

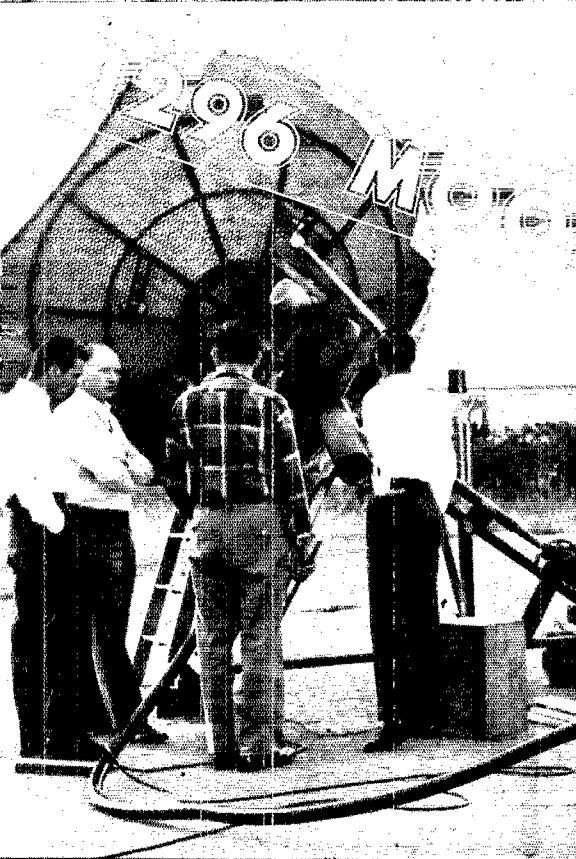
September 1960

50 Cents

55c in Canada

# QST

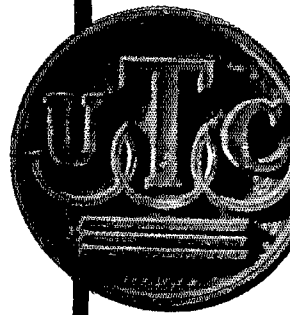
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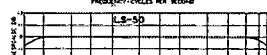
## TYPICAL UNITS



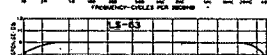
**LS-10X Shielded Input**  
Multiple line (50, 200, 250, 500/600, etc.) to 50,000 ohms... multiple shielded.



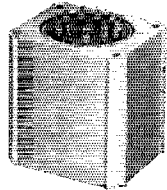
**LS-19 Plate to Two Grids**  
Primary 15,000 ohms.  
Secondary 95,000 ohms C.T.



**LS-50 Plate to Line**  
15,000 ohms to multiple line... +15 db. level.



**LS-63 P.P. Plates to Voice Coil**  
Primary 10,000 C.T. and 6,000 C.T. suited to Williamson, MLF, ul-linear circuits.  
Secondary 1.2, 2.5, 5, 7.5, 10, 15, 20, 30 ohms. 20 watts.



**CASE** LS-1 LS-2 LS-3  
Length... 3 1/8" 4-7/16" 5-13/16"  
Width... 2 1/4" 3 1/2" 5"  
Height... 3 1/4" 4-3/16" 4-11/16"  
Unit Wt. 3 lbs. 7.5 lbs. 15 lbs.

### HIPERMALLOY series

This series provides virtually all the characteristics of the Linear Standard group in a more compact and lighter structure. The frequency response is within 1 db. from 30 to 20,000 cycles. Hipermalloy nickel iron cores and hum balanced core structures provide minimum distortion and low hum pickup. Input transformers, maximum level +10db. Circular terminal layout and top and bottom mounting.



**HA-100X Shielded Input**  
Multiple line to 50,000 ohm grid... tri-alloy shielding for low hum pickup.



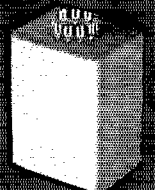
**HA-106 Plate to Two Grids**  
15,000 ohms to 135,000 ohms in two sections... +12 db. level.



**HA-113 Plate to Line**  
15,000 ohms to multiple line... +12 db. level... 0 DC in primary.



**HA-133 Plate (DC) to Line**  
15,000 ohms to multiple line... +15 db. level... 3 Ma. DC in primary.

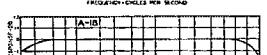


### ULTRA COMPACT series

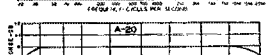
UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 2 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die cast case provides good inductive shielding. Maximum operating level is +7db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.



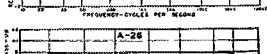
**A-10 Line to Grid**  
Multiple line to 50,000 ohm grid.



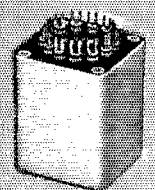
**A-18 Plate to Two Grids**  
15,000 ohms to 80,000 ohms, primary and secondary both split.



**A-20 Mixing Transformer**  
Multiple line to multiple line for mixing mixes, lines, etc.



**A-26 P.P. Plates to Line**  
30,000 ohms plate to plate, to multiple line.



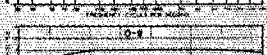
**A CASE**  
Length... 1 1/2"  
Width... 1 1/2"  
Height... 2"  
Unit Weight... 3/32



**Q-1 Line to Grid**  
Primary 50, 200/250, 500/600 ohms to 50,000 ohm grid.



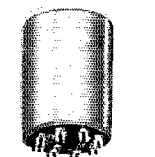
**Q-5 Plate to Two Grids**  
15,000 ohms to 95,000 ohms C.T.



**Q-9 Plate (DC) to Line**  
Primary 15,000 ohms, Secondary 50, 200/250, 500/600.



**Q-14 50:1 Line to Grid**  
Primary 200 ohms, Secondary .5 megohm for mike or line to grid.



**OUNGER CASE**  
Diameter... 7/8"  
Height... 1-3/16"  
Unit Weight... 1 oz.

WRITE FOR 1960-61 CATALOG

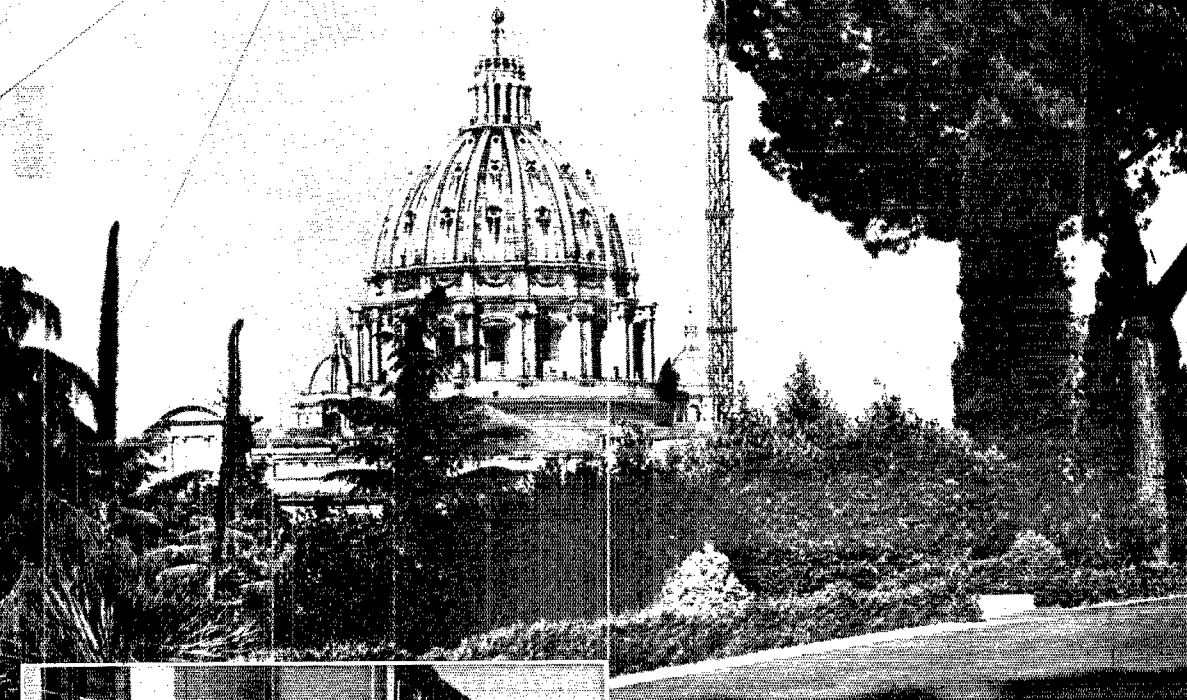
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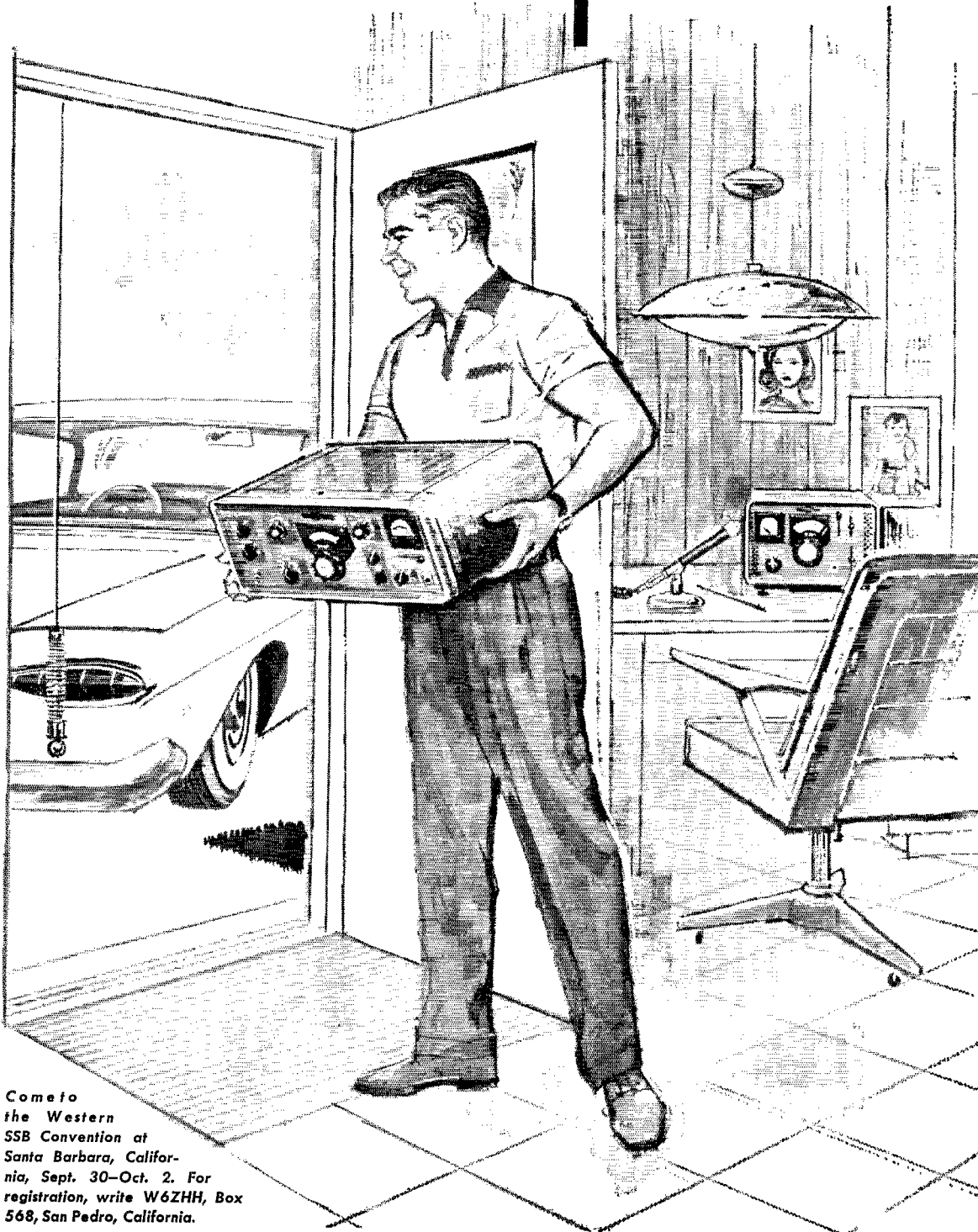
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Bill was first licensed as W2HCE in 1934 and has been licensed as W6SAI since 1938. He holds DXCC (260 countries), WAZ and other ham awards. Other famous calls held by him are 3A2AF (Monaco), 7B4QF (Andorra) and FP8AC (St. Pierre and Miquelon).

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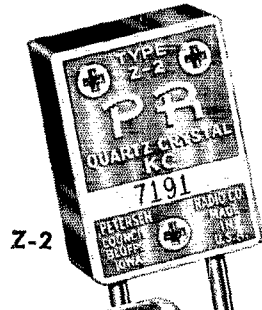
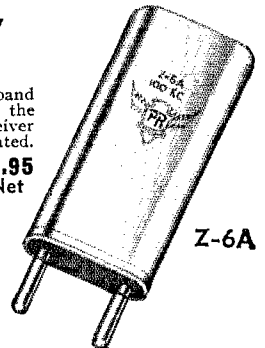
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.01% .....\$2.95 Net

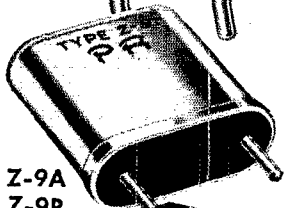
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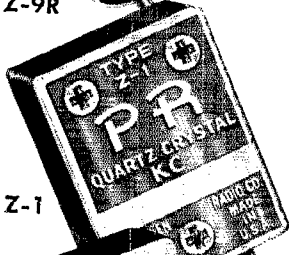
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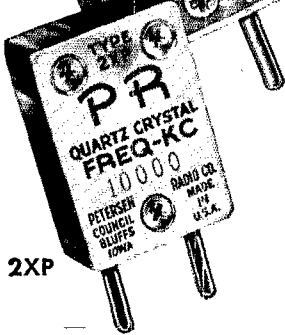
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Z-9R



Z-1



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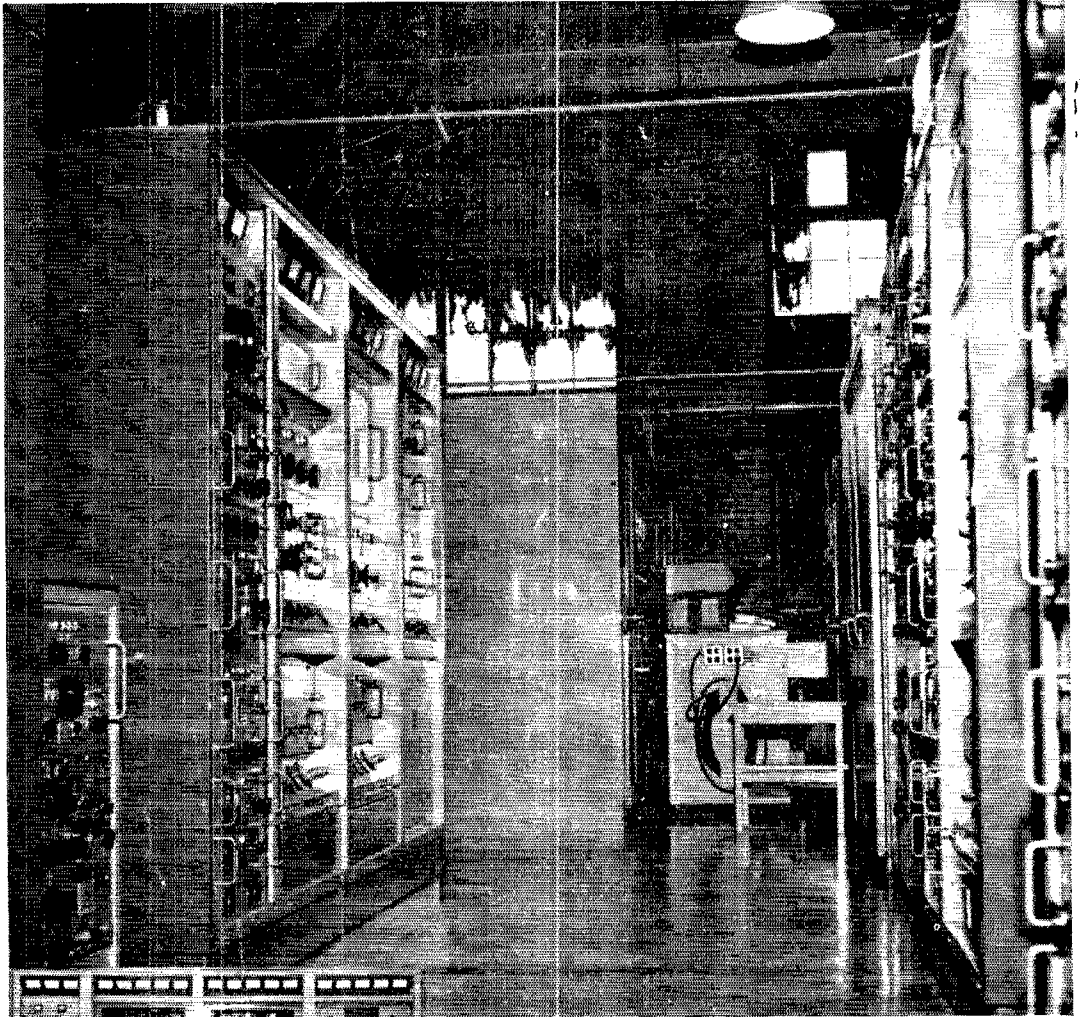
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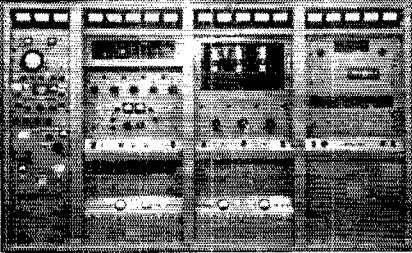
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From the time the AN/FRT-40 left the shipping department at TMC to the time the switch was thrown at the U. S. Naval Radio Station at Annapolis, Md., actually less than four days elapsed.

The completely new concept in high power transmitter design applied to the GPT-40K is only a part of the whole story in the new approach to transmitter design and construction being employed at TMC.



**The  
TECHNICAL MATERIEL CORPORATION  
MAMARONECK, NEW YORK**

# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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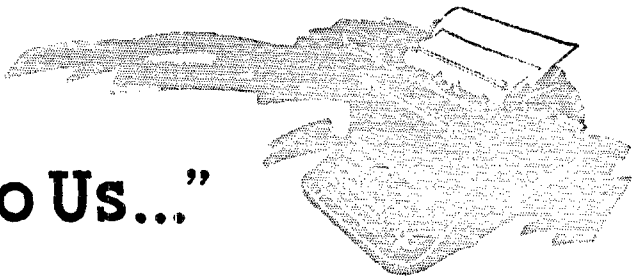
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# "It Seems to Us..."



## NEW FRONTIERS

The saga of amateur history is exciting, and our past is studded with outstanding technical and operating achievements. Hardly a month goes by without there being some new event which emphasizes the excitement of amateur radio and points out that there are, forever, new fields to conquer.

Such a month was this July. It was a month of new records on u.h.f., punctuated with reports of near success, and then final achievement. It was the sort of month that throws copy deadlines all askew, but for good reason.

The first intimation that something was brewing came on Sunday, July 17, when W1HDQ was helping time a sports-car rally, but had sort of a preoccupied air throughout the proceedings. Not until the next day at the office did he confide that he had been tipped off that W1FZJ had succeeded in bouncing 1296-Mc. signals into W6HB's setup in California and that a two-way exchange was in the offing. By the middle of the week we were getting more details, but the real news was that signals had been bounced both ways off the moon between east and west, on 1296 Mc.

Imagine — two-way transcontinental communication on 1296 Mc! Such frequencies are ordinarily thought of as being useful only from one side of town to the other, yet these fellows had talked with each other clear across the country, with the signals actually traveling a half a million miles in the process. Few people, indeed, in this world have had the privilege of participating in such an historic event; our hats are off to W1FZJ, W6HB, and all the others who took part so successfully.

But wait! This was not the only exciting u.h.f. news of the month. Right in the middle of all the 1296-Mc. hubbub came word that KH6UK and W6NLZ had done it again — this time the Pacific had been spanned, on 432 Mc. The signals of KH6UK were heard loud and clear in California, and only some local receiving difficulties at KH6UK prevented this from being two-way between the Mainland and the Islands on 432 Mc.

It is this sort of achievement which helps write the record of amateur performance in the public interest. In 1944 the Federal Communications Commission held extensive hear-

ings covering the entire frequency spectrum, requiring each radio service to appear and present its case justifying continued use of the public domain of the frequency spectrum, plus new assignments in the v.h.f. region and above. At that time the League, on behalf of the amateur radio service, said (in part) concerning the territory above 50 Mc.:

"You will understand our immense enthusiasm to get hold of the very high frequencies and the superhighs after the war. It has been the constant history of amateur radio that its pioneers explore and open new territory at successively high-frequency frontiers for the use of the amateur body generally and to the benefit of the whole art. We want a chance to apply, to the problems of amateur communication at such frequencies, some of the new knowledge born of this war. Although there has been a great increase in man's knowledge of such frequencies in the last few years under the impetus of military necessity, we can be certain that the surface has hardly been scratched, that much work remains to be done, that there are untold treasures to unearth to the subsequent benefit of mankind. This art definitely needs the application and ingenuity of the amateur in this part of the spectrum."

Amateur achievements in July, 1960, are simply an unusually-spectacular example of the foregoing principle. We are not so naive as to argue that the amateur service pioneers in technical developments today in the same way and to the same extent as in the earlier development of the lower frequencies; the complexity and expense of microwave gear handicaps the great majority of amateurs and prevents our service from "competing" on an equal basis with the billions of dollars now being poured into research of the upper reaches of the spectrum. But no amount of money can buy "the amateur spirit in research," that lively curiosity which often transcends a mere professional call to duty, and which was certainly the inspiration behind the W1FZJ-W6HB and W6NLZ-KH6UK feats. It is that heart-interest in the art which is carried by radio amateurs from their own avocation to all the other fields of radio, and can be said to be the fundamental reason for America's leadership in technical electronics. QST

# Coast to Coast Via the Moon on 1296 Mc.!

**A** LONG-CHERISHED amateur objective was achieved early in the morning of July 17, when Sam Harris, W1FZJ, Medfield, Mass., first heard a signal other than his own, reflected from the moon. Four days later the second hurdle was cleared, and the first lunar QSO by amateurs was on the record. It had been a long, hard pull for Sam and other members of the Rhododendron Swamp V.H.F. Society (W1BU), and a shorter but no less spectacular crash effort by the Eimac Radio Club of San Carlos, Cal. (W6HB).

