amateur space communication; to the Field Engineering & Monitoring Bureau and the Public Safety & Amateur Division of the Federal Communications Commission for assistance and cooperation rendered the amateur service; and for the continuing efforts of League field officials in over-all amateur interests.

Approval was granted for the holding of an ARRL National Convention in Cleveland, Ohio, October 4-6, 1963, as well as for the publication of a 10-year index of QST and a new v.h.f. handbook. General Manager Hunt was designated to represent the League at the June dedication of 4U1ITU, the new amateur club station at the headquarters of the International Telecommunications Union in Geneva, Switzerland. The Executive Committee will consider the desirability of appointing a General Counsel in Canada.

The Board reviewed the progress of the League, studied and discussed reports of the officers and its several committees, and made numerous policy decisions to guide League and amateur affairs during the coming year. Informal sessions in the three days previous to the official meeting included extensive discussions of various amateur matters, requiring less time for the formal meeting.

Minutes of the meeting will appear in July QST.
Members Are Saying...

Your idea for a drive to raise money for the new building by going directly to the membership is not only good sense but I think that members would get a great deal of benefit and pride in helping to further the growth of ARRL. — K7BJB.

My first contact with QST was just prior to World War I when my cousin transferred his subscription to me when he was called into the Navy. Each month I look forward to receiving QST today as I have in the past years. I certainly would be pleased to help as best I can. — W2DMU.

Now is the time to do it — higher construction costs in the future. — K8SPC.

I personally would be glad to help — especially when it’s for such a worthwhile and beneficial cause. In short, the idea is great. — K1ZML.

I would feel proud to know that I have paid for that nail or brick. — VE7FB.

The plan will cause every contributing member to take even more interest in his League and its operation. — W0SPM.

Just name the place and time; I’m ready. — K6BAIY.

You have my full cooperation in building a new headquarters. Congrats on such an excellent idea. — K8PMP.

I would like to express my desire to contribute toward a building fund, and my earnest support toward a project which will express the ARRL’s strong faith in a productive and prosperous future for amateur radio. — K5VVY.

I have never been in New England but this will be an incentive to see W1AW when you have it in “new” operation. — W8BKB.

Hams have always cooperated among themselves and with the general public. The very existence and importance of the League is merely evidence of this fact. Were it not for this cooperation and sense of brotherhood, such activities as RACES and Project Oscar would not be successful but merely ideas and dreams of what might have been. — K9VOM.

If everyone would do his and her part, it would all add up and not be a burden on any one person. — W1ZWL.

I am strongly opposed to depleting other funds for a building, or mortgages or bonds to put off paying into the future sometime. Let’s pay for it now! — W9TZN.

I feel a great responsibility to do something more for ARRL than just paying my yearly dues. — W8CXM.

I can think of no other way of doing it that will allow us all to participate. FB! — W4BZE.

It is the most sensible suggestion which I have heard out of Hartford in a very long time. I am appointing myself a committee of one to sell this idea to the local fraternity. — W6BE.

Please keep our 40-year investments intact. — WA2LPH.

The Magic Valley Radio Amateurs are entirely in favor of setting up a building fund for the purpose of constructing new League headquarters. — W7GCX.

I’m not “heelled” but can scrape up a few bucks. If we don’t quite make it, you can hit ARRL reserve for the small balance. — W4NO.

I am pleased to hear that our organization is planning for improved location, building etc. I’ve wondered why we didn’t do this before. — W5WSM.

I do not favor depletion of present reserves. I think this is not only unwise, but unnecessary. Issuance of bonds might be a quicker way to raise the amount needed but that would hardly be a better way since those bonds would have to be paid off and with interest. Be assured of our continued interest and support. — K8COW.

I think a stronger ARRL is essential if amateur radio is to survive in the coming years. — K8RIJ.

With two boys in college I am financially limited but will make a small contribution and will support the fund drive. — W1WMIK.

Build the building! I’ll help out. — K8WCX.

You can count on each of us. — K9KSM, K6EYT.

To what avail is any organization without the support of its members. I look forward to the success of the project and the participation of all members, including myself. — WA2SRO.

While I can’t find a big amount I’m sure ready to do my bit towards support of your building fund. — VE8BY.

The more closely united in purpose the membership becomes, the better; not to mention the sense of pride we would all have in accomplishment by joint effort. — W3UEB.