Sam had been at it for years. Several tremendous arrays had been erected above and amid the pines at Medfield in an attempt to make a moon-bounce contact on 144 Mc. Echoes of a sort were recorded several times, but even with a huge 128-element array rigged with an ingenious system for tracking the moon the returns were discouragingly weak, and few and far between. After endless hours of back-breaking labor and patient testing, the gang at W1BU sadly came to the conclusion that if a lunar QSO was to be made the work would have to be done all over again, on a higher frequency.

The logical frequency for the new effort appeared to be 1296 Mc. Here it is now possible to achieve truly low-noise receiver performance, and efficient operation of a 1-kw. transmitter is practical. With a parabolic reflector of reasonable size a beam sharp enough for moon-reflection work is within the realm of practicality for amateurs.

Work toward this end was begun by W1BU about a year ago.

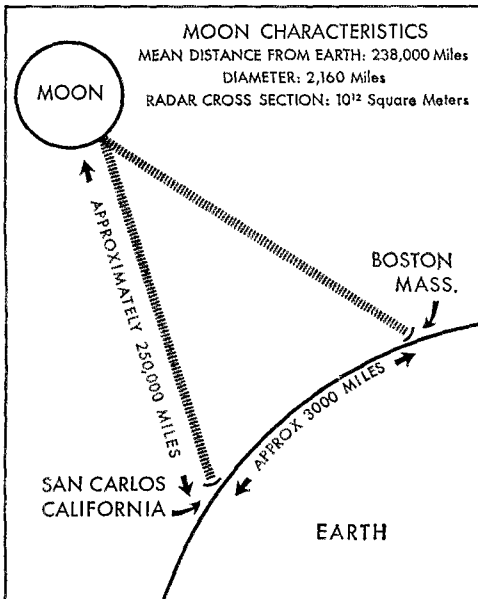
The problems were many, all revolving around the need for high stability and accuracy in several fields. If you are to have more than a few minutes in which to conduct tests, the antenna array must track the moon. You don't just aim in the general direction of the moon and blast away, hoping for the best; you rig up some kind of automatic system that will put your beam squarely on the moon and keep it there, for hours. To get the needed sensitivity in the receiver you go to a bandwidth of 100 cycles or less. This means a high order of precision in several departments, and it imposes stability problems most amateurs have never dreamed of. Before you dash out to your corner radio store for the necessary parts, you first solve a whole batch of thorny mechanical and electrical problems. Then you work, work, work — and work some more.

There are probably few amateurs with the financial resources needed to build and operate a 1296-Mc. moon-bounce station, and if there are those who could afford it they would need help to perform the physical labor involved. Thus, moon bounce becomes an ideal project for an ambitious radio club group, and the first lunar QSO resulted from two such cooperative efforts. The Rhododendron Swamp V.h.f. Society had a backlog of experience with big antennas. They also had access to considerable scientific equipment and know-how. The 18-foot parabolic reflector (D. S. Kennedy Co.), the 1296-Mc. parametric amplifier (Microwave Associates), and the kilowatt klystron amplifier (Eimac) were "promoted." But that still left a vast amount of construction of typical ham make-do style, and plenty of man-hours and foot-pounds of labor. A high-stability exciter and the necessary moon-tracking antenna mount and drive had to be designed and built, as did the 1296-Mc. converter and 1000-cycle and 100-cycle filters for the receiver.

Somehow this was finally done, with results somewhat as shown in our pictures, and by the end of May, Sam was able to announce that the W1BU moon-bounce station was working — and receiving its own echoes consistently for hours on end. Now, who would match the effort so that actual communicating could be tried?

The challenge was picked up by O. H. "Hank" Brown, W6HB, of Eitel-McCullough, Inc., San Carlos, Cal. Rallying members of the Eimac Radio Club, Hank put them to work on a crash program aimed at making the first amateur moonbounce QSO, and incidentally a new 1296-Mc. DX record.

The Eimac group were ready for their first test July 17. Moonrise was at a most inconvenient time, but that didn't hold the gang at W6HB



Path of 1296 Mc. Signal of W1BU/W1FZJ — W6HB

back. Tests were started as soon as the moon was above trees and power wires, or about 0200 PST. Almost at once, Sam heard the signal from W6HB, weak and barely discernible in the noise, but a signal other than his own, at last! Then followed three hours of testing both ways, with the telephone line across the continent busy all the while.

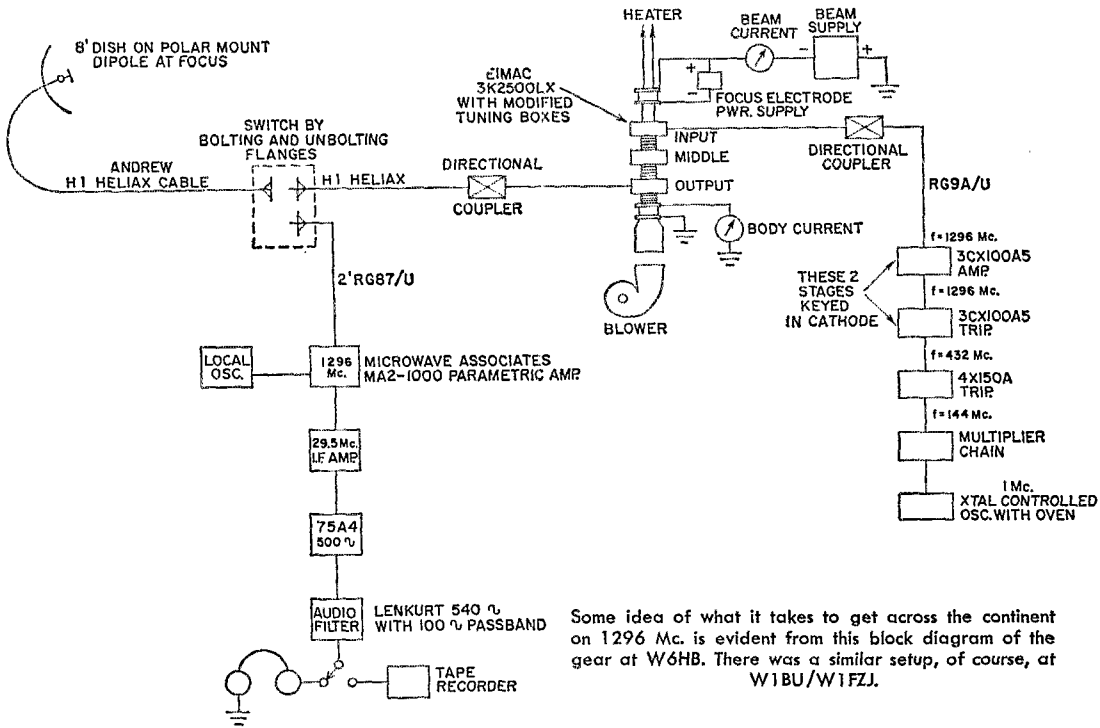
Reception at W1BU was considerably better than at W6HB, due at least in part to the use of a 100-cycle filter at W1BU. When Sam switched to 1000-cycle bandwidth there was little or nothing to be heard of W6HB. Communication was only partially successful for two reasons: the signal at W6HB was just too weak to copy, and keying of the transmitter at the western end moved the frequency just enough so that it slipped out of the passband at W1BU. With 100-cycle selectivity, that can happen even when little or no frequency shift is audible on the beatnote.

Several weak spots were turned up by the first

test. The dish at W6HB was scrounged from surplus; it was rusty and in none too good condition otherwise. Before the next test it was coated with aluminum foil obtained from a nearby grocery store. Perhaps more important, the 100-cycle filter was added in the receiving setup. Tests were set for July 21, beginning at 0600 PST.

The moon had been clear before, so the simple sighting-tube method had been quite satisfactory for lining up the W6HB dish. This time there was fog, and furthermore the moon rose close to the sun, making visual sighting extremely difficult. Finally they were lined up, and transmissions began at W6HB. The signal came through immediately at W1BU, peaking some 8 db. above the noise level, though with a rapid flutter fade which made copy extremely difficult.

Using a 3-letter code for "no signal, some signal or good signal," reports and calls were exchanged, and the first two-way amateur communication via the moon was history. — E. P. T.



Some idea of what it takes to get across the continent on 1296 Mc. is evident from this block diagram of the gear at W6HB. There was a similar setup, of course, at W1BU/W1FZJ.

### OUR COVER

The four photos on our cover this month give some idea of what was involved at each end of the lunar QSO. The top pair of photos show the dish and the gear at W1BU, with W1FZJ looking at what hath been wrought. The pair of pictures at the bottom show the W6HB dish at the left and at the right is W6SAI tuning up some of the gear. See above and pages 62 and 65 for more details.

### Strays

The Windblowers V. H. F. Society will hold its fall Big Blow, Saturday, September 24, from 1400 to 2400. Portable equipment will be set up at four locations — Lake Arcadia, N. J.; High Knob, Pa.; Sand Point, N. Y.; and Redding Ridge, Conn. As in previous Big Blow events, a handsome certificate will be awarded to all amateurs completing contact with all four stations. All operations will be on the 2-meter band. Calls used will be W2ESW, K2EHR, K2ILO, and K2BC.

### CENTRAL DIVISION CONVENTION

*Indianapolis, Indiana — September 10-11*

A program of top-notch technical speakers is being planned for the Central Division Convention at the Claypool Hotel, Washington Street at Illinois (US 40) in downtown Indianapolis on Saturday and Sunday, September 10-11. Special activities are also being scheduled for the XYLs.

The Indiana Radio Club Council is the convention sponsor. Patrick J. Husk, K9EUQ, is executive chairman of the convention. A full line of amateur gear is to be displayed by equipment manufacturers. George Grauc, W9BKJ, is in charge of a Royal Order of the Wouff Hong initiation and ceremony. Bulletins concerning the convention activities are being carried by the Indiana Phone Net.

Advance registration is \$4.00 (at the door, \$5.00), banquet tickets, \$5.00. Ticket requests should be sent to Art Evans, W9TQC, 823 North Bosart, Indianapolis, Indiana.

### DAKOTA DIVISION CONVENTION

*Minneapolis, Minnesota  
September 16-18*

The Dakota Division "Mid-America" Convention featuring technical talks, two transmitter hunts, including mobile judging, DX meeting with top area DXCC operators is to be held at the Leamington Hotel in Minneapolis, September 16-18. For the first time, the convention is being combined with the Upper Midwest Electronic Conference, making an attractive bonus for convention registrants.

Traffic and net meetings, RTTY demonstrations, MARS discussions and events for YLs are also scheduled. Specially arranged will be the holding of FCC amateur General Class license exams in St. Paul, during the convention. A Royal Order of the Wouff Hong initiation and ceremony is to be conducted with John B. Morgan, W0RA, in charge.

Convention registration, including a grand banquet (prime ribs) is \$7.50 per person. Checks should be made payable to Carl Baur, treasurer and sent to "Convention", Box 5311, Minneapolis 7, Minnesota.

Dakota Division Convention sponsor is the Minneapolis Radio Club. Philip Peteler, K0UWC, is general chairman with Rex Kiser, W0GLU, secretary.

Convention guests will have free access to the electronic conference and more than 500 exhibits at the Minneapolis auditorium.

### EASTERN CANADA CONVENTION

*Montreal, Quebec — September 16-17*

Canadian and American amateurs are expected to enjoy a rounded program of exciting activities at the Eastern Canada Convention at Victoria Hall, Westmount, P. Q. Registration begins Friday evening at 7:30 with convention highlights convening at 9 o'clock Saturday morning.

Sponsored by the Montreal Amateur Radio Club, convention planners have arranged mobile hunts, speakers, displays and events for the

XYLs, including a visit to Botanical Gardens. A dinner-banquet (roast beef or steak) is to be held at the Queen's Hotel. Early registration is \$7.00, at the door, \$7.50. Information and ticket requests may be sent to Ethel Pick, VE2HI, 535 Lansdown Avenue, Westmount 6, Quebec.

### GREAT LAKES DIVISION CONVENTION

*Cleveland, Ohio — October 7-8, 1960*

The Great Lakes Division ARRL Convention, sponsored by the Cleveland Amateur Radio Convention Committee, will be held on October 7-8 at the Manger Hotel, East Thirteenth Street and Chester Avenue in Cleveland.

Group suppers and several hospitality shows are scheduled for the evening of October 7. At midnight there will be a Royal Order of Wouff Hong ceremony and initiation. General convention program is to begin at 10 A.M., continuing throughout the day and on Sunday. Technical talks, a DX session, an afternoon tea for the ladies, along with an ARRL session, are planned. A Sunday evening banquet in the Grand Ball Room concludes convention activities.

Registration is \$2.00, banquet tickets are \$5.00. Hotel rooms may be reserved by writing the Manger Hotel. For convention registration and banquet tickets, write The Cleveland Amateur Radio Convention Committee, P.O. Box 5167, Cleveland 1, Ohio.

### OKLAHOMA STATE CONVENTION

*Oklahoma City, Oklahoma —  
September 10-11*

The Greater Oklahoma City Council of Amateur Radio Clubs is sponsoring an ARRL State Convention to be held in the Municipal Auditorium in Oklahoma City on September 10-11.

Convention registration begins at 9 A.M., Saturday, September 10. Since the night before happens to fall on the meeting night of the Oklahoma City Amateur Radio Club, a special meeting will be planned with activities of interest to early arrivals for the convention. Talks on technical subjects plus commercial exhibits, along with other activities are scheduled. Tentative plans include an Oklahoma version of the exciting hide-and-peek contest by the Fort Worth hamfest gang.

Registration fee is \$6.00 per person which includes a special Saturday night dinner-dance featuring a popular dance orchestra. Registration and requests for motel or hotel accommodations may be sent to the Greater Oklahoma City Council of Amateur Radio Clubs, P.O. Box 93, Oklahoma City 1, Oklahoma.

### HUDSON DIVISION CONVENTION

*New York City—October 14-15, 1960*

The Hudson Amateur Radio Council with more than 33 active amateur clubs is sponsoring a one-day Hudson Division ARRL Convention at

*(Continued on page 156)*

## A New Field for the Experimenter

Over-all view of the color television system. The bottom unit on the left is the flying spot scanner which was made from a discarded TV set. The color slide to be transmitted is fastened to the face of the cathode-ray tube and is visible just beneath the upper chassis. In the center of the picture is the photocell chassis with three photomultiplier tubes equipped with red, blue and green filters facing the scanner. On the right is the sync and blanking generator. This, too, was made from a salvaged TV receiver, and is also part of the author's black and white television system. The coaxial cables from the photocell chassis carry the red, blue and green channels to the color unit, the upper chassis on the left. This is the heart of the system and contains a matrix for converting the three color signals to standard black and white, "I" and "Q" signals, plus the 3.58-Mc. color carrier oscillator, the color modulators and the burst signal generator.



## Amateur Color Television

BY MELVIN H. SHADBOLT,\* WØKYQ

WITH amateur television on its way to becoming a popular phase of ham radio, it was only natural that some experimenting should be done in color. Since color TV has been confined primarily to commercial broadcast use, a great deal of planning and gathering of information was necessary before undertaking such a project. Such questions as what type pickup source would be desirable, could good color quality be obtained, what types of color filters should be used, and could junk-box parts be made to work had to be answered. After studying all of the facts and drawing up some circuits that would be satisfactory for amateur purposes, it was decided that it would be practical to go ahead with the project. Fig. 1 shows a block diagram of the system that was finally decided on and constructed.

### Type of Pickup

Cost was a prime factor, and since this was an experimental project I decided to use the "flying spot scanner" type of pickup to transmit color pictures put on glass plates about  $3\frac{1}{4} \times 4$  inches. These slides have been made with water colors, drawing inks, colored cellophane and transparency film. Briefly, the flying spot scanner depends upon a light source that is capable of scanning the color slide at the proper rate. The light at any one instant will depend on the density of the slide at that point. If the slide is in color the light will also be filtered as it passes through the slide.

Assume now that the beam of light is passing through a red portion of the color slide. This

simply means that the red dye in the slide absorbs all the colors except red. Therefore, this is the only color that will pass through the slide at this instant. If a photocell is now placed in front of the slide with a filter in front of it so that only red light will be allowed to pass through, then a voltage that is proportional to the light passing through the slide at that point will be developed by the cell. Now, if we have a second cell with a filter that will pass only blue light in front of it, and a third cell with a green filter, we will be able to produce every color of the rainbow, including white, simply by proper mixing of the three basic colors.

*Those who feel that regular black and white TV is on the far fringe of ham experimentation had better catch their breath. WØKYQ has built a color television system which transmits slide pictures and drawings of excellent quality. So far as we know, this is the first amateur color TV to be put on the air, at least in the United States. The signal is very similar to the NTSC standard for commercial broadcasters and can be viewed on a standard color set with a 420-Mc. converter. It is also compatible with regular black and white receivers. By using junk-box parts and sections of two give-away TV sets, the author kept the cost of the system to \$175.*

\* Box 807, Dakota City, Nebraska.

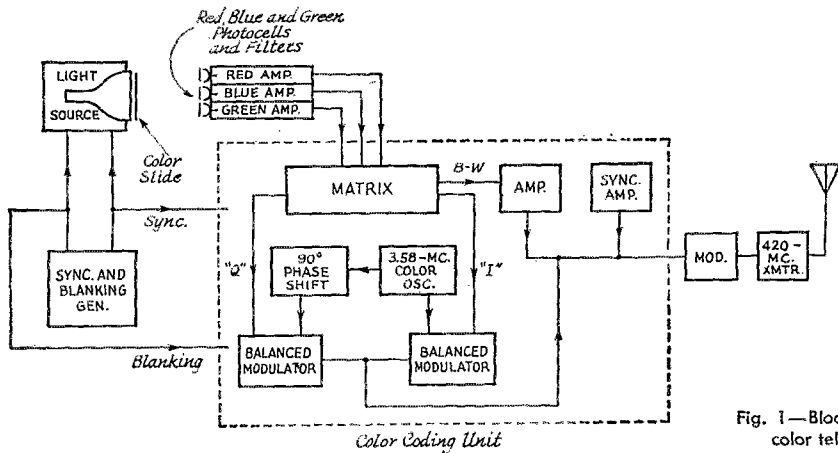


Fig. 1—Block diagram of the color television system.

For example, assume it is desired to produce yellow. Red and green when mixed in the proper proportion will produce this color. Therefore as the light beam is passing through a yellow portion of the slide, the red cell will see red information and the green cell will see green information. When these two separate signals are recombined, the original yellow will be reproduced. Let's take one more example. If we want to reproduce white light, which is actually a mixture of all colors, it will be found that the red photocell will see about 30 per cent of the light, the blue cell will see about 11 per cent, and the green cell will see about 59 per cent. When these three signals are added together, the original white will be reproduced.

The amount of light actually reaching the photocells after passing through the color slide and the selective filters is very small, so sensitive photomultiplier tubes were used. The green and blue channels use 931-As and the red channel uses a 1P22. These photocells are presently on the surplus market for about \$5 each. The filters that were used in front of the red, blue and green photocells were Kodak Wratten filters Nos. 25, 47B, and 58, respectively. Each of the photocells is followed by a three-stage video amplifier employing 6AK5s. This unit was built on a separate chassis along with its own electronically-regulated power supply.

### Light Source

Readily-available used television receivers at giveaway prices solve the problem of a scanning light source. In this instance, an old RCA KCS

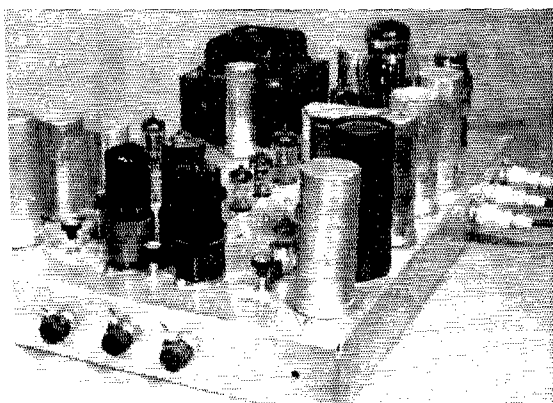
28 chassis was obtained for \$5. All of its front-end tubes were removed, leaving only the sync, video amplifier and deflection circuits intact. Another rectifier tube was added in parallel with the one that was already in the set, since it was desired to use this power supply to run the remainder of the color unit. Provisions were also made to feed in blanking and sync pulses to control the scanning.

For the light, a 5AXP4 picture tube was used. This is a TV serviceman's 5-inch substitution type tube. When selecting a tube to be used for color television, it must always be kept in mind that the light transmitted by the tube must have sufficient amounts of the three basic colors. If this condition is not met it will be impossible to obtain a satisfactory signal on all colors. Red is the hardest color to reproduce from the standpoint of both the photocell and the light source since each is down in output at this frequency.

### Matrix

The real problem is still to come. The red, blue and green signals must now be prepared in such a manner that all their information can be put on one carrier and also produce a signal which is compatible with standard black and white receivers. This is the job of the matrix. Its first function is to produce a black and white signal from the three color signals. This is simply a matter of mixing the color signals together in the right proportions. The black and white signal will also be used in color reception as a mixing signal.

By properly adding and subtracting the red,

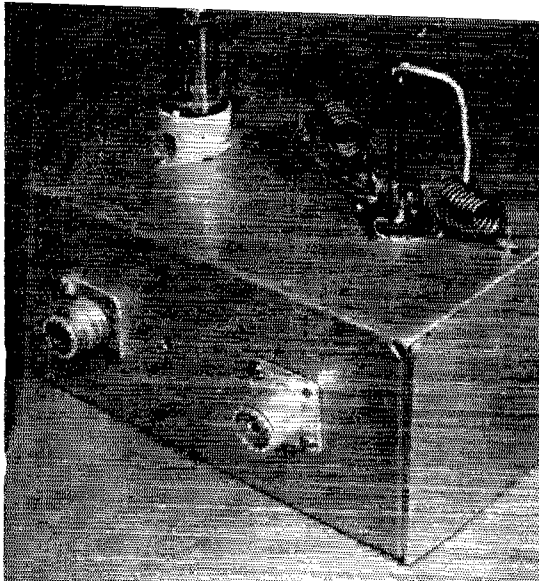


Close-up of the photocell pickup unit showing the end which normally faces the scanner. The red, blue and green photomultiplier tubes are mounted front and center with their respective color filters wrapped around them. The gain controls on the front panel are for balancing the three channels. Behind the photomultiplier tubes are the red, blue and green three-stage video preamplifiers, and at the rear of the chassis is an electronically-regulated power supply. The coaxial cables on the right carry the three color signals to the matrix.

**QST for**



And here (don't laugh, now!) is the transmitter. The inverted socket at the right holds a 12AT7 parallel line oscillator for 420 Mc. Shown above the chassis are the plate and cathode lines and the heater r.f. chokes. On the left is a 6CL6 modulator. It and the 12AT7 are connected in series across the plate supply, and video drive is applied to the 6CL6 grid. W0KYQ admits the irony of such a simple rig for so complex a system, but points out that TV signals are wideband and that the little 5-watter does fine for local work. A 420-Mc. converter and standard color (or black and white) set are used for reception



blue, and green signals electronically, all the information they contain can be condensed into two signals if the black and white signal is properly mixed with these two signals at the receiver. The two new signals that take the place of the red, blue and green information are called "I" and "Q."

Now we can make use of a very special type of modulation called "quadrature modulation." This is a system whereby two signals can modulate one carrier by making one signal always lag behind the other signal by 90 degrees. The color modulators operate on the standard color frequency of approximately 3.58 Mc. and are of the balanced-modulator type. Effectively, we put all the color information on a single carrier and then suppress the carrier so that we are sending all the color information by d.s.b. Next, we mix this color signal with our black and white signal and with the standard sync pulses.

### Sync and Blanking

Another cheap TV receiver was obtained to generate the sync pulses. This receiver was left intact and is adjusted to receive a local station. The sync can then be taken from the sync circuit in the receiver without any additional equipment being required. By obtaining the sync in this manner a superior pulse can be had with the minimum of cost. The blanking generator is built as a subchassis on this same unit. It is a group of multivibrators and clippers which effectively produce a pulse that will turn out the light source during the retrace period of the electron beam.

The only thing left now is to produce a pulse which will initiate a reference signal for the color receiver to lock on so that the proper colors will be reproduced. This signal is called a burst signal and is sent only during the period of time when no picture information is being transmitted.

By making good use of the junk box the complete project cost a total of about \$175. The results have been very satisfactory. Colors are true and brilliant. All colors have been faithfully reproduced, including some of the hardest, flesh tones.

There is a great deal of fun to be had in exploring this new phase of amateur radio, and I am sure that we will begin to hear a considerable amount from now on about experiments in amateur color television. Unlimited ideas and methods are waiting to be tried out, and many systems like mine can be built out of readily-available parts. There are many different ways of producing color TV and this is only one of them. So let's go color — there's nothing quite like it in amateur radio.

**QST**

Note: Practical circuit diagrams have been left out of this article intentionally. Anyone experimenting with color TV would have to acquire enough knowledge of the subject to devise his own, based on current commercial practice and standards if regular receivers are to be used. For more information, consult texts such as *Introduction to Color TV*, 2nd Edition by Kaufman and Thomas, published by Rider. — Editor.



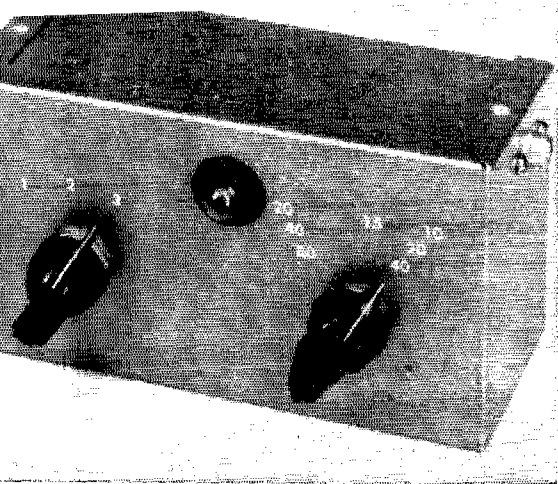
September 1935

. . . The editorial 25 years ago was a plea to amateurs to cooperate in cutting down QRM by three simple methods: using the proper bands to avoid jamming DX with local rag-chewing, trimming power to just that necessary for the QSO in progress, and ceasing to test on radiating antennas, using dummy antennas instead.

. . . The magazine served a pot pourri of technical fare including articles on plate modulation of pentodes . . . an all-purpose s.s. superbet with turret-type automatic coil changing . . . a new type u.h.f. transmitter . . . a frequency-lock multi-vider . . . a flexible e.c.-controlled transmitter . . . plus technical topics and three pages of hints for the experimenter.

. . . The seventh international DX contest was hailed as "the greatest in the history of amateur radio." The winner was W3SI who rolled up 40,808 points in contacting 56 countries on all continents. "Breath-taking!" said QST.

. . . The third annual Field Day was hailed as best yet — the United Radio Amateur Club of Wilmington, Calif. took top honors with 1116 points.



The completed wavemeter ready for use. The knob on the left is the band-switch control, the dial lamp is at the top center, and the knob for  $C_1$  is at the right.

## Easy-To-Build

### Novice Band Checker

BY LEWIS G. MCCOY,\* WIICP

# A Simple Wavemeter for Use in Coax Lines

A common complaint from Novices is that they get on the air, call and call, but don't get answers. In many cases the transmitter and antenna seem to be working OK and a local station or two may have been worked, but nothing out of town.

Believe it or not, one of the easiest mistakes to make is to tune your rig for what you think is the right band but your fundamental signal is actually going out on some other band. The local station? He is probably copying a harmonic or spurious emission. If you don't believe Novices

\* Technical Assistant, *QST*.

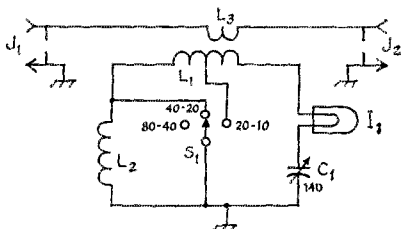


Fig. 1—Circuit diagram of the wavemeter.

- $C_1$ —140- $\mu\text{f}$ . variable (Hammarlund HF-140).
- $I_1$ —Dial Lamp; up to 25 watts input, No. 48 or 49 (60 ma.), 25-50 watts input, No. 47 (150 ma.), 50-75 watts input, No. 46 (250 ma.).
- $J_1, J_2$ —Phono connector.
- $L_1$ —15 turns No. 20, 16 turns per inch, 1-inch diam. (B & W Miniductor 3015).
- $L_2$ —22 turns No. 24, 32 turns per inch, 1-inch diam. (B & W Miniductor 3016).
- Tap for 7-14-Mc. range is at junction of  $L_1 L_2$ ; tap for 14-28-Mc. range is 5 turns from  $L_1$  end of  $L_1$ .
- $L_3$ —Coupling loop; see text.
- $S_1$ —Single-pole three-position switch (Centralab type 1461).

can get on the wrong band just listen around 20 meters—you'll hear plenty of Novice call signs. Also, the 7400-ke. region is "popular" with some Novices.

These aren't harmonics we're discussing, but are instances where the transmitter is actually tuned to these bands or frequencies. It is true that the band switch on your transmitter may be set correctly, but unfortunately many rigs, both commercial and home-built, can be incorrectly tuned up. The result is a signal going out on the wrong frequency.

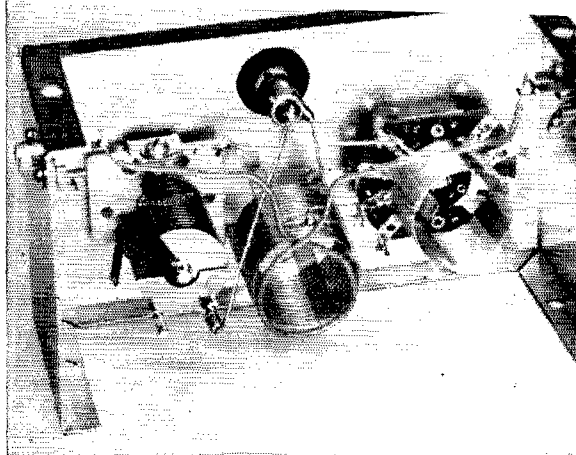
Fortunately, there is a very simple method for checking to make sure you are transmitting on the right band. This consists of using a calibrated absorption-type wavemeter to check your signal. The unit described in this article can be built in an evening and only costs a few dollars. In addition to checking the band, the unit also serves as an output indicator that shows you when r.f. is in the feeders on the way to the antenna.

One of the problems in using an absorption wavemeter is that you must have relatively tight coupling between the wavemeter and the circuit with r.f. in it. Most transmitters these days are built into cabinets that have fairly tight shielding to prevent harmonic radiation. Trying to couple a wavemeter to the tank circuit in such a rig could prove to be quite a chore. In addition, many hams use a coax feed line from the rig to the antenna and here again it is well-nigh impossible to couple the wavemeter to the line. These problems are eliminated with the wavemeter described here. The unit is a part of the coax line and can be left in the line at all times.

#### The Wavemeter

The circuit of the wavemeter is shown in Fig. 1. It consists of a pair of coils,  $L_1 L_2$ , in

Inside view, showing the arrangement of the components.  $L_1$  is mounted between  $C_1$  and  $S_1$  and  $L_2$  is directly over  $S_1$ . A double-pole, three-position switch is shown in the photo but only one pole is used, as specified in Fig. 1



series with a variable capacitor,  $C_1$ , and a dial lamp,  $I_1$ , which serves as the indicator.  $S_1$  is a single-pole, three-position switch which is used to short out  $L_2$  and a portion of  $L_1$  for changing bands. In the open (first) position of  $S_1$  the 80- and 40-meter bands are covered. In the second position, the range from 40 through 20 can be covered. The third switch position takes care of 20, 15 and 10 meters.

When the entire inductance,  $L_1L_2$ , is used, the 3.5-Mc. end of the 80-meter band falls near the maximum-capacitance setting of  $C_1$  (plates nearly fully meshed) and the 7-Mc. band is near minimum capacitance. Advancing  $S_1$  to the next position shorts out the  $L_2$  portion of the coil and 7 Mc. appears near maximum capacitance and the 14-Mc. band near minimum. In the last position of  $S_1$ , 14 Mc. is near maximum and the 28-Mc. band is close to minimum, with 21 Mc. near the middle of the range.

Coupling from the coax line is accomplished via a single loop,  $L_3$ , in the line, the loop being positioned near one end of  $L_1$ .

### How To Make It

The wavemeter is built into a  $2\frac{1}{8} \times 3 \times 5\frac{1}{4}$ -inch Minibox.  $L_1$  and  $L_2$  consist of sections of Miniductor coil stock. One section is mounted over  $S_1$  and is held in place by its own leads and the other section is positioned between  $S_1$  and  $C_1$  (see back view). Two phono jacks,  $J_1$  and  $J_2$ , are mounted on either end of the box and the pickup line, an 8-inch length of insulated wire, is connected between the two jacks. A single loop ( $L_3$ ), the same diameter as  $L_1$ , is made in the line, the loop being positioned about  $\frac{1}{4}$  inch away from the end of  $L_1$ .

The dial lamp is held in place by a  $\frac{3}{8}$ -inch rubber grommet mounted on the front of the box. The leads from the arm of  $S_1$  and the stator of  $C_1$  are soldered to the base and shell of the lamp. This eliminates the need for a lamp socket. Check Fig. 1 for the correct lamp size for your power input.

When arranging and mounting the components be careful not to place any of them too close to the edges of the box, otherwise the bottom of the box won't fit.

### How To Test and Use the Wavemeter

Connect the wavemeter to your transmitter, through  $J_1$ , using a couple of feet of RG-58/U or RG-59/U coaxial cable. Tune up on 80 meters. Connect a dummy load, such as a lamp bulb, to

$J_2$  so you don't have a signal going out on the air. Switch  $S_1$  to the position that leaves the entire coil,  $L_1L_2$ , in the circuit. Carefully tune  $C_1$  until the dial lamp lights up. The dial lamp should light near the *maximum* capacitance setting of  $C_1$ . Make a note of the knob setting and then tune up on 40 meters. Using the same switch position, the lamp should light near minimum capacitance of  $C_1$ . Leave the transmitter tuned to 40 and switch  $S_1$  to the next position. Tune  $C_1$  near maximum and the bulb should light up again. Change bands to 20 (if you're a Novice licensee you *have* to use a dummy antenna on this and the 10-meter band) and find the  $C_1$  setting for this band as indicated by the light. Follow the same procedure for next switch position, making notes of the settings of  $C_1$ . Finally, replace the dummy by the coax line to your antenna and you're all set.

As an alternative to depending on the transmitter, the wavemeter can be calibrated if you have a grid-dip meter or can borrow one. Here is the way to do it:

Couple the grid-dip meter to  $L_1$ , set the meter to the middle of the 80-meter band (3750 kc.) and then tune  $C_1$  for the grid dip. Make a note of the setting of  $C_1$  and proceed to 7 Mc., following the same system. You can quickly determine the  $C_1$  settings for the rest of the bands with the grid-dip meter. The information you have from your notes will enable you to make a dial that can be mounted under the mounting nut of  $C_1$ .

In using the wavemeter as an output indicator all you have to do is set  $S_1$  and  $C_1$  for the right band and tune your rig for maximum brilliance of the dial lamp. With the unit mounted alongside the rig you will always have a check on the band plus visual indication of power in the coax line.

This gadget is primarily for the Novice who can't be sure where he is in the radio spectrum. However, some General or Conditional Class hams may be interested in installing the wavemeter in their stations. For higher power levels than 75 watts it is possible that the circuit as described could burn out dial lamps. It is a simple matter to reduce the amount of coupling from the line by reducing the size of the pickup loop or bending it away from  $L_1$ .

QST

# Amateur RTTY in Europe

BY A. C. GEE,\* G2UK

*This paper was prepared for the Radio Society of Great Britain for submission at the Region 1 Division Conference of the I.A.R.U., held at Folkestone June 13-17. It is such an excellent summary of the current status of RTTY in Europe that we believe it will be of great interest to RTTY enthusiasts in the U. S.*

**R**ADIO teletyping as a means of amateur radio communication first began in the U.K. during the latter part of 1959. Our experience in this field is, therefore, as yet, very meager. However, there are one or two problems already coming to the fore which will need to be solved by mutual agreement between the parties concerned. It was thought worthwhile, therefore, to present this short paper to bring some of these matters forward so that they might benefit from discussion at a representative gathering of radio amateurs such as this Conference.

## *The word "Teletype"*

Much of the work of getting RTTY started in U.K. was undertaken by a very small group of enthusiasts who, to give themselves some official weight, formed the British Amateur Radio Teletype Group. Shortly after announcing their existence and intentions in the radio press the Hon. Secretary was informed in a letter from the British agents of the Teletype Corporation of America that the word "Teletype" is a registered trade name and could not be used in the title of the Group. After some discussion it was agreed to change the name to "British Amateur Radio Teletyping Group." Lesson number one, therefore, is that, as far as English speaking countries are concerned, the title for amateur radio RTTY must not include the word "Teletype." From the nomenclature point of view, we should refer to this aspect of amateur radio as "Amateur Radio Teletyping" if we wish to keep out of trouble with the lawyers!

## *Teletyping Systems*

Members of the Conference Technical Committee will, no doubt, be aware that, generally speaking, there are two teletyping systems in use by commercial operators. The first is that known as the International Alphabet No. 2, a five-unit code used for teleprinter operation in most parts of the world other than America. The second is the five-unit code used in America, which differs slightly from the International system. The differences are not great, but in addition to that of the code characters them-

\*Honorary Secretary, British Amateur Teletyping Group.

selves, there is a difference in working speed, those teleprinters which work to the International standard running at 66 w.p.m. whilst the American machines operate at 60 w.p.m.

As far as amateur RTTY is concerned, American amateurs have a very long lead indeed on amateurs in Europe. Their experiences of this mode of communication goes back to the years immediately following the end of World War II. Consequently, such amateur literature as is available on RTTY originates for the most part from the U. S. A., and the techniques described are those current in the United States using American equipment. Furthermore, the RTTY equipment used by radio amateurs outside the U. S. A. is usually operated by American Forces personnel stationed overseas, or is equipment which has been passed on by enthusiastic American RTTY amateurs to amateurs overseas. We thus have the situation that at present, or rather until amateur teletyping started up in the U.K., all amateur RTTY stations were using the American standard code and teleprinter speed and American equipment.

The British Amateur Radio Teletyping Group appreciated this point very keenly right from the start. Obviously it would be best if British—and other European—radio amateurs adopted the American standard. DX working appeals to the RTTY enthusiast as it does to the a.m., s.s.b., or c.w. man, and in any case, amateur stations equipped for RTTY are not likely to be very thick on the ground in the U.K. for some time to come, so most of our contacts may well have been only with U. S. A. stations. So we decided that, if possible, we must equip ourselves with American teleprinters—or, as they are called—teletypewriters.

Unfortunately, members of the B.A.R.T.G., were unable to obtain the offer of any American machines at prices which would appeal to the average amateur's pocket. Even the ex-service surplus dealers would not dispose of their very meager stocks of Type 14, 15, 26, etc., at under £100 apiece. And then, quite out of the blue, the Group received an offer of 25 ex-G.P.O. Creed Type 3 machines at a price around £3 each! These machines, of course, use the International Code, but this "gift from the Gods" most certainly could not be dismissed in the interests of standardization with the Americans. So they were acquired, and with their arrival went all the good intentions of adopting the American standards!

## *The International Code*

As it has turned out, this involuntary change of policy forced upon the Group by circumstance has not proved quite so unfortunate as it might

have done. Most of the commercial radio stations sending RTTY signals audible in the United Kingdom use the International Code, and these signals have proved invaluable as sources of test transmissions for lining up gear. Again, it has been found that radio amateurs in Holland and Germany, who have obtained the same facilities for RTTY as ourselves, have to obtain Siemens, Olivetti and other well-known European makes of machine and these too use the International Code. So cooperation with them has been helped by the similarity of our equipment. This will doubtless apply in most European countries. So, regrettable as it may be, it looks as though amateur radio RTTY will follow the example of its commercial "big brother" and have to put up with two standards in relation to machine speeds, viz. the American 60 w.p.m. and the International 66 w.p.m. In this connection it is interesting to note that the very latest Creed teleprinter can be used for either standard by suitable gear changing.

As far as amateurs are concerned, this dual standard is already leading to some inconvenience, because those who wish to work DX — and the G's are much sought after by their RTTY colleagues across the water — have to make speed adjustments to their machines when changing from DX to local working and vice versa. Getting the speed right does take a little time.

#### **Frequency-Shift Keying**

With regard to the degree of frequency-shift keying to be used, the story here is, fortunately, a happier one. Whilst experiments with narrow-band shift are popular with advanced American RTTY enthusiasts, the normal standard used by both amateurs and commercials alike appears to be 850 c/s. This has been accepted by the British G.P.O. as the standard applicable to British radio amateurs, so in this respect we are in line with our American colleagues. But it is understood from PAØFB that the Netherlands authorities have set the f.s.k. standard for their radio amateurs at 400 c/s, but representations

are being made to have this altered to 850 c/s.

#### **Frequency Bands**

With regard to the amateur bands which may be used for RTTY, the British G.P.O. have stated that "there is no objection to the use by radio amateurs of the type of transmission referred to as RTTY, provided that such transmissions are confined to amateur bands in respect of which emission F1 is already authorised."

Subsequently, at the Group's suggestion, the G.P.O. excluded the 160-meter band from use for RTTY and they confirmed the Group's suggestion that the call sign should be sent in plain language at the beginning and end of each transmission. This means that RTTY can be used on any frequency within the specified amateur bands, as far as U.K. amateurs are concerned. This freedom of choice of frequency does not appear to have been granted by all countries, however. For instance, DLIGP, who has permission to operate RTTY, is restricted to the band 3590-3600 kc.

#### **Summary**

To sum up, then, it can be stated that RTTY has come to stay as part of the amateur radio scene in Region 1. Whilst it is not expected that the number of enthusiasts for this mode of transmission will be large, there is no doubt that most, if not all, of the national radio societies represented at Folkestone will be asked by some of their members to assist them in obtaining authorisation from their license issuing authorities for the use of RTTY.

When doing this, it would be advantageous if the same standards for RTTY could be asked for, viz.: 850 c/s shift, and use on any frequency within the amateur bands for which F1 emission is already authorised. The question of machine standards is likely to be determined by the particular models of teleprinter available, and in Europe, these are most likely to be of the type using the International code and speed. QST

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## NEW BOOKS

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**How to Use Grid-Dip Oscillators**, by Rufus P. Turner. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. Catalog No. 245. 112 pages, including index, 5½ by 8½ inches, paper cover. Price \$2.50.

This book covers just about everything that has to do with grid-dip oscillators. Circuit principles, g.d.o. accessories, measurements, receiver and transmitter applications, and antenna and transmission line tests are just a few of the subjects covered. The presentation of applications is enhanced by many diagrams and sketches of the test setups. The final chapter deals with commercial grid-dip meters, giving circuit diagrams, special features and general information on most of the popular kits and ready-made commercial models.

**Television Receiver Servicing**, 4th edition, by Milton S. Kiver. Published by D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J. 8¼ by 11 inches, 312 pages, including index, paper cover. Price, \$5.95.

This is a practical trouble-shooting manual covering antennas, complete TV installations, test instruments, alignment and servicing, and reducing and eliminating interference. Data are given on r.f. tuners, keyed a.g.c. systems, horizontal a.f.c. systems and color television. Included is a short-cut reference chart to aid in locating minor troubles by their symptoms. The book also contains information on soldering and replacing components in printed circuits, replacing tube sockets and coils, and removing and installing picture tubes.

— E.L.C.

*Residual voltage to ground or leakage is often a source of trouble in high-resistance a.g.c. circuits with no-signal or small-signal input. The lower-resistance circuit described here includes means for setting the line at ground potential.*

## Lower-Resistance Circuit with Better Performance at Low Signal Levels

BY HUBERT WOODS,\* W9IK

# An Improved Audio-Driven A.G.C. Circuit

**A**UTOMATIC gain control circuits requiring an extremely high d.c. resistance between the a.g.c. line and ground are sometimes subject to troubles arising from slight grid emission or gasiness of controlled tubes, or from contact potentials developed in diodes connected to the a.g.c. line. A consequence of any of these is that the a.g.c. line may not be at ground potential in the absence of signal or with a weak signal, and tube aging may cause drift. If the a.g.c. line is not at ground potential with no signal, the actual grid bias on the controlled tubes will differ from the design value by the voltage between the a.g.c. line and ground, and this difference may not be negligible.

To give a specific illustration, the "audio-hang" a.g.c. circuit described by Luick<sup>1</sup> and shown in the 1960 ARRL *Handbook* was applied to a receiver using three gain-controlled 6BZ6 tubes. It was found that the a.g.c. line was standing at nearly one volt positive to ground, due mainly to contact potential developed in the discharge triode  $V_{1B}$  in Luick's circuit. As a consequence, the actual grid-to-cathode bias was only about 1.5 volts instead of the 2.5 volts desired.

In another instance, a slightly gassy tube was found to be discharging the a.g.c. line very rapidly, after it had been driven negative by rectified audio signals, and the timing circuit connected to the grid of the discharge triode  $V_{1B}$  had little or no effect on the actual a.g.c. time constant. In a third instance, a tube having some internal leakage between grid and cathode (4

megohms) was also found to cause rapid discharge, thus rendering the intended timing circuit quite ineffective. These slightly imperfect tubes were new, and worked well enough in other places.

These troubles stem from the necessarily extremely high d.c. resistance between the a.g.c. line and ground in this circuit, whereby a very slight unintended current flow to or from the line may change its resting voltage, or its own time constant, quite seriously. An a.g.c. circuit having much lower d.c. resistance to ground minimizes such troubles.

An audio-driven a.g.c. circuit having a very much lower d.c. resistance between a.g.c. line and ground (about 0.1 megohm or less) is shown in Fig. 1. The small plate current (about 2 ma.) of triode  $V_{1A}$  flows through cathode resistor  $R_3$  (4700 ohms) and produces a voltage drop across it of about 8 volts. The a.g.c. line is tied through  $R_1$  to the cathode, and the lower end of  $R_3$  goes to a source of negative voltage equal to the normal drop across  $R_3$ . It is this latter feature which permits setting the resting or no-signal potential of the a.g.c. line equal to ground potential. When the voltage drop through  $R_3$  equals the voltage of the source connected to its lower end, the two voltages cancel, and the cathode stands at ground potential.

$V_{1B}$  amplifies the incoming audio signal. When the amplified signal exceeds the delay bias established at the junction of  $R_5$  and  $R_6$  (about 10 volts with the resistor values shown), diode  $V_2$  conducts and charges  $C_1$  rapidly. The negatively-charged end of  $C_1$  is directly connected to

\* 2346 Clover Lane, Northfield, Illinois.

<sup>1</sup> Luick, "Improved A.V.C. for Side Band and C.W.," *QST*, October, 1957.

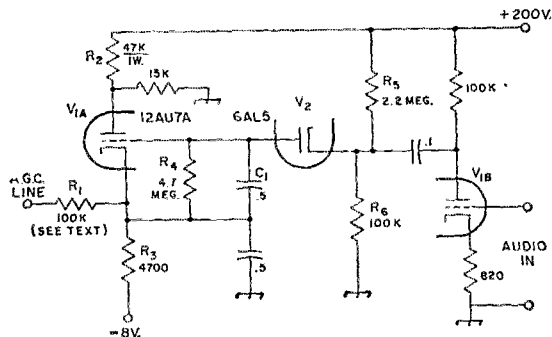
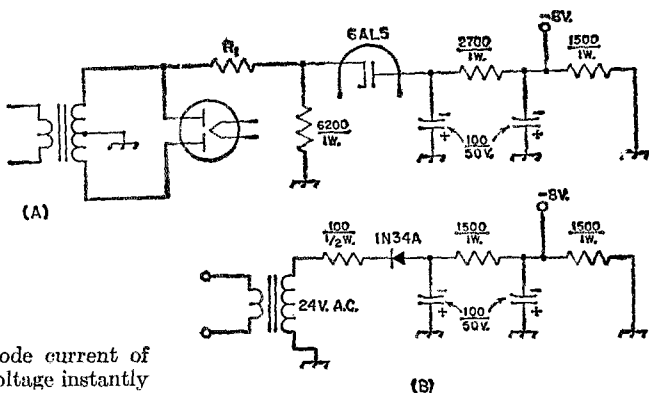


Fig. 1—Circuit of the improved audio-driven a.g.c. circuit. Resistances are in ohms and capacitances are in  $\mu$ f. Resistors are  $\frac{1}{2}$  watt. Component labels refer to text.

Fig. 2—Suggested circuits for obtaining the required biasing voltage. In A, a rectifier is fed from a voltage divider across half of the receiver's high-voltage transformer secondary. In B, a separate 24-volt transformer is used.

Resistances are in ohms and capacitances are in  $\mu\text{f}$ . The value of  $R_1$  should be adjusted to give the required output voltage (approximately 50,000 to 150,000 ohms, 5 watts, depending on transformer voltage). Capacitors are electrolytic.



the grid of  $V_{1A}$ . Thus the cathode current of  $V_{1A}$  decreases, and the cathode voltage instantly goes negative to ground, carrying the a.g.c. line with it. If the audio signal is strong enough to result in cutting off  $V_{1A}$  completely, the a.g.c. line will drop to  $-8$  volts. Different ranges of control may readily be had by change of the negative voltage to which  $R_3$  is connected, and by compensating changes in  $R_3$  or  $R_2$ , or both, to achieve equality of the voltage drop in  $R_3$  with the negative voltage chosen. The value of  $-8$  volts was found amply adequate for the three tubes mentioned.

Once  $C_1$  is charged by rectified audio signal, it can discharge only through resistor  $R_4$ . The combination of  $C_1$  and  $R_4$  shown will provide a discharge time constant of about 2.5 seconds, but greater or lesser time constants may be had by using larger or smaller values for  $R_4$ . For c.w. and s.s.b.,  $R_4$  might well be 10 megohms, although where fast recovery is needed the resistance should perhaps be something less than 4.7 megohms. It is sometimes desirable to provide a range of time constants, by switching  $R_4$ .

The value of resistor  $R_1$  is not critical, but can conveniently be 100K ohms or less. If the total capacitance from the a.g.c. line to ground is, say, 0.03  $\mu\text{f}$ ., the use of 100K for  $R_1$  will introduce only an imperceptible lengthening of the attack time.

### Bias Source

The supply for the  $-8$  volts need not be par-

ticularly "stiff" but the output should be well filtered. If the receiver is already provided with a negative voltage source, this can be tapped at  $-8$  volts or whatever is desired. Otherwise, the negative voltage can be obtained in any of several ways. It may be obtained by use of a diode rectifier and filter connected, through a suitably high resistance, between one side of the high-voltage a.c. winding of the power-supply transformer and ground, as shown in Fig. 2A. In my case, the power transformer had an unused 24-volt secondary, and the  $-8$  volts was readily obtained from this by use of a 1N34 diode, three resistors, and two low-voltage 100- $\mu\text{f}$ . electrolytic capacitors as shown at B. Perhaps a 12.6-volt a.c. winding, already used for heaters, could be used in this manner. Diode  $V_2$  can be half of a 6AL5, and the other half could be used as a rectifier to provide, along with a filter, the needed negative voltage.

The only trick in adjusting the circuit initially is to choose a value for  $R_2$  so that the voltage drop across  $R_3$  is equal to the negative voltage to which the lower end of  $R_3$  is connected. The resting cathode current of  $V_{1A}$  should be kept low, a value of, say, 2 ma. being desirable.

In practice the circuit works very well, and is free from most of the troubles likely to plague a.g.c. circuits requiring very high d.c. resistance to ground. QST

## Strays

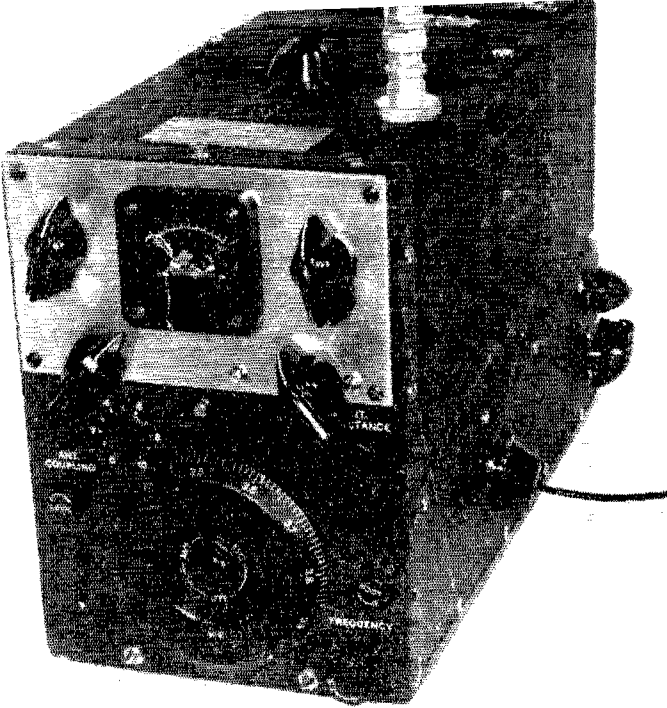
The Boy Scouts' third Jamboree-on-the-Air will be held October 22-23, from midnight to midnight GMT.

Any radio amateur with a past or present association with the Scout movement or operating on behalf of a Scout unit may take part by simply calling "CQ Jamboree." All stations and participants must strictly observe their license regulations. Either phone or c.w. may be used. The Jamboree is not a contest and there are no awards for operators making the most contacts. Its sole purpose is to promote contacts between Scouts of different countries.

The Boy Scouts International Bureau will operate from a station in Ottawa with the call VEBJAM, on the following approximate frequencies:

28,450 kc.	14,175 kc.
21,250 kc.	7100 kc.
	3750 kc.

The Jamboree has become a major world Scouting event and participation by as many amateurs as possible will be greatly appreciated. Hams wishing to take part are asked to contact the nearest Scout unit or the National Scout Headquarters of their countries.



Front view of the modified Command transmitter. Across the top of the aluminum subpanel are the Monimatch sensitivity control, the meter, and the forward-reflected power switch. Below are the meter switch and the antenna loading control. The final tuning adjustment is near the middle of the side apron, and the buffer-doubler band switch (above) and tuning knobs are near the back. On top of the cabinet are the final band switch and the r.f. output connector.

## 80 or 40 Meters with V.F.O. or Crystal

*Band switching, up to 200 watts c.w. input, v.f.o. or crystal control, built-in metering and Monimatch coupler, CHEAP. How? Take one surplus Command set . . .*

BY GEORGE SHUART,\*  
W4AMN, ex-W2AMN

# Deluxing the ARC-5 Transmitter

**N**EARLY everyone will agree that the SCR-274N and ARC-5 "Command" transmitters are nifty pieces of gear which present no end of conversion possibilities for old-timer and newcomer alike. Here are some "deluxing" ideas which have paid big dividends. The 3- to 4-Mc. version (BC-696 or T19) becomes an 80- and 40-meter rig capable of as much as 200 watts input with either v.f.o. or crystal control. A built-in meter measures final grid and cathode currents and also indicates relative power output and proper adjustment of the antenna system.

To change from v.f.o. to crystal control it is only necessary to move the oscillator tube from one socket to another. Two-band operation requires an additional stage for doubling to 40 meters, and this stage also provides variable excitation to the final amplifier. Additional controls have to be mounted on the side aprons of the chassis, but this is no hardship except for squeezing them in and making the connections.

### Circuit Details

What would appear to be two stages,  $V_1$ (XTAL) and  $V_1$ (VFO), in Fig. 1 is really the 6AG7 oscillator stage. Two sockets have their plate, screen and heater terminals connected in parallel while the grids and cathodes are connected to the respective frequency control devices.  $V_1$ (XTAL) is a grid-plate crystal oscillator, and  $V_1$ (VFO) is a Hartley v.f.o. The original 1626 v.f.o. circuit had the heater current flowing through a winding on the

oscillator coil. This was changed because the 6AG7 draws more current and might have caused overheating and instability. An untuned output circuit using a small inductance,  $RFC_2$ , provides adequate output and reduces interaction with the oscillator.

Another 6AG7 was used for the buffer-doubler so that the heaters of the first two stages could be connected in series and only a 12.6-volt heater supply would be required. Circuitry is conventional, but notice that the unused turns of the plate coil,  $L_2$ , are *not* shorted out on 40 meters; shorting reduced the output.<sup>1</sup>  $R_2$  varies the screen voltage on this stage to control the excitation to the final.

The final amplifier uses the original 1625s with a pi-section output circuit for ease in band changing and making loading adjustments. The small suppressor chokes in the plate leads were retained, and 25-ohm resistors were added to the grid circuits to further aid stability. The original neutralizing capacitor was discarded since none was needed. Here, too, better efficiency was obtained by not shorting the unused turns on tank coil  $L_3$  in the 40-meter position.<sup>1</sup> The output coupler is a simplified version of the Monimatch<sup>2</sup> and reads both forward and reflected power. The

<sup>1</sup> This is probably because switching was done at the high-impedance end of the coil. If the "cold" end were switched (as is more conventional), there should be little difference between shorting the turns and not shorting them when changing frequency over only a 2:1 range. — Editor.

<sup>2</sup> Bunce, "The Mickey Match," *QST*, Nov., 1958.

\* Route 2, River Bend, Dunnellon, Florida.



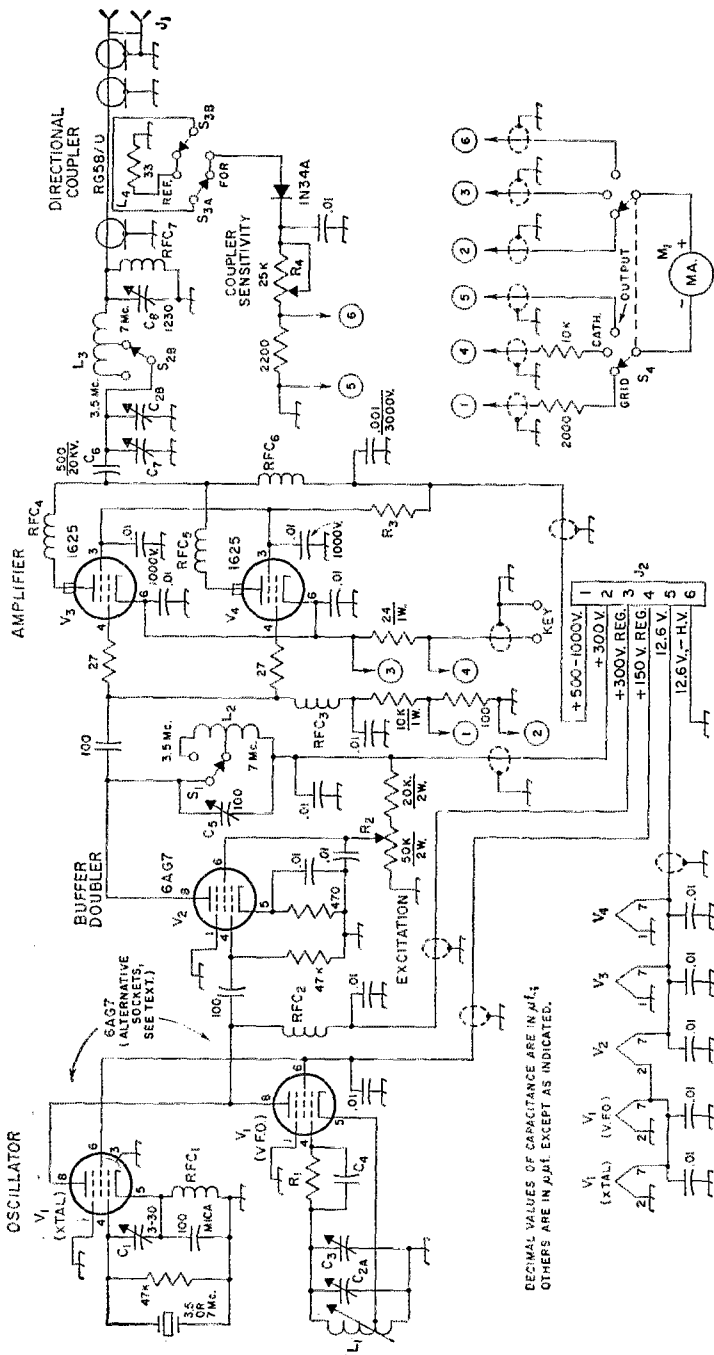


Fig. 1—Circuit diagram of the "deluxed" Command transmitter. Unless otherwise indicated, resistors are 1/2 watt; 0.01- $\mu$ f. capacitors are disk ceramic, 600 volts; other fixed capacitors are tubular ceramic except as specified.

- C<sub>1</sub>—3-30- $\mu$ f. mica trimmer.
- C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>7</sub>—Part of original unit.
- C<sub>5</sub>—100- $\mu$ f. variable (Hammarlund APC-100-B).
- C<sub>6</sub>—500- $\mu$ f., 20,000 volts (TV "doorknob" type).
- C<sub>8</sub>—1230- $\mu$ f. variable (Allied 60H726 or equivalent with three sections connected in parallel).
- J<sub>1</sub>—Coaxial receptacle (Amphenol 83-1R).
- J<sub>2</sub>—6-contact power plug (Amphenol 86-RCP6).
- L<sub>1</sub>—Part of original unit.
- L<sub>2</sub>—32 turns No. 24 enamel, close-wound on 7/8-inch diam. ceramic form and tapped 15 turns from bottom end.
- L<sub>3</sub>—19 turns No. 16 enamel, wound on original coil form and tapped 9 turns from the C<sub>3</sub> end.
- L<sub>4</sub>—Insulated wire inside coaxial line (see text).
- M<sub>1</sub>—0-1 d.c. milliammeter, miniature type.
- R<sub>1</sub>—Part of original unit.
- R<sub>2</sub>—50,000-ohm, 2-watt, wire-wound potentiometer.
- R<sub>3</sub>—Screen-dropping resistor (see text).
- R<sub>4</sub>—25,000-ohm volume control.
- RFC<sub>1</sub>, RFC<sub>2</sub>, RFC<sub>3</sub>, RFC<sub>7</sub>—2.5-mh. r.f. choke (National R-50 or similar).
- RFC<sub>4</sub>—R.f. choke, about 70  $\mu$ h. (Ohmite Z-7 usable).
- RFC<sub>5</sub>, RFC<sub>6</sub>—Part of original unit.
- RFC<sub>6</sub>—2.5-mh., 300-ma. r.f. choke (National R-300 or similar).
- S<sub>1</sub>—S.p.d.t. rotary switch (Centralab 1460).
- S<sub>2</sub>—Ceramic rotary, 1 pole, 6 positions, 1 section, shorting, 2 positions used (Centralab 2500).
- S<sub>3</sub>—D.p.d.t. rotary switch (Centralab 1462).
- S<sub>4</sub>—Phenolic rotary, 2 poles, 5 positions, 1 section, non-shorting, 3 positions used (Centralab 1003).

miniature meter can also be switched into the 1625 grid and cathode circuits where it functions as a voltmeter measuring the drop across low-value series resistors. The full-scale readings with  $S_4$  in the grid and cathode positions are 20 and 400 ma., respectively.

### Construction

The first job is to remove all wiring and parts except the v.f.o. coil box, dial and drive assembly, variable capacitors, tube sockets, and the oscillator grid leak and capacitor mounted on a small metal bracket and wired to the stator of  $C_2$ . There will be much drilling, filing and reaming. It is important that all chips and metal dust be removed with a clean paint brush or other means since such residue can make trouble later on. A  $3 \times 5\frac{1}{8}$ -inch aluminum panel should be added to the front of the transmitter to cover the unused holes. This may be polished with oil and fine sandpaper or treated with a lye solution for neat appearance. Replace the power cable socket on the rear apron with a bakelite six-contact plug. Use of a male plug instead of the socket shown in the photos will make it impossible for exposed terminals to be "live."

The output inductor,  $L_3$ , requires some reworking. First, remove the small rotary coil by holding it tightly in place and twisting off the two shafts with a screwdriver. Leave the outside terminals in place for use when rewinding. All the small contact studs around the bottom of the form should be taken out and moved to the top of the form in holes which are already there. They will be needed for mounting the band switch. The two parasitic chokes mounted inside the form should be disconnected from the point where they are joined together and rejoined at the terminal which has previously been placed at the opposite side of the form. This will be the connection point for  $RFC_6$ .

Starting at the bottom of the upper threaded section of the form, wind on 19 turns of No. 16

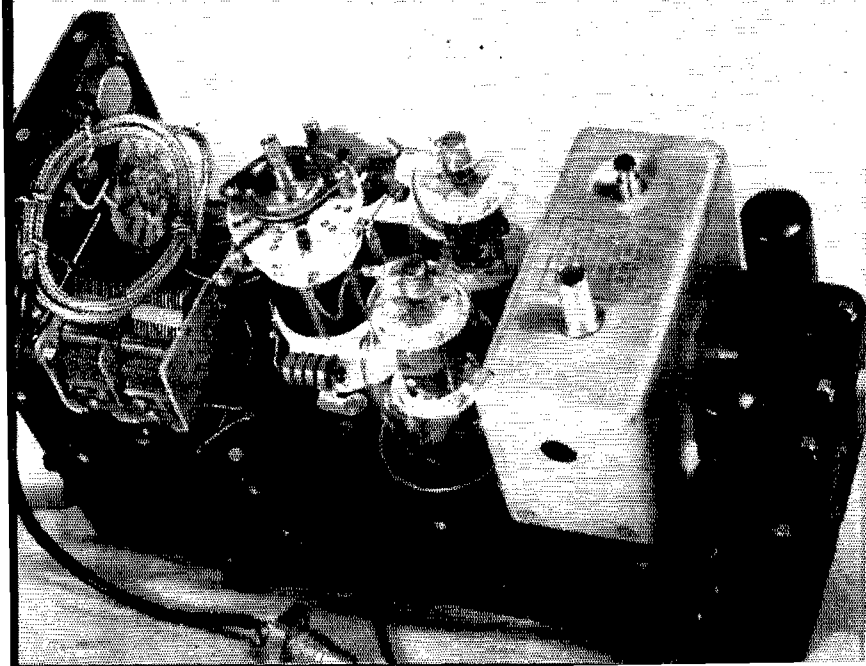
enameled wire. Begin at the front contact that was formerly used for the rotary coil. Form a  $\frac{1}{2}$ -inch loop nine turns from the beginning for the 7-Mc. tap. Make the winding as tight as possible, and no "dope" will be needed.

The band switch,  $S_2$ , selected should have an excess of stationary contacts because they are used to hold the switch against the top of the coil form. Short lengths of heavy wire (No. 14 or 16 solid) are run between the unused contacts and the unused studs which have previously been moved from the bottom to the top of the form. The connections between the switch and the coil also contribute to mechanical strength when heavy wire is used. Be certain that no *operating* connections are shorted out when mounting the switch.  $S_2$  must clear the under side of the cover, and a hole drilled in the latter must also clear the switch bushing. The switch is hot with r.f., so do not attempt to operate it without a well-insulated knob!

The buffer-doubler coil,  $L_2$ , is wound on a ceramic form and supported by heavy connecting leads.  $S_1$ , which changes taps on this coil, is a bakelite wafer unit with straight sides; the round variety just will not fit. In positioning items such as this, be sure they will go into the space available before doing any drilling.

Looking at the bottom of the transmitter, there are two sets of terminals projecting through the chassis from the v.f.o. box. Only one terminal is used since all other necessary connections are made internally. The third contact from the rear on the side opposite the worm drive mechanism goes to Pin 5 of  $V_1(VFO)$ . The grid leak and capacitor which were left in place go to Pin 4 of the same socket. This completes the wiring of the v.f.o. grid and cathode circuits.

Although capacitors for tuning the v.f.o. and final amplifier are ganged, final tuning will be done from the side of the chassis with what used to be the padder capacitor,  $C_7$ . The ganged unit,  $C_8$ , serves to keep the amplifier approxi-



Top view of the set with covers removed. Note the Monimatch coax coiled up near the front and the final band switch mounted above the tank coil by heavy wire leads. The three-gang b.c. replacement capacitor specified in the parts list as  $C_3$  should be used instead of the two-gang unit shown here. The three octal sockets along the rear edge of the chassis are all used in this conversion. For v.f.o. operation, a 6AG7 is inserted in the socket farthest from the camera as shown; for crystal control, it is moved to the empty center socket. The 6AG7 nearest the camera is the buffer-doubler. The crystal socket is on the rear apron to the right of the power connector.

mately in resonance when changing frequency over a limited range, but  $C_7$  should be equipped with a short extension shaft and knob for final tuning. The photos show a two-gang loading capacitor in the output circuit. It was discovered too late that a three-gang unit was only 1 inch longer and would have fitted into the available space. Use a three-gang capacitor for  $C_9$  and there'll be no need for any fixed padders.

Shielded wire should be used for all leads to the meter switch, for the keying lead (which is brought out a hole at the right side of the transmitter) and for all heater and power wiring. The final plate supply lead should be made of light-duty coax instead of ordinary 600-volt shielded wire.

The directional coupler is made of 39 inches of RG-58/U or RG-59/U (for 52- and 72-ohm output, respectively). Score the vinyl covering with a knife blade and peel it off the cable. Measure  $6\frac{1}{2}$  inches out on either side of center and open the shield braid slightly with a pointed tool at these points. Thread a length of insulated (either enamel or plastic) No. 20 wire in one hole and out the other, being careful not to scratch off the insulation. Smooth out the shield braid and coil the coax up to fit the space available. The ends of the No. 20 wire should go directly to the rotor terminals of  $S_3$  with no excess lead length. Be careful to avoid overheating the 1N34A when soldering it into position. A BNC-type coaxial fitting is shown as the output connector in the photos, but most constructors will probably want to substitute the UHF fitting specified in the parts list.

The value of the screen-dropping resistor,  $R_3$ , is determined by the final plate voltage used. According to the tube ratings, this may be anything up to 750 volts, but 1000 volts has been used on c.w. without any ill effects. Just watch out for those long dashes! In all cases, the screen voltage should be about 250 and the screen current for two tubes is in the neighborhood of 16 ma. With 1000 volts on the plates, the drop across  $R_3$  must be  $1000 - 250 = 750$  volts. Dividing 750 by the screen current, 0.016 amperes, gives 47,000 ohms as the value for  $R_3$ . Multiplying 750 by 0.016, we find that a 20-watt resistor will be more than adequate. Follow the same procedure for any other plate voltage that may be used.

### Firing Up

Besides a final plate supply you will need a source of 150 volts regulated for the oscillator screen and 300 volts regulated for the plate. These potentials can be obtained from two VR150 regulator tubes connected in series with a dropping resistor across the output of a suitable supply. The buffer-doubler stage will also need 300 volts which can come via a dropping resistor from the same supply.

Getting the rig on the air is rather simple. Disconnect the antenna from your receiver; turn the r.f. gain down and the b.f.o. on. Set the tuning to 7100 kc. The controls on the transmitter

should be set as follows: antenna loading — maximum capacitance, Monimatch sensitivity — maximum resistance, meter switch in grid-current position, band switches in 7-Mc. positions, key closed, antenna disconnected. The oscillator tube should be in the v.f.o. position. Apply 12.6 volts to the heaters (they require 1.55 amperes), and allow them to warm up. Now apply plate and screen voltage to the oscillator, and rotate the main tuning dial of the transmitter until a signal is heard in the receiver. Be certain that it is the real signal and not an image. The calibration is not likely to be correct, so adjust the controls at the top of the v.f.o. shield box to make the dial read 3550 (half of 7100) when a signal is heard on 7100 kc.

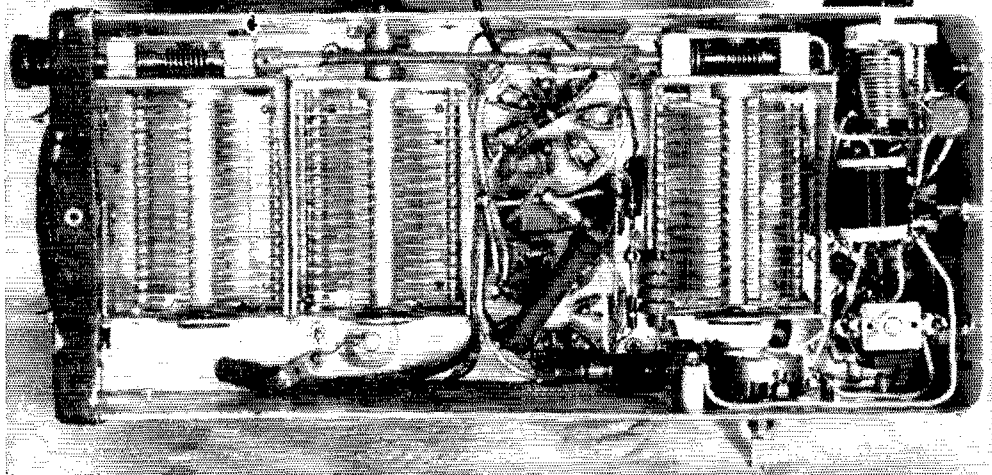
Next apply about 300 volts to the doubler stage and tune  $C_5$  for maximum signal in the receiver. This should also produce an indication on the final grid meter, so repeak  $C_5$  for maximum current. Adjust excitation control  $R_2$  for a reading of 6 to 10 ma. Tune final plate capacitor  $C_7$  across its range. At resonance there will be a slight variation in signal strength; leave  $C_7$  set at this point.

Now you will need a load for the transmitter. This could be an antenna, but it is better to use one or two 100-watt bulbs instead and keep the signal off the air while you're testing. Open the key and apply about 300 or 400 volts to the final. Switch the meter to read 1625 cathode current. Close the key and immediately adjust  $C_7$  for minimum reading on the meter. Now decrease the capacitance of loading control  $C_9$  and retune  $C_7$  for minimum current. Switch the meter back to the grid circuit, adjust the doubler tank for maximum reading and set the excitation control for a current of about 6 ma. The full high voltage may now be applied to the final. Repeat the loading and final tuning adjustments in succession to bring the cathode current up to 175 or 200 ma.

This tuning procedure also applies with any coax-fed antenna or antenna coupler. In addition, you can switch the meter to the output circuit, set  $S_2$  to "Forward," and adjust the grid drive and final tuning for maximum transmitter output. Just be sure and keep the cathode current at 200 ma. or less, and don't hold the key down for too long an interval if you are using more than 750 volts on the 1625s. When  $S_3$  is in the "Reflected" position the meter reads relative power reflected by the load. Proper adjustment of the antenna or antenna coupler should reduce this reading to a very low value.

For 80-meter operation, the rig is tuned up in exactly the same way except for the positions of  $S_1$  and  $S_2$ . With the first 6AG7 in the crystal oscillator socket, either 80- or 40-meter crystals can be used. In this case the main dial tunes the final amplifier but does not affect the frequency.  $C_1$  should be adjusted for best oscillator operation. A 50-ohm, 1-watt resistor in series with the key contacts (at the key) helped eliminate sparking and clicks.

Of course, you don't have to keep the trans-



Bottom view of the transmitter. The buffer-doubler tuning capacitor,  $C_5$ , can be seen at the top right, and the band switch for that stage is hidden beneath it.  $L_2$  is just below  $C_5$  by the power connector, and the mica trimmer for the crystal oscillator is in the bottom right corner. The potentiometer mounted on the lower chassis edge is the excitation control,  $R_2$ . The lead going through the side of the chassis is for cathode keying the amplifier.

mitter on c.w. all the time. With 600 volts on the 1625s it makes a good a.m. rig, or you might want to consider adding d.s.b. to the final stage<sup>3</sup>. With some modifications, the 1625s could even be used as an s.s.b. linear amplifier. Any way you operate

it, you'll find this version of the Command set to be a handy and sweet-running piece of gear.

**QST**

<sup>3</sup> Rockafellow, "High-Level Balanced Modulator for D.S.B.," *QST*, April, 1960.

## Silent Keys

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

W1DW, Rayburn F. Jefferson, Islington, Mass.  
 W1GBO, Bert Appleby, Riverside, R. I.  
 W1KXN, Herbert T. Dewhurst, Squantum, Mass.  
 WA2HQN, Kenneth H. Fegley, Waterloo, N. Y.  
 W2KT/W3PZO, Bernard P. Sloane, Ridgewood, N. J., and Forest Heights, Md.  
 W2KZG, Oscar J. Davis, Avenel, N. J.  
 K2LEA, Stephen T. Carmody, Syracuse, N. Y.  
 W3LGG, Virgil J. Sacco, Ambridge, Pa.  
 W4NAK, Frank J. Cipray, Lakeland, Fla.  
 W4QDZ, Edward A. Stanley, Tampa, Fla.  
 K4YUQ, Helen E. Babcock (Mrs. Verle E. Babcock), Huntsville, Ala.  
 W4ZB, W. Pat McViekar, Petersburg, Fla.  
 W5CCL, Basil B. Butler, San Antonio, Texas  
 W5ILA, Charles D. Marriott, Flaton, Texas  
 K5PDI, Mary M. Carmack, San Antonio, Texas  
 W6EER, Omer N. Wright, Salinas, Calif.  
 K6KMP, John S. Hunter, Newport Beach, Calif.  
 W6MGN, Thomas M. Catich, Fresno, Calif.  
 K7EHz, Lester S. Ross, Seattle, Wash.  
 W7GMO, Leslie E. Cook, Salt Lake City, Utah  
 K7HIO, Lee M. Kesler, Salt Lake City, Utah  
 K7JHC, G. La Mar Adams, Boulder City, Nev.  
 W7MIY, Joel A. Farris, Seattle, Wash.  
 W7TWC, Ralph E. Davis, Concrete, Wash.  
 W8FVZ, Walter L. Perkins, Lodi, Ohio  
 K8PHO, Paul F. Lambert, Detroit, Mich.  
 W8WDE, Howard W. Phillips, Mount Clemens, Mich.  
 K9BYX, Russell E. Lewins, Western Springs, Ill.  
 W9BZZ, Harold F. Kaiser, Chicago, Ill.  
 W9CDI, Warren F. Camp, Streator, Ill.  
 W9TL, Major Paul M. McCallen, O'Fallon, Ill.  
 K9CDV, Eino Kostki, Mountain Iron, Minn.  
 CN8EH, Jean-Claude Sanchez, Kenitra, Morocco  
 VE4LF, Daniel Adwin Wood, Winnipeg, Manitoba  
 VE5NZ, Norman H. Chappell, Saskatoon, Saskatchewan

## NEW BOOKS

**How To Use Meters, 2nd edition**, by John F. Rider and Sold D. Prensky. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. Catalog No. 144. 216 pages, including index, 5½ by 8½ inches, paper cover. Price, \$3.50.

The title of this book pretty well sums up its contents. It should be of practical interest to anyone who uses meters. Completely up-to-date, the book contains information on principles and construction of a.c. and d.c. meters, all types of electrical meters, adaptation of different types of meter movements for different measurements, and industrial applications. Descriptions of the latest advanced instruments and data on transistorized voltmeters, digital displays, and refined laboratory instruments are included.

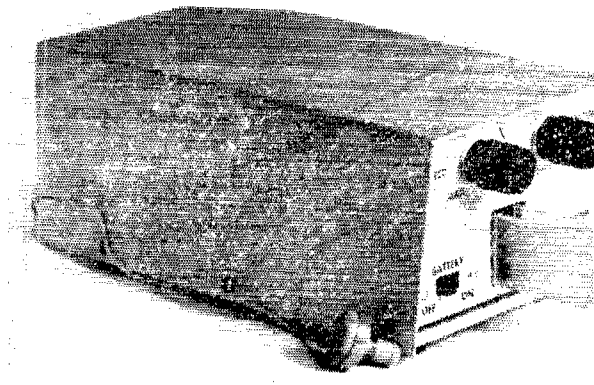
**Radiotelephone License Manual, 2nd edition**, by Woodrow Smith, published by Editors and Engineers, Ltd., Summerland, California. 148 pages, plus appendix, 6½ by 9½ inches, cloth cover. Price, \$5.00.

This manual is a question and answer study guide to prepare the reader for examinations for the various grades of the F.C.C. radiotelephone licenses or permits. However, it can also serve as an excellent self quiz for those who wish to find where their technical weak points lie. The manual covers four examination elements: basic law, basic operating practice, basic radiotelephone and advanced radiotelephone. A 26 page appendix has electrical formulas, charts, tables and radio mathematics and calculations.

## Strays

W9JHN QSOd W6HAW and W6GAW on 14 meter c.w. the other night, one right after the other.

The complete transistorized "Ultimatic" key with monitor ear piece. The controls at the top are for speed (left) and monitor volume (right). The battery on/off switch is below at the left and the tune/operate switch (hidden by the paddle) at the right.



## Semiconductor Version of the "Key with a Brain"

BY ALVIN F. KANDA,\* KØMHU, ex-KH6OJ

# The "Ultimatic"—Transistorized

## Part I of Two Parts

*The combination of semiconductors and etched-circuit technique used in this version of John Kaye's "Ultimatic" electronic key vastly reduces the time and labor required for construction, and the final result is a clean assembly free from crowding. None of the original operating features has been sacrificed.*

THE *QST* file which helps hold down the bookshelf in the shack goes back only to 1953 but I've counted no less than 11 articles on automatic keys — almost two per year. Considering the multitude of other subjects in ham radio, this indicates a high interest in a device which only helps you turn your transmitter on and off. This should squelch some of the comments that c.w. is a dying art. By far the circuit that has offered the most has been W6SRV's electronic "Ultimatic" keyer<sup>1,2</sup> which evolved from his relay version.<sup>3</sup> In this age of transistors, it was

\*201 Clifton Ave., Minneapolis 3, Minnesota.

<sup>1</sup> Kaye, "The All-Electronic 'Ultimatic' Keyer," Part I, *QST*, April, 1955.

<sup>2</sup> Kaye, "The All-Electronic 'Ultimatic' Keyer," Part II, *QST*, May 1955

inevitable that the next step in the evolution of this keyer be a transistor version.

For those of you familiar with the various functions of the original tube model, a few notes on the advantages of its transistorized counterpart are in order. This key does everything the original does, but much more efficiently. While it takes about a dozen or so watts in the tube model to ultimately operate a 20-mw. relay, this one takes less than 0.2 watt (0.3 watt with monitor), making an internal battery pack and hence portability practical. With the smaller components, mainly the transistors and the low-voltage capacitors, a compact package is possible without drastic piling and squeezing. Since the impedance levels encountered in this key are much lower than in the vacuum-tube model, the circuit is less susceptible to false triggering by stray r.f. or by probing with a scope or v.t.v.m. All of the transistors are operated as switches; that is, they are either saturated or cut off, which enables the use of back biasing on the base to counteract the temperature-sensitive collector leakage current.

For the new crop of fancy-key fanciers which may have arisen since the publication of W6SRV's articles, I'll start from scratch and make the descriptions as self-sufficient as possible. But

<sup>3</sup> Kaye, "The 'Ultimatic' — The Key with a Memory," *QST*, February, 1953.

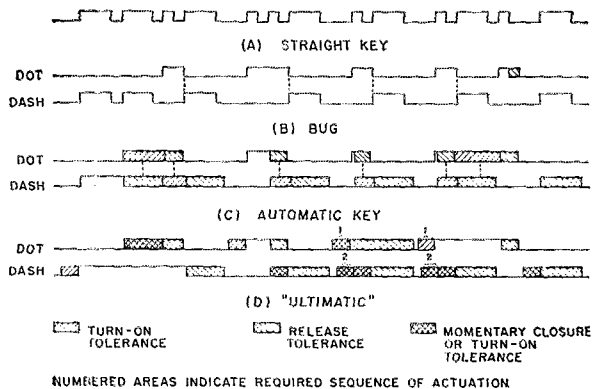
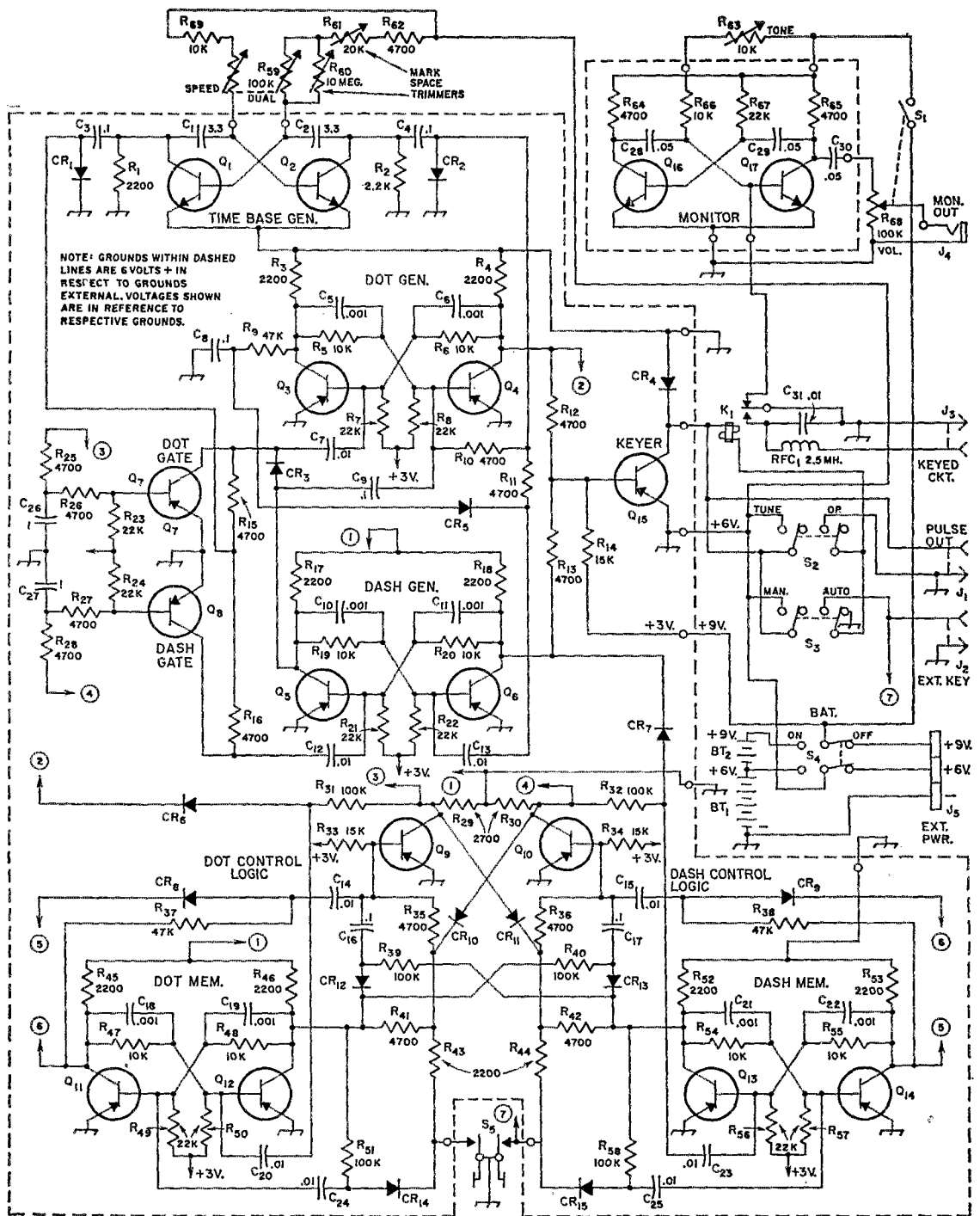


Fig. 1—Lever displacement vs. time for various keys producing perfect code.



to fully appreciate this key, the previously-mentioned articles are must reading.

### Why So Complicated A Circuit?

A glance at the circuit diagram in Fig. 2 will

probably make you wonder if the complexity is worth it. Therefore let us compare the following types of keys, listed in order of increasing complexity, in terms of ease of operation to obtain perfect code: (1) straight key, (2) bug, (3) auto-

Fig. 2—Complete circuit diagram, left, of the transistorized "Ultimatic" electronic key.  
Capacitances are in  $\mu\text{f}$ ., resistances in ohms.

BT<sub>1</sub>—Four 1.5-volt size AA cells in series (Burgess 930 or equiv.).  
BT<sub>2</sub>—Two cells, same as BT<sub>1</sub>.  
C<sub>1</sub>, C<sub>2</sub>—3.3  $\mu\text{f}$ ., 20 per cent, 15 d.c.w.v. (Texas Inst. 335FP015B4 or equiv.).  
C<sub>3</sub>, C<sub>4</sub>, C<sub>5</sub>, C<sub>9</sub>, C<sub>10</sub>, C<sub>17</sub>, C<sub>18</sub>—0.1  $\mu\text{f}$ ., 30 d.c.w.v. (Centralab DA-104).  
C<sub>6</sub>, C<sub>7</sub>, C<sub>10</sub>, C<sub>11</sub>, C<sub>18</sub>, C<sub>19</sub>, C<sub>21</sub>, C<sub>22</sub>—0.001  $\mu\text{f}$ ., 600 d.c.w.v. (Centralab D6-102).  
C<sub>7</sub>, C<sub>12</sub>—C<sub>15</sub>, inc., C<sub>20</sub>, C<sub>23</sub>—C<sub>26</sub>—0.01  $\mu\text{f}$ ., 50 d.c.w.v. (Sprague TG-S10).  
C<sub>26</sub>, C<sub>27</sub>—1  $\mu\text{f}$ ., 12 d.c.w.v. (Mallory TT12XI or equiv.).  
C<sub>28</sub>—C<sub>30</sub>—0.05  $\mu\text{f}$ ., 30 d.c.w.v. (Centralab DA-503).  
C<sub>31</sub>—0.01  $\mu\text{f}$ ., 1000 d.c.w.v. disk ceramic.  
CR<sub>1</sub>—CR<sub>15</sub>, inc.—See text.  
J<sub>1</sub>, J<sub>2</sub>, J<sub>3</sub>—Single-hole-mounting phono jack.  
J<sub>4</sub>—Miniature open-circuit headphone jack.  
J<sub>5</sub>—Male chassis-mounting connector (Amphenol 126-216).  
K<sub>1</sub>—S.p.d.t., 1000 ohms, less than 4.5-ma. pull-in (Sigma type 4F-1000-S/SIL).

Q<sub>1</sub>—Q<sub>17</sub>, inc.—See text.  
R<sub>1</sub>—R<sub>58</sub>, inc., R<sub>62</sub>, R<sub>64</sub>—R<sub>67</sub>, inc., R<sub>69</sub>—10 per cent tolerance,  $\frac{1}{2}$  watt.  
R<sub>59</sub>—Dual 0.1-megohm control, linear taper (IRC RQ 11-128, M 11-128 or equiv.).  
R<sub>60</sub>—10-megohm control, linear taper (IRC RQ 11-143 or equiv.).  
R<sub>61</sub>—20,000-ohm control, linear taper (IRC RQ 11-119 or equiv.).  
R<sub>63</sub>—10,000-ohm control, linear taper (IRC RQ 11-116 or equiv.).  
R<sub>68</sub>—0.1 megohm control, log taper (IRC PQ 13-128, M 13-128 or equiv.).  
RFC<sub>1</sub>—2.5-mh., 200-ma. ferrite-core r.f. choke (Miller 6302 or equiv.).  
S<sub>1</sub>—S.p.s.t., part of R<sub>68</sub> (IRC 76-1 or equiv.).  
S<sub>7</sub>, S<sub>8</sub>, S<sub>4</sub>—D.p.d.t. slide switch.  
S<sub>5</sub>—Key lever (see text).

Note: The etched circuit boards mentioned in Footnote 5 are designed to accommodate the capacitors specified in parenthesis.

matic key with self-completing characters, and (4) "Ultimatic." By comparing the number of times the levers of the various keys have to be actuated and released, and the time interval, if any, in which the lever can be actuated and released and still obtain perfect code, the advantages of the "Ultimatic" will become apparent.

In Fig. 1A, the lever displacement vs. time for a straight key producing the word "quart" in perfect code is shown. The timing of the closures and releases is left completely to the operator, which makes possible the recognition of different operators by their "fists" or their individual peculiarities in their timing.

For the bug, in Fig. 1B, the first line shows the displacements of the lever to actuate the dots (swings toward the right) and the second line shows the dash-actuating displacements to the left. As can be seen, the generation of the dashes is just as for the straight key, but for a string of dots, the motion is reduced to that of initiating and stopping the string. The timing responsibilities of the operator are not relieved very much except in a string of two or more dots where the length of the first dot and any dots up to the last dot in the string, as well as the space(s) between them, are automatic. Also, when a dot occurs at the end of a letter, as in the letter "r", the dot lever may be released within the time after the dot ends and the start of the next dot, as indicated by the hatched area.

For the automatic key with self-completing characters, the number of hatched intervals or "slop" time is greatly increased, as shown in Fig. 1C. The operator is relieved of timing the dot and dash lengths and the following space of one-dot length. But the starting character in a letter must be initiated right on time for perfect code.<sup>4</sup>

With the independent dot and dash levers and memory circuits in the "Ultimatic," additional flexibility in operation is obtained as shown in Fig. 1D. Now note that there is an almost 2-dot

length leeway in which a letter may be started and still come out perfectly spaced, thanks to the memories. The combination of the memories and the independent levers reduces much of the back and forth motion associated with the other types of keys. As an example, for the letter "q", the dash lever can be actuated any time within the cross-hatched interval as shown in the diagram and the dot lever actuated and then released (just a quick flick is necessary) any time after the start of the second dash up to the time of the required dot, the dash lever held closed all the while. The dash lever can then be released any time after the start of the last dash up to one dot length after the end of the last dash. The letter "a" is made most simply by actuating both memories in the proper sequence. First the dot lever is closed, next the dash lever is closed, and then both levers are released simultaneously. With a little practice, this sequence of events amounts to simply quickly squeezing or pinching together the levers with a little English on the dot side. By prolonging the squeeze, the letters "w" and "j" and the number "1" would result, depending on when the levers were released. The above examples also apply to the letters "y", "n", "d", "b" and the number "6" by replacing dot for dash and vice versa in the description.

In summarizing, the "Ultimatic" takes over most of the timing responsibilities, leaving the operator to do the dot and dash selecting and rough timing. For the operator already proficient with a bug or other types of automatic keys, perhaps the additional complexities of this key may not be worth it, but for the operator who has never used an automatic key before, high-speed proficiency would probably be achieved sooner and with less effort than with other types. Another attractive but unproven thought is that the errors in sending associated with long hours of contest operating, DX-ing, or after several beers should be greatly reduced.

### How Does It Work?

Unfortunately, describing how it works is more

<sup>4</sup> This does not apply to free-running multivibrator types. See, Thornwall, "The 'Magkey,'" *QST*, March, 1960, and Herbstreit, "Automatic Spacing of Letters and Words for the Electronic Key," *QST*, April, 1961. — Ed.

difficult than using it. To ease the job of describing, the treatment is very general, leaving the whys and details for the interested reader to pursue in a "Quist Quiz" manner.

Note from the schematic of Fig. 2 that the majority of transistors in the circuit are p-n-p types. Therefore, the voltages mentioned in the description are referenced from the p-n-p emitters shown connected to the chassis ground symbol in the diagram. Notice, however, that this point is actually at +6 volts with respect to the ground outside the dotted block representing the etched circuit board. Since all of the transistors are operated as common-emitter switches which are either on or off, an "on" p-n-p transistor or its collector voltage (about 0 volts) will be represented by the digit 0 and an "off" p-n-p transistor or its collector voltage (about -5 volts) by the digit 1 in the following description.

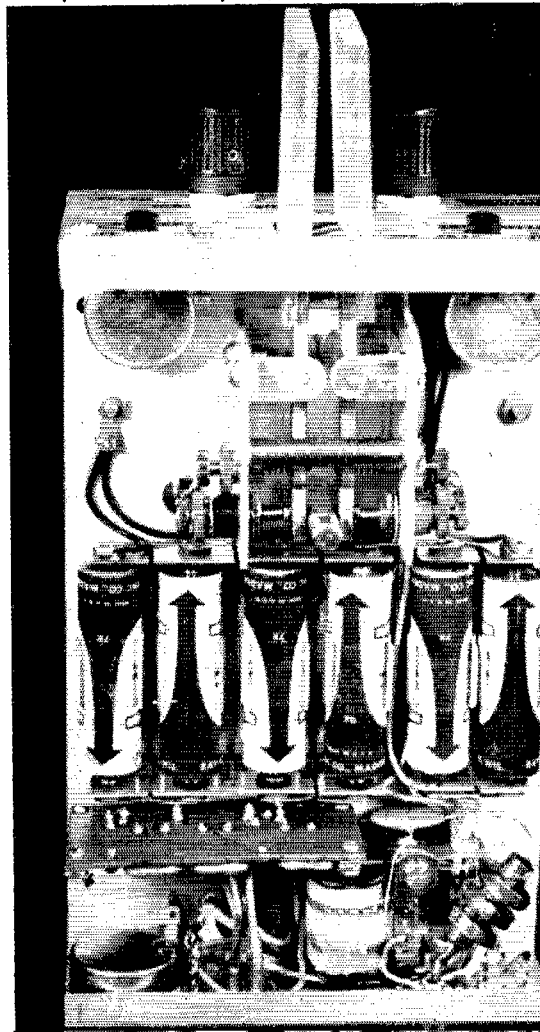
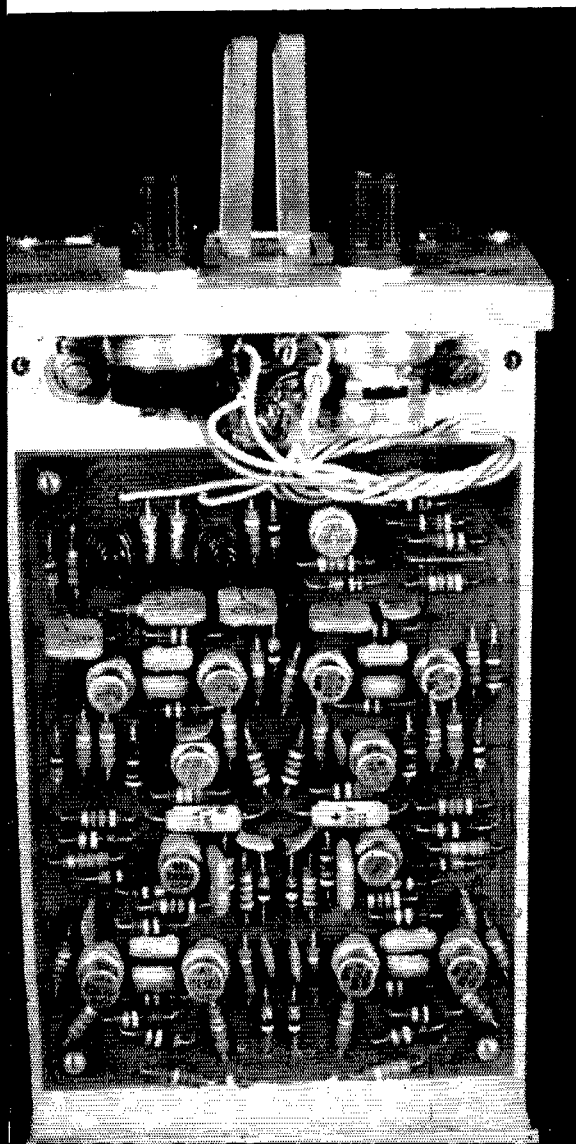
The dot and dash generators and memories are identical bistable multivibrators or flip-flops. As the name implies, the circuit is in one of two possible states — (1) the left-hand transistor is

on and the right-hand transistor is off or (2) vice versa. The flip-flop remains in either state until changed or flipped to the other state by either turning on the 1 transistor by applying a short negative pulse to its base or turning off the 0 transistor with a positive pulse on its base. Once the state is changed by a pulse, succeeding pulses of the same polarity have no effect; in other words, a negative pulse on the base of a 0 transistor or a positive pulse on the base of a 1 transistor will not change the state of the multivibrator.

The circuits of the time-base generator and the monitor are related to the bistable multivibrator, but instead of being in one of two stable states, the two transistors are alternately switching on and off without external triggering and hence the circuit is called an *astable* or *free-running* multivibrator. In the time-base generator, the rate at which the switching occurs can be varied by the speed control  $R_{59}$ . In the monitor, the switching occurs at an audible rate variable by the tone control  $R_{63}$ . EST

Part 2 will be carried in a subsequent issue. — Ed.

Top and bottom views. The transistor sockets are Elco 3303. The battery holders are Keystone models 182 and 140 for  $BT_1$  and  $BT_2$ , respectively. The mark/space trimmers,  $R_{60}$  and  $R_{61}$ , may be seen on either side of the paddle, close to the front panel, in the bottom view right.

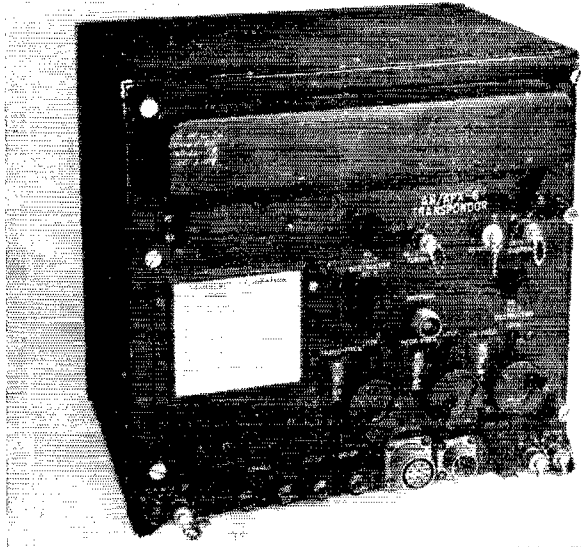




The APX-6 before conversion. Everything used in amateur work is mounted on the front panel, which is mounted on hinges. Fittings and fuses across the bottom are not used and may be salvaged for other purposes. The three crank knobs control the transmitter frequency, the diplexer tuning, and the local oscillator frequency. The long narrow compartment across the top houses the i.f. strip. The rest of the unit is a gold mine of parts and tubes not needed in the conversion for 1215 Mc.

## Conversion of Low-Cost Surplus Unit for Amateur U.h.f. Work

BY EDWARD P. TILTON,\* WIHDQ



# Communication on 1215 Mc. with the APX-6

THE APX-6 is a radar i.f.f. (identification, friend or foe) unit that has interesting possibilities for amateur 1215-Mc. communication. There is hardly anything more useless commercially than obsolete i.f.f. equipment, so the price is low and is likely to remain so. Thousands of APX-6s are available, mostly in Southern California, where over-the-counter prices run around \$10.00. This figure includes a goodly supply of useful tubes and parts, in addition to the r.f. portion we'll be dealing with here.

The r.f. assembly (entirely mounted on the hinged portion of the front panel) has a 2C42 cavity oscillator for transmitting, a similar 2C46 oscillator for receiver injection, a t.r. cavity, a crystal mixer, and a wide-band 60-Mc. i.f. system. The cavity circuits are continuously variable in frequency, by means of separate Veeder counter dials equipped with locks. The transmitter hits the lower part of the 1215-Mc. band at the high end of its range, tuning up to about 1227 Mc. It can be made to go higher by modifying the cavity. The receiver tunes the entire band, and by using the image response on the low side of the oscillator frequency a range of about 900 to 1320 Mc. can be covered. The band, 1215 to 1300 Mc., occupies about 210 divisions (14 turns of the crank) on the Veeder dial.

Conversion information presented here is largely the work of Don Goshay, W6MMU, who has been instrumental in getting a large number of APX-6s on the air in the Los Angeles area. More than 40 of them are to be found in various hamshacks in Western New England, and here the efforts of Dick Stevens, W1QWJ, have been a great help in getting things rolling.

### Working Over the Transmitter

The transmitter was designed for operation

\* V.H.F. Editor, *QST*

on high-voltage pulsed d.c. More feedback is needed to make it oscillate on the low-voltage d.c. we will use for voice work. The addition of a simple power supply and modulator will then put you on the air on 1215 Mc. If you want to cover the entire band with the transmitter a false bottom in the plate cavity is needed, but it will hit at least the first 10 megacycles of the band without change, other than the additional feedback.

Before you start work, decide whether you want to keep your APX-6 in its original case. (The box is completely equipped with electronic weather-stripping and would be ideal for a portable or other low-power station on lower bands.) To use the APX-6 in its case, take out everything not fastened to the front panel. This involves disconnecting a lot of cables and removing scores of screws, but all the pulse circuits and power supply gear will come out in one piece. This leaves the r.f. assembly mounted on the drop-front portion of the case, with plenty of room for the power supply and modulator inside. On the other hand, it is no great job to rack-mount the r.f. unit, as W6MMU did with his. The lighthouse tubes are mounted base-up in their cavities, with their molded-bakelite sockets held in place by spring fingers. Lift these fingers, turn them 90 degrees and lift off the sockets. Unsolder the B-plus lead to the local oscillator cavity (gray lead running to feed-through insulator) and unscrew the high-voltage terminal (heavy red lead) from the transmitter cavity. Power leads can be left connected to the terminal strip on the inside of the front panel when the r.f. assembly is removed for conversion. Remove the lighthouse tubes.

Remove the crank knobs. Some units come through with Allen wrenches for this purpose mounted on the box housing the drive assembly,

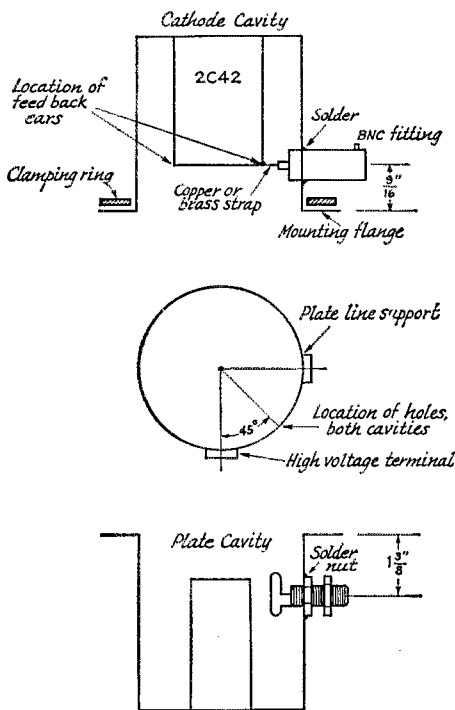


Fig. 1—Details of the cavity modifications in the APX-6 transmitter. At the top is a cut-away view of the cathode cavity, showing the method of coupling. When the cavity is taken apart the feedback "ears" or lobes will be seen as parts of the inner conductor, at the points indicated. They should be broken off flush with the end of the line.

Feedback loop connectors are mounted in both cavities at an angle of 45 degrees to the principal center lines of the assembly, as shown in the center sketch.

The bottom portion shows the plate cavity, with the adjustable feedback assembly mounted in place.

but don't count on it. The r.f. assembly will now lift off the front panel when the screws holding it are removed.

Take out the 16 screws that hold the upper and lower sections of the r.f. assembly together, and lift off the transmitter cathode cavity, stamped V<sub>401</sub> and 2C42. Inside the cathode cavity are bean-shaped lobes that "look" through similarly-shaped holes into the plate cavity. These are for feedback, but they are not used in our adaptation. Break them off at the bottom of the stem by bending the stem back and forth with long-nose pliers.

The holes in the divider plate should now be sealed. This was done in the original conversion by soldering 0.005-inch copper or brass plates over or under the holes, but the writer found it a simpler matter to cut a disk of thin sheet brass and merely clamp this in place when the cavity is reassembled. The disk was cut to the diameter of the lock-washer type grounding ring, and a circular hole was cut in the center just large enough to pass the grid-grounding ring of spring fingerstock.

Feedback between the cathode and plate cavities is provided by an external loop, with coupling arrangements described below. A BNC fitting (several are available after the APX-6 is stripped down) is used here. W6MMU ground the flange from a fitting, in order to solder the entire area of contact between the fitting and the cavity wall, but fittings in their original condition have been soldered in place and found to work equally well. Drill a  $\frac{3}{8}$ -inch hole in the cathode cavity, and mount the fitting as shown at the top of Fig. 1. Drop the ring clamp over the cavity before this is done, or you will have to saw a slot in it when the cavity is reassembled. Do not mount the fitting with machine screws.

Soldering can be done most readily if a torch is at hand, but a 100-watt or larger soldering iron will do the job. Tin the cavity and fitting lightly and smoothly first, and the soldering process is not difficult. If necessary, use a very small amount of soldering paste, but use it sparingly and wipe off all residue with alcohol and a soft cloth. Special low-temperature solders make this work easy, but regular radio solder can be used.

Cut a piece of thin brass or copper  $\frac{1}{4}$  inch wide and about  $\frac{1}{2}$  inch long and solder it between the fitting terminal and the inner conductor of the cathode cavity, shown in Fig. 1 and in the photograph.

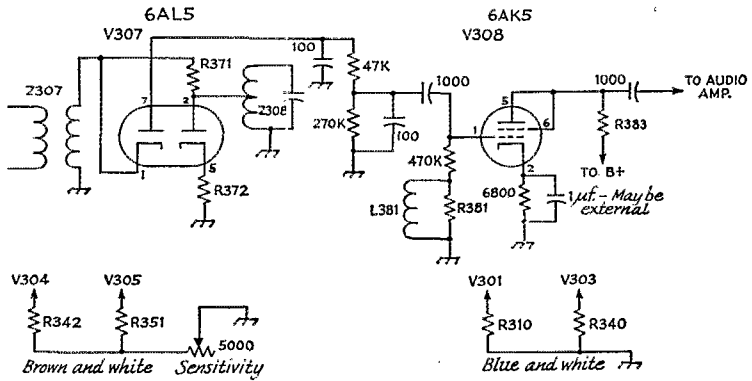
The angular position of the coupling loop in the plate cavity is made adjustable, in order to vary the feedback for optimum oscillator performance. Drill a  $\frac{3}{16}$ -inch hole in the plate cavity  $1\frac{3}{8}$  inch below the mounting flange, and midway between the high-voltage terminal and the flat boss that holds the plate line standoff. This hole takes a Herman Smith No. 1660 or Jerrold C-61 coaxial chassis fitting. The nut of this fitting is soldered to the outside of the cavity wall. If your fitting is not Teflon-insulated, do this with care, to avoid melting the insulation. Be sure that the body of the fitting will still turn, as this is necessary in adjusting feedback.

The coupling loop is made from 0.005-inch copper or brass,  $\frac{3}{16}$  by  $\frac{1}{16}$  inch in size. Bend it in hairpin shape, so that it will pass through the nut, and solder it to the fitting. As it is run into the cavity, the loop can be bent to the desired shape with a thin screwdriver or other flat tool inserted from the top of the cavity. See bottom portion of Fig. 1.

The interconnecting cable for the feedback loop is made of RG-59/U, with a BNC fitting at one end and a Smith 1650 or Jerrold C-52 at the other. Length tip to tip should be  $7\frac{1}{16}$  inches, or electrically  $1\frac{1}{2}$  wavelengths. At this point the transmitter is ready for testing.

W1QWJ and others used Amphenol 31-102 fittings for the plate cavity, and BNC fittings for both ends of the cable. The 31-102 has to be filed flat at the point where the coupling loop is soldered to its outer conductor, but otherwise use of it is similar to the procedure outlined above. W1CUT found an Amphenol fitting not listed in most catalogs, 31-236 or UG-625/BU,

Fig. 2—Changes in the i.f. strip of the APX-6, as modified by W6MMU. Parts with 3-digit numbers are the original components. These for which values are given are changes. This circuit results when the step-by-step procedure given in the text is followed. Capacitor values in  $\mu\text{mf.}$  unless marked.



which already has the flat surface and permits use of BNC fittings for both ends of the cable. The length of his cable was very critical for maximum transmitter output.

### Receiver Conversion

Converting the receiver of the APX-6 involves modifying the i.f. strip for audio output instead of video. W6MMU runs his converted unit transceiver style, with a 6V6 serving as both audio amplifier and modulator. The writer and W1QWJ wanted to be able to work duplex, so we fixed up separate audio systems for the transmitter and receiver. The step-by-step procedure used by W6MMU is given below. Every part has its number clearly marked in the equipment, so following the instructions is easy.

Remove  $R_{373}$  (3300 ohms) and  $R_{374}$  (4700). Remove  $L_{373}$  (green-orange choke) and substitute a 47,000-ohm resistor. From the junction point of  $L_{373}$  and  $C_{380}$ , connect a 270,000-ohm resistor and a 100- $\mu\text{mf.}$  capacitor to ground. Change  $C_{380}$  to .001  $\mu\text{f.}$  Change  $R_{380}$  (10,000) to 470,000, and  $R_{383}$  (6800) to 100,000. Lift the grounds from Pins 2 and 7 of  $V_{308}$  and connect a 6800-ohm resistor from either pin to ground. Bypass with 1  $\mu\text{f.}$  or more. Lift the wires from Pin 6 of  $V_{308}$  and connect Pin 5s and 6 together. Lift  $C_{390}$  (.001) from Pin 1 of  $V_{309}$ . This is now the audio output from the i.f. strip. It should be connected through a shielded wire to the input of the audio amplifier-modulator.  $V_{309}$  is removed from the socket and no longer used. The circuit of the W6MMU conversion is shown

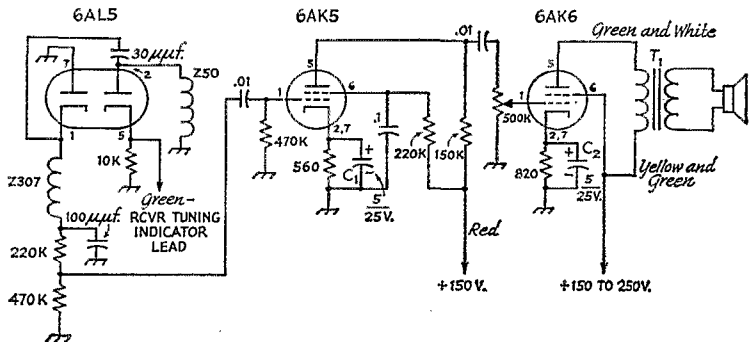
in Fig. 2.

The circuit of W1QWJ's converted receiver is shown in Fig. 3. He changed the last stage to a 6AK6, using the 6AK5 in  $V_{308}$  as a driver. The writer followed W6MMU's instructions mainly, but left the last 6AK5 in its socket, wiring it up as an audio pentode. Even with no more than 150 volts on the receiver, it delivers ample audio power for communications purposes.

The local oscillator requires little attention. W6MMU recommends that a 220-ohm resistor be inserted between the 2C46 cathode and ground. This can be installed inside the socket. Plate voltage for the oscillator and the i.f. strip is taken from the single 300-volt supply, regulated at 105 volts with a VR tube, or two in parallel if the load requires them. Oscillator instability is no problem, even with an unregulated supply; the regulator is used mainly as a convenient means of obtaining the desired voltage from one supply used for both transmitter and receiver.

Leads in the i.f. strip may be identified by color as follows: Brown and white—common lead to the cathode resistors of  $V_{304}$  and  $V_{305}$ . Bring out to 5000-ohm potentiometer to be used for sensitivity control, as shown in Fig. 2. Blue and white—a.v.c. Clip off the blue and white portion of the circuit and ground the junction of  $R_{310}$  and  $R_{340}$ . Red—plus 150 volts. Black and white—6.3 volts. Black—minus high voltage, 6.3 volts and ground. Green and yellow—video output. Yellow—crystal current. This has a shunt resistor, so the receiver

Fig. 3—Some who convert the APX-6 receiver prefer to strip out the video detector and amplifier stages and rebuild. This is the circuit used by W1QWJ following this approach. The cathode bypass capacitors,  $C_7$  and  $C_2$ , and the pentode output transformer,  $T_1$  may be mounted externally if necessary. Capacitor values in  $\mu\text{f.}$  unless marked.



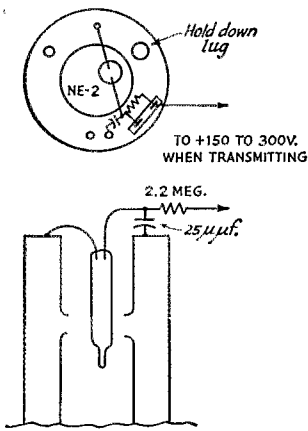


Fig. 4—Method of using the t.r. cavity developed by W1QWJ. The original t.r. tube is removed and a neon lamp mounted inside the cavity. It is made to fire, detuning the receiver input circuit, when the d.c. voltage is applied simultaneously with turning on the transmitter. The resistor, bypass capacitor and one side of the neon lamp are supported on a 2-lug tie-strip mounted on the top of the cavity.

will operate with no meter connected. Constant monitoring of crystal current is desirable, at least until it is determined that no combination of tuning control settings can allow excessive transmitter r.f. to reach the mixer crystal.

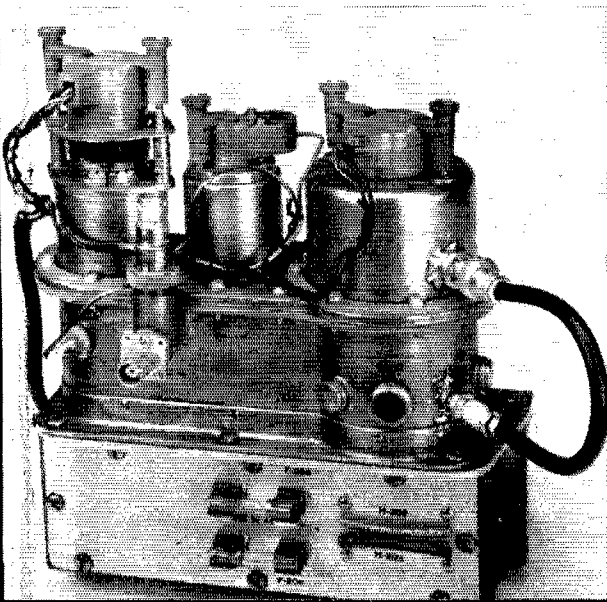
#### Send-Receive Systems

The W6MMU conversion discards the t.r. system of the APX-6 and uses either separate sending and receiving antennas or some sort of switching arrangement. His coaxial relay seems to be good enough, but W1QWJ found that some conventional relays had excessive insertion loss at 1200 Mc., so he worked on use of the t.r. system. Separate antennas have some merit in duplex operation, and they are no great problem when only local work with simple antennas is contemplated, but working out to appreciable distances requires good antennas and you may want to do it all with one array in this case.

To use external switching or separate antennas, mount a BNC fitting on the flat circular surface of the crystal mixer assembly, as seen in the left-center portion of the second photograph. Drill a  $\frac{3}{8}$ -hole at the center of the circle, being careful not to penetrate with the drill farther than necessary. The fitting can be fastened in place by drilling two holes in its flange, as close to the main body of the fitting as possible, and then drilling and tapping matching holes in the mixer housing. Use 4-40 or smaller screws for this. File the tip of the BNC fitting terminal, so that it will fit snugly into the hole in the crystal mount.

If the t.r. section is not to be used, remove the inner conductor and the t.r. tube. W1QWJ removed the t.r. tube and connected an NE-2 neon lamp inside the diplexer cavity, as shown in Fig. 4. The supply voltage to the transmitter is applied to the neon through a 2.2-megohm resistor when the transmitter is turned on. This causes the neon to fire, detuning the cavity enough so that the transmitter r.f. does not affect the receiver adversely. Position of the neon inside the cavity is quite critical. It must be close to the cavity wall, and deep enough so that it can act as a capacitance between the inner and outer conductors. Check the crystal current carefully at all frequency combinations, to be sure that it will not go over about 2.5 ma. or so with the transmitter on. Normal current, with the transmitter off, is 0.5 to 1.5 ma.

W1CUT came up with the neatest arrangement yet. He broke the glass from the original t.r. tube and then used its flange and inner conductor for mounting the NE-2, the circuit being the same as shown in Fig. 4. *Important notice:* If the t.r. tube is to be broken take care that glass fragments do not cut the skin. The tubes contain a small amount of radioactive material; not enough to cause harm except in the case of skin abrasions or direct inhalation, but enough so that they should be handled with care. Making use of the t.r. system in any way complicates receiver operation, in that it adds a tuning control that must be "on the nose" if maximum sensitivity is to be achieved. There is no external noise on which to peak the t.r. tuning in going across the band, so it could be far enough off to prevent the operator from hearing anything but strong local signals. Best bet here is to calibrate the t.r. tuning on strong signals spaced across the desired tuning range, and then be sure that it is properly tracked with the oscillator if one is looking for weak signals.



The r.f. assembly of the APX-6, converted for 1215-Mc. communication. At the right is the transmitter oscillator. Note the feedback loop at the right, the principal conversion item. The diplexer cavity is in the middle and the local oscillator at the left. The mixer crystal is inside the small vertical portion in the left foreground. The BNC fitting for antenna connection to the receiver is mounted on the front of the crystal housing.

Transmitter r.f. unit in its converted form. At the lower left is the 2C42 cathode cavity, with feedback lobes removed and an external connection for the feedback coupling, visible around the plate cavity at an angle of 45 degrees. In this view we see the brass disk installed to seal off the openings between the cathode and plate circuits. It is cut to the same diameter as the lock-washer type grounding ring, seen resting on top of it. Spring fingers are part of the original assembly.

### Operation

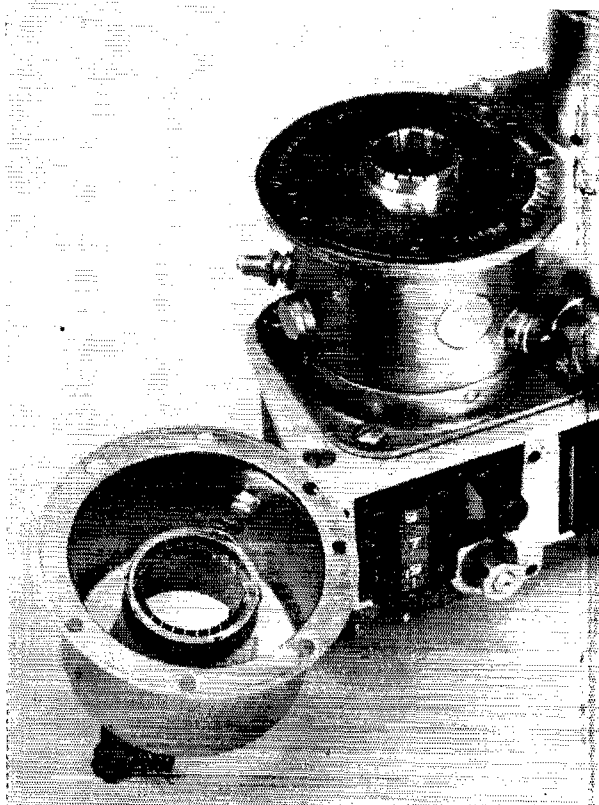
The outfit can be tested with any power supply delivering 200 volts d.c. or more. Regulated voltage for the i.f. strip and local oscillator is desirable, though not mandatory, but some device must be used to drop the voltage to a safe level. Voltage applied to the i.f. strip should not be over 125, or some of the tubes may run hot.

The transmitter oscillator tube is a high- $\mu$  type and it will not draw excessive plate current, even with the cathode grounded and feedback at maximum, unless the plate voltage is in excess of 200. Adjustable cathode bias is desirable, as a combination of bias and feedback can then be found which will enable the transmitter to deliver maximum output at any safe plate voltage. Heater voltage should not be allowed to drop below 6.3.

The output fitting on the front of the r.f. section is one of the HN series. If the price of a matching cable fitting for this shocks you, the fitting can be changed over to one of the types more commonly found in surplus. This involves some mechanical improvisation, however. A load suitable for testing the transmitter can be made by paralleling two or more 6.3-volt 250-ma. pilot lamps. It is well to make the connections to these with copper or brass strip, rather than wire, to keep inductance down.

Connection of a variable resistor in the cathode circuit of the 2C42 is recommended. W6MMU uses a 500-ohm potentiometer, and sets it so that approximately 50 ma. plate current is drawn when the feedback is set for best output. He recommends 300 as the maximum plate voltage, and at 15 watts input the measured output is between 2 and 3 watts. Stability is as good as can be expected from any self-controlled oscillator and modulation up to about 50 percent can be achieved without severe distortion. At much lower plate voltages the modulation suffers due to lower grid drive. At higher voltages the output increases, but at a sacrifice of tube life and oscillator stability.

Receiver sensitivity can be improved with the right crystals. The 1N21C has given the best results of any tried by W6MMU. W1QWJ and others near Springfield, Mass., found it convenient to test their receivers on the TACAN signal from Westover Air Force Base, on 990 Mc., signing SEF. Presumably there will be others of a similar nature around the country. If you are near a radar station you'll very likely hear it regardless of its frequency, and nearby u.h.f. TV stations may come through here and there. With no preselection ahead of the crystal mixer,



the receiver is wide open for spurious responses.

It will be noted that the receiver has provision for a tuning meter. This was tried and found wanting for amateur purposes. The noise generated in the receiver is so high that the meter is of little value in receiver adjustments. W1QWJ connected an oscilloscope to the audio output, and with this was able to see fairly weak modulated signals in the "grass." The visual indication so obtained is helpful in making adjustments for best signal-to-noise ratio.

### Antennas

The 1215-Mc. band is a fine place to experiment with antennas. Element configurations commonly used on lower bands will still work, but there are points to watch out for. Due to scaling difficulties, Yagis of practical dimensions are not too good. The corner reflector looks like the best bet for a simple array. Coax, at least the kind most of us have, is murder at this frequency; don't use any more than absolutely necessary. Still, W1QWJ and W1RVW found that 50 feet of RG-8/U. needed to bring their corner reflector arrays into the clear, netted a real improvement over indoor antennas of the same type, on their across-town path. Absorption by trees and buildings is high, too.

Close-spaced lines of No. 12 or larger wire are probably the best thing you can get at low cost. Transmitting Twin-Lead, tubular type, is not too bad. From here on, you're on your own. Perhaps more on the antenna problems at another time.

QST

Correspondence indicates a sizeable response to the author's earlier article describing the construction of a vertical 40-meter antenna from an accumulation of empty beer cans. The addition of the simple matching circuit described here permits operation on the 20-meter band, also. Included are some helpful hints on maintenance.

## Method of Feeding the 7-Mc. Beer-Can Radiator on 14 Mc.

BY W. PETE CZERWINSKI,\* W2JTI

# The "Budget" Vertical on 20 Meters

WITH a DX appetite stimulated by the performance of the "Budget" vertical antenna<sup>1</sup> on 7 Mc., it wasn't long before the author started entertaining thoughts of joining the "Big Guns" on 20 meters.

A quarter-wave antenna on 40 will resonate as a half-wave radiator on 20 meters. However, the bottom end of a half-wave vertical is a high-voltage point and therefore an impedance step-up is necessary between coax line and the antenna. The impedance-transforming device used by the author consists of a simple parallel tuned tank circuit tuned to 14 Mc. and connected between the bottom end of the antenna and ground. The coax line is then tapped onto the tank coil at a point that provides a match to the line, as shown in Fig. 1.

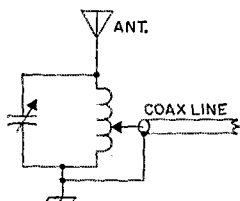


Fig. 1—Circuit for feeding the quarter-wave 7-Mc. vertical antenna as a half wave on 14 Mc. Tank-circuit values are discussed in the text.

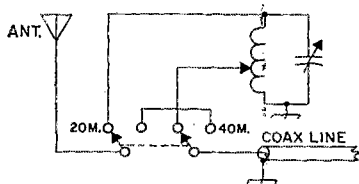


Fig. 2—Switching circuit for 7- or 14-Mc. operation. See text for details of components.

To permit operation on 20 or 40 as desired, the switching circuit of Fig. 2 may be used. The author uses a d.p.d.t. ceramic-base knife switch. However, a well-insulated antenna relay may be used for remote switching.

\* 202 Beechwood Drive, Shrewsbury, New Jersey.

<sup>1</sup> Czerwinski, "Budget 7-Mc. Vertical Antenna," *QST*, November, 1955.

### The Matching Circuit

The  $L-C$  ratio of the tuned tank circuit is not critical. A high- $C$  circuit will provide some additional discrimination against harmonics. However, don't carry the  $C$  too far or you will end up with a coil so small that it will be difficult to adjust the tap. Also, a high- $C$  circuit will reduce the band width. In deciding on the dimensions of the coil and its conductor size, a good rule to follow is to make the coil an approximate duplicate of the 20-meter tank coil in your transmitter. The plate spacing of the capacitor should also be about the same as you find in your transmitter tank capacitor. The maximum capacitance should be somewhat greater than required to tune to resonance with the coil to make allowance for the effect of possible antenna reactance. For the coil, I used 10 turns of  $\frac{1}{8}$ -inch copper tubing, with  $\frac{1}{16}$  inch between turns, wound on a  $1\frac{1}{4}$ -inch form. The capacitor has a maximum capacitance of 100  $\mu\text{f}$ . and transmitter plate spacing. The combination should be enclosed in some sort of weatherproof box.

### Adjustment

After connecting the tank circuit between the base of the antenna and the ground system, ground the outer conductor of the coax line and spot-solder the inner conductor onto the coil at about  $2\frac{1}{2}$  turns above ground. Set the capacitor at about 80  $\mu\text{f}$ . if you use the coil described above. Otherwise, check the circuit with a g.d.o. and set the tuning to approximately the center frequency of the desired portion of the 20-meter band.

Although one can use his transmitter and a reflected-power meter for adjustment, the author used a grid-dip oscillator and an s.w.r. bridge—both built from the *ARRL Handbook*. The "load" end of the s.w.r. bridge is connected to the station end of the coax line. A one- or two-turn loop is attached to the input connector of the s.w.r. bridge, and the g.d.o. is link-coupled to this loop. Set the g.d.o. to the desired center frequency in the 20-meter band.

Now get someone to adjust the capacitor at the antenna slowly while you watch for a minimum reading on the s.w.r. bridge. If a complete null does not result, the tap on the coil should be moved a quarter of a turn at a time in one direction while you watch for the null. If the

minimum reading goes higher, move the tap in the opposite direction. If adjustment of the tap does not result in a complete null, the setting of the capacitor may have to be touched up. When the null has been obtained, the s.w.r. bridge may be removed and the coax line connected to the transmitter. You are now all set to go on 20 meters with a low angle of radiation.

### 15 Meters

The antenna may also be fed directly with coax line (no matching network) on 15 meters. The antenna will be operating as a  $\frac{3}{4}$ -wave vertical radiator on this band and, here too, most of the energy should be radiated at a low angle.

### Maintenance

Last, but not least, the author would like to make a few comments on the mechanical attributes of this antenna. It has weathered all storms over the last five years without damage. A direct hit with a baseball kinked one of the cans a couple of summers ago, so I had to scare up a replacement — not a very serious problem!

The original aluminum paint lasted about two

years. When the labels on the cans began to show through, the NYL rounded up the mast-lowering team (our two sons and me) and we gave the beer-can vertical a new coat. She said that I had a worried expression when we started to lower the contraption which, however, soon evaporated in a smile. It seems that it is as strong as ever. It should prove something about the mechanical abilities of solder.

Several of the readers of the original article complained of difficulty in making the solder stick to the cans. In answering these inquiries I advised the liberal application (slop it on) of noncorrosive soldering paste. After the job is completed, the excess may be removed very easily with acetone or other solvent.

The buried aluminum radials have corroded quite badly, although they are still useful. However, I plan to supplement them with a new set of copper radials when the antenna comes down for repainting as soon as time and weather permit. The performance of this antenna on 20 has been as satisfactory as it was previously on 40 and the author has now achieved prominence by qualifying as a member of DXCC. QST

## Strays

Trouble-shooting FCC field engineers sometimes find strange interference . . . as witness the case of an irate TV viewer in Rochester, N. Y., who was so positive that a local ham was the cause of his trouble that he got his neighbors to sign a petition and appealed to his Congressman.

Diligent checking proved the ham's equipment was not at fault, but the trouble continued and so did the search for its cause. Finally, after spending some 100 hours, the interference was located — a butter conditioner in the refrigerator of the complainant's own kitchen.

Noted the FCC: "The noise of both the gadget and the complainant were immediately quieted."

At the DL4 hamfest in Germany, Bob Morgan, DL4SP/DL0IF started a QSO in an airplane as aeronautical/mobile, jumped out and carried on parachute/mobile, landed and continued shanks mare/mobile, using a  $\frac{1}{2}$ -watt 10-meter transmitter. Larry Nusbaum, DL4NF, walked away with the Golden Key after copying 40 w.p.m. longhand.

K1KAK reports that the raising of the first 50-star flag in the United States (on Mars Hill in Maine) wasn't as successful from a ham point-of-view as had been hoped. In the first place, it rained all the night of July 3 and was still raining when the flag went up, dampening the enthusiasm and equipment of amateurs at the top of Mars Hill.

The only band open at 4:37 A.M. was 40 and the flag group heard K0VCD and fellows out his way trying to reach them, but it was one-way skip.

The FCC didn't send a club call in time, so they used K1KAK's call.

Despite the disappointments, the group was happy to make the QSOs it did on such an historic event and stations will receive their certificates soon.

Naval Security Group hams anywhere are invited to join West Coast Naval Reserve Naval Security Group hams on their net. Meeting time is every Sunday morning at 8 A.M. PST on 7033 kc. and each Thursday at 8 P.M. PST on 3515 kc. W6FLE is NCS and he calls CQ NSG on the frequencies given.

A contact with K4PUZ on July 17 finished off post-war log book number 200 for W1AW.

### Famous Last Words by WV6IMN



"NAW, I'M NOT SCARED. THE FCC JUST DOESN'T HAVE ENOUGH PEOPLE TO CATCH YOU FOR RUNNING 2500 WATTS."

## Radical Departure in Tube Design Pays Off in V.h.f. Service

# The Nuvistor as an R. F. Amplifier at 144 Mc.

**H**AMS who attended the ARRL National Convention in Galveston in 1959 got their first look at a wholly-new idea in vacuum-tube design. They got the look, that is, if they looked closely enough as they passed the RCA booth at the convention. The Nuvistor is so small that it has to be displayed in blown-up fashion. This small size is just one of the features that make the Nuvistor of interest to the v.h.f. amateur. It also has high transconductance, low lead inductance, low power consumption and exceptional ruggedness and uniformity to recommend it. Best of all, it is moderately priced, and it will soon be readily available.

Working K1IJB, Sandy Hook, Conn., recently on 144 Mc., we learned that he was using a Nuvistor as an r.f. amplifier ahead of his 2-meter converter. It had a measured noise figure of around 2 db., slightly better than the 417A cascade job with which it was being tested. When adjusted for lowest noise figure, it delivered about 20 db. gain. This in a single neutralized-triode r.f. stage of simple design, with a relatively inexpensive tube, was of more than ordinary interest. We wasted no time getting down to Sandy Hook to learn more of this first amateur use of the Nuvistor in our area.

It will be seen from the circuit diagram that the amplifier is a conventional neutralized stage, similar to the first half of the familiar cascode, except that the cathode is grounded directly, rather than through a bias resistor. The Nuvistor (commercial tube number: 6CW4) operates at low plate voltage. If the supply voltage is much over 70, the dropping resistor  $R_1$  should be adjusted in value to keep the voltage on the plate to about 70, and the input to less than the rated 1-watt plate dissipation. At 70 volts and 8.1 ma. the transconductance is 12,700  $\mu$ mhos. Thus its performance at 144 Mc. is better than all but the very best tubes, and because of the uniformity of the Nuvistor results of this order are likely to be more readily obtained than with random 417As.

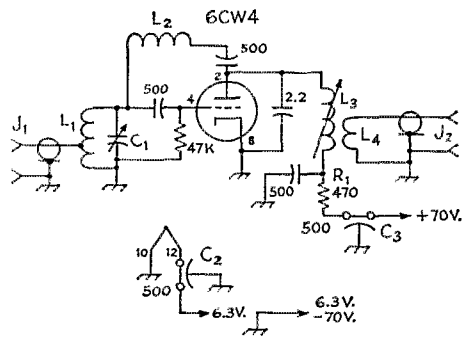


Fig. 1—Circuit of the Nuvistor r.f. amplifier.  
Capacitor values in  $\mu$ mf.

- $C_1$ —Sleeve-type trimmer, 1.5 to 7  $\mu$ mf.
- $C_2, C_3$ —Feed-through bypass, 500  $\mu$ mf.
- $J_1, J_2$ —Coaxial fitting, BNC type.
- $R_1$ —470 ohms,  $\frac{1}{2}$  watt. With higher supply voltage adjust value to give 70 volts on plate.
- $L_1$ —5 t. No. 20,  $\frac{1}{4}$ -inch diam., spaced wire diam. Tap about 2 turns, or for lowest noise figure.
- $L_2$ —No. 26 enamel close-wound on high-value  $\frac{1}{2}$ -watt resistor, about  $\frac{3}{8}$  inch. Adjust turns for neutralization; see text.
- $L_3$ —5 t. No. 22, spaced wire diam., on  $\frac{1}{4}$ -inch iron-slug form.
- $L_4$ —1 t. insulated hookup wire around bottom of  $L_3$ .

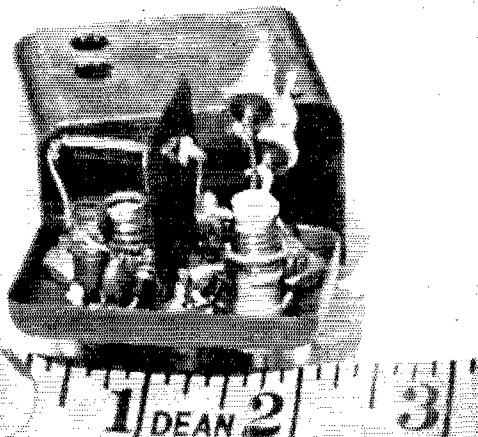
K1IJB neutralized his amplifier by the time-honored method of disconnecting one heater lead and adjusting the inductance of  $L_2$  for minimum feed-through of a strong test signal. Size of the winding was critical to about plus-or-minus 1 turn. The input circuit is adjusted for lowest noise figure, and the plate circuit for maximum gain. No further adjustment of  $L_2$  was needed after the initial feed-through minimum was obtained.

The metal cover of the Nuvistor has two extensions that key it to its socket, maintaining correct pin alignment. The socket is available as Cinch Mfg. Co. No. 133-65-10-001.

The input capacitance of the 6CW4 is 4.2  $\mu$ mf., or less than half that of a 417A. This should make use of conventional circuits easy at 220 Mc., and possible at 420. Work on converters for these bands is planned for the very near future, and results will be published as soon as available. Meanwhile, this example of what one ham was able to do with the Nuvistor on 144 Mc. stirs optimism that here, in a simple way, is a means to lower noise figures than we have attained previously with inexpensive tubes and conventional circuitry.

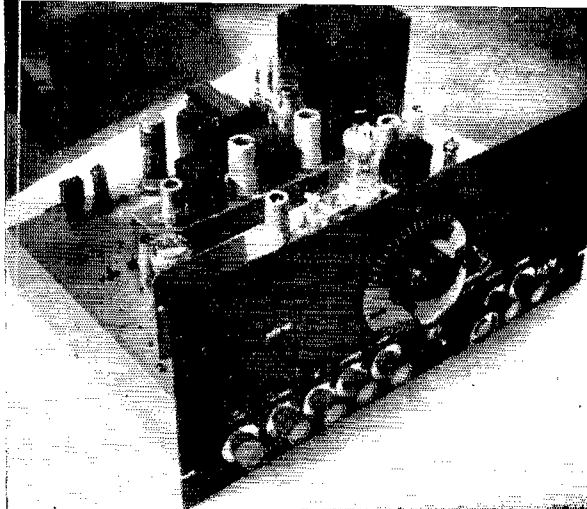
E. P. T.

The Nuvistor 2-meter amplifier built by K1IJB. Shield partition separates input and output circuits, with input at the left. Note position of the neutralizing winding, perpendicular to the input coil.





Controls along the lower edge of the panel, from left to right, are for r.f. trimmer, antenna trimmer, i.f. gain control, r.f. gain, mixer gain, calibration oscillator switch, Selectoject frequency and peak level, audio gain, power switch and headphone jack. The calibration-corrector knob is to the right of the dial.



## A Stable and Selective 2-Band Receiver for the C.W. DX Man

BY CLYDE B. LEE,\* W4PHJ

# The PHJ-1

THE receiver shown in the photographs was built for c.w. DX work on the 14- and 21-Mc. bands. It is essentially a combination of features taken from earlier *QST* articles devoted to homemade receivers. The time and expense involved in its construction are no more than would be required to build several converters, with power supply, for a vintage receiver probably already over-burdened with outboard gear. This unit replaced such a receiver here—a surplus Super Pro—and, for the purpose for which it was built, it will outperform the old Pro in just about every department except weight.

The circuit is shown in Fig. 1. The 12AT7 ( $V_1$ ) modified cascode r.f. stage will be recognized as a familiar presclector circuit. This arrangement was adopted in preference to a conventional 6AK5 r.f. stage and a cathode-coupled 6BK7A which were tried successively. The h.f. oscillator ( $V_3$ ) circuit, suggested by ZL4GP<sup>1</sup> some issues back, is extremely simple and provides good isola-

*Many hams who feel that they have a limited amount of do-it-yourself ability very foolishly pass up a project that can be one of the most rewarding of all ham activities—the building of their own receivers. Owners of expensive units who have tried the PHJ-1 have been impressed by its performance and simplicity as an effective c.w. receiver.—*  
The Author.

tion from the mixer ( $V_2$ ).

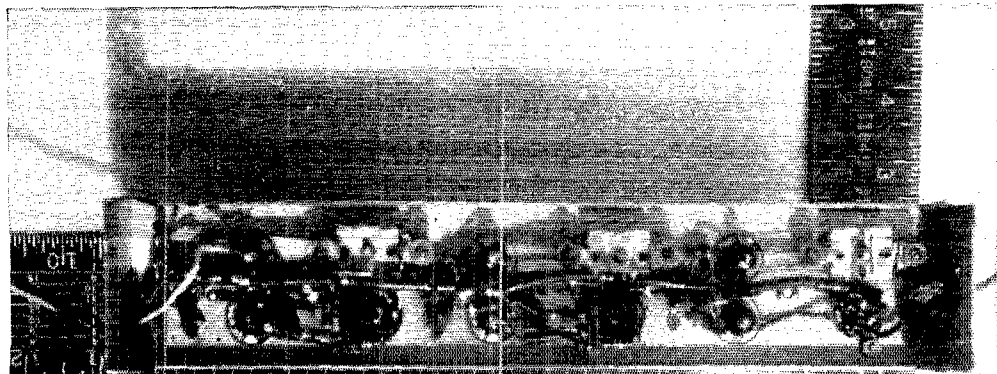
The 1690-ke. crystal i.f. strip ( $V_4$ ,  $V_5$ ,  $V_6$ ) uses surplus crystals of the DC34 type.<sup>2</sup> Checks with a Munston CA-1510 signal generator and a General Radio output meter show that the 6-db. band width is about 500 cycles, and the 20-db.

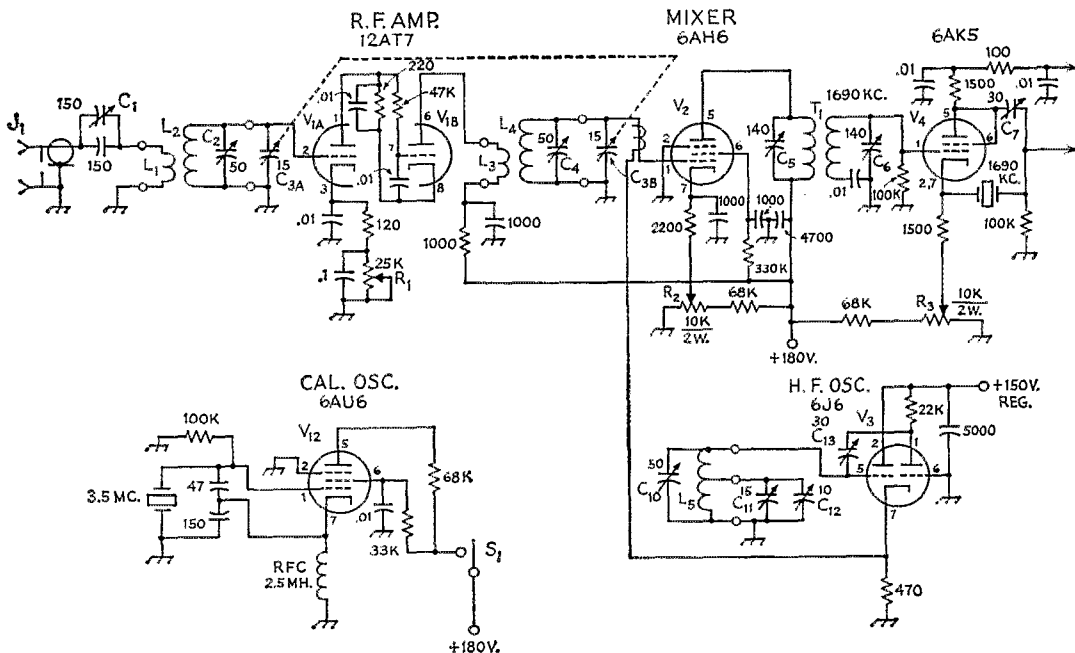
\* 827 Palatka Road, Louisville 14, Kentucky.

<sup>1</sup> "Technical Correspondence," *QST*, July, 1955, p. 48.

<sup>2</sup> Gottfried, "An Inexpensive Crystal-Filter I.F. Amplifier," *QST*, Feb., 1958.

Top and bottom views of the crystal i.f. strip.





DECIMAL VALUES OF CAPACITANCE ARE IN  $\mu\mu\text{f}$ ;  
OTHERS ARE IN  $\mu\text{f}$ , EXCEPT AS INDICATED.

Fig. 1—Complete circuit of the PHJ-1. Fixed capacitors of 1000- $\mu\text{f}$ ., 4700- $\mu\text{f}$ ., and 0.01- $\mu\text{f}$ . capacitance are disk ceramic. Capacitors of 3000  $\mu\text{f}$ ., 0.05  $\mu\text{f}$ . and 0.1  $\mu\text{f}$ . are paper. Capacitors marked with polarity are electrolytic. Other fixed capacitors should be mica. Resistances are in ohms and resistors are 1/2 watt unless specified otherwise.

- C<sub>1</sub>—150- $\mu\text{f}$ . midget variable.
- C<sub>2</sub>, C<sub>4</sub>, C<sub>10</sub>—50- $\mu\text{f}$ . air trimmer mounted in coil form.
- C<sub>3</sub>—Ganged 15- $\mu\text{f}$ . midget variables (Bud MC-1850).
- C<sub>5</sub>, C<sub>6</sub>—140- $\mu\text{f}$ . air trimmer (Hammarlund APC-140).
- C<sub>7</sub>, C<sub>8</sub>, C<sub>9</sub>, C<sub>13</sub>—30- $\mu\text{f}$ . mica compression trimmer.
- C<sub>11</sub>—15- $\mu\text{f}$ . midget variable (Bud MC-1850).
- C<sub>12</sub>—miniature variable (Hammarlund MAC-10).
- J<sub>1</sub>—Chassis-mounting coax receptacle (SO-239).
- J<sub>2</sub>, J<sub>R</sub>—Open-circuit headphone jack.
- L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub>, L<sub>5</sub>—See table.
- L<sub>6</sub>—10.5-hy. 110-ma. filter choke (Stancor C1001).
- L<sub>7</sub>—5-hy. 100-ma. filter choke (Stancor C2305).

- R<sub>1</sub>—25,000-ohm potentiometer.
- R<sub>2</sub>, R<sub>3</sub>—10,000-ohm 2-watt potentiometer.
- R<sub>4</sub>, R<sub>5</sub>—0.5-megohm potentiometer.
- R<sub>6</sub>—3-megohm potentiometer, standard audio taper.
- R<sub>7</sub>—1000-ohm 25-watt resistor with slider.
- R<sub>8</sub>—10,000-ohm 25-watt resistor with slider.
- S<sub>1</sub>, S<sub>2</sub>—S.p.s.t. toggle switch.
- T<sub>1</sub>—1690-kc. i.f. transformer (see table).
- T<sub>2</sub>—Audio output transformer: 5000 ohms to voice coil, 5 watts.
- T<sub>3</sub>—Power transformer: 700 volts, c.t., 120 ma.; 5 volts, 3 amps.; 6.3 volts, 4.7 amps. (Thordarson 22R05-U).

#### COIL DIMENSIONS

- L<sub>1</sub>—14 Mc.—3½ turns, close-wound, spaced 1/8 inch from ground end of L<sub>2</sub>.
- 21 Mc.—5¾ turns, close-wound, spaced 5/16 inch from ground end of L<sub>2</sub>.
- L<sub>2</sub>, L<sub>4</sub>—14 Mc.—10½ turns, 1¾ inch long.
- 21 Mc.—7½ turns, 1¾ inches long.
- L<sub>3</sub>—14 Mc.—7¾ turns, close-wound, spaced 7/16 inch from ground end of L<sub>4</sub>.
- 21 Mc.—6¾ turns, close-wound, spaced 5/16 inch from ground end of L<sub>4</sub>.

- L<sub>5</sub>—14 Mc.—9½ turns, 1¾ inches long, tapped at 2½ turns from ground end.
- 21 Mc.—5½ turns, 1¾ inch long, tapped at 1½ turns from ground end.

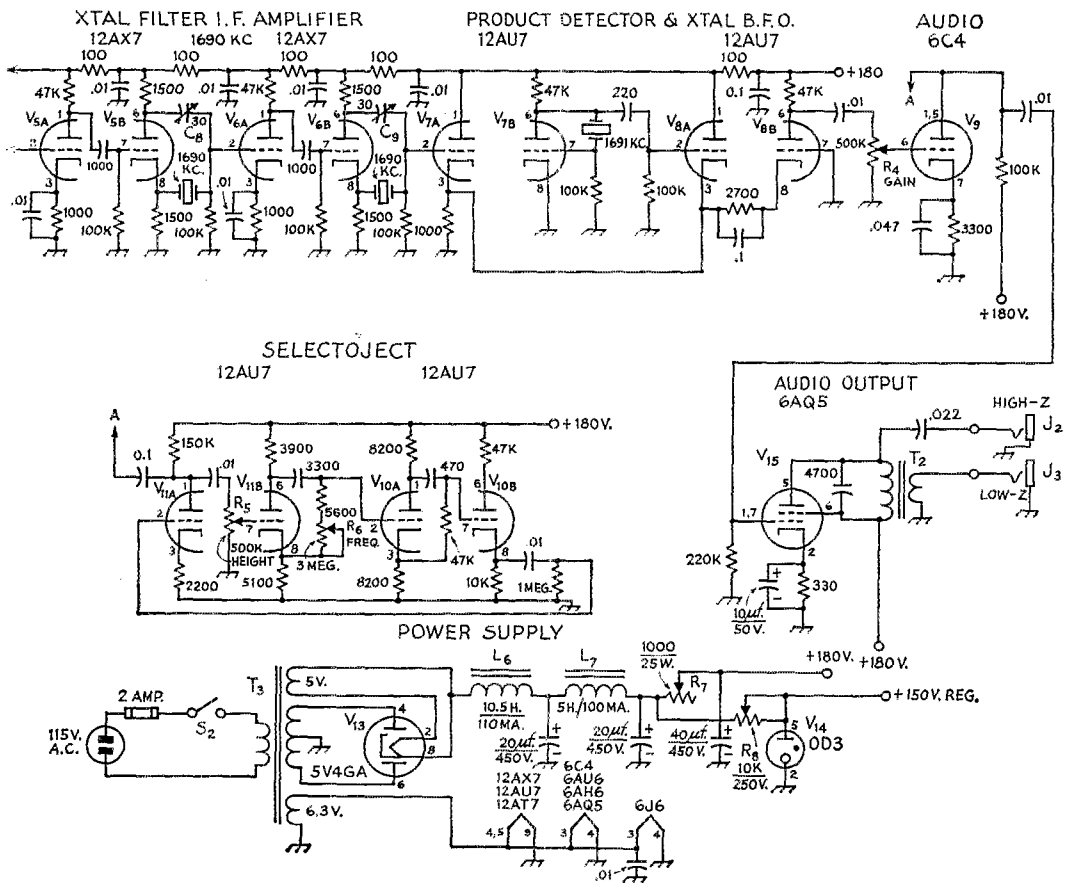
Above coils wound with No. 22 enameled wire on Amphenol or Allied 1¼-inch-diameter polystyrene plug-in forms.

- T<sub>1</sub>—Each coil 90 turns No. 26 enameled, close-wound on 1-inch polystyrene-rod forms, coils spaced approximately 1/2 inch; see text.

band width about 1 kilocycle. Beyond 1 kc., the skirt is so sharp that further measurement wasn't possible with this setup. This seems to be an optimum amount of selectivity for general use. Any further demand in this respect is taken

care of nicely by a built-in Selectoject<sup>3</sup> (V<sub>10</sub>, V<sub>11</sub>). Only the "boost" part of the circuit was incorporated in this receiver. This aid, together with the inherent selectivity of the receiver, provides

<sup>3</sup> Villard, Diaz, "The Shunt Selectoject," *QST*, Oct., 1952.



performance, simply and economically, that surely compares with the best of them. Since the Selectoject circuit is a shunt arrangement, it can be easily added, if found desirable, after the remainder of the receiver has been completed.

There are three r.f. gain controls.  $R_3$  in the first i.f. is the main level control. I have found the additional controls  $R_1$  and  $R_2$  in the r.f. and mixer stages, respectively, to be useful in taming some of the stronger signals.

The i.f. feeds a product detector<sup>4</sup> ( $V_{7A}$ ,  $V_8$ ) which is rapidly becoming standard for c.w. and s.s.b. reception. The b.f.o. ( $V_{7B}$ ) is crystal-controlled. The audio section consists of a 6C4 driver and a 6AQ5 output stage. Included also is the indispensable crystal calibrator ( $V_{12}$ ). A small power supply with a 5V4GA rectifier delivers 180 volts with a regulated tap at 150 volts for the h.f. oscillator.

### Tuning System

The tuning system can be quite simple, since the frequency range required for c.w. operation on the two bands is relatively small. Also, since only three tuned circuits are involved, plug-in coils are no particular inconvenience. The main

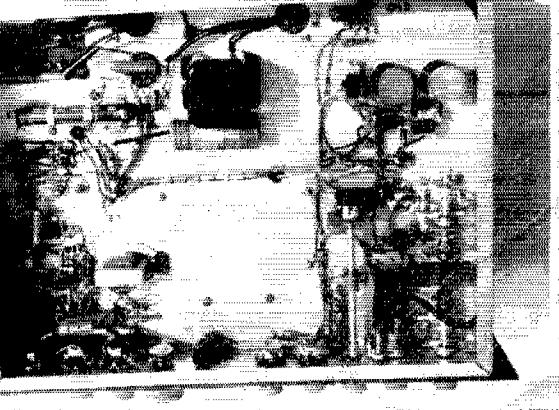
capacitance in each of the three high-frequency circuits ( $C_2$ ,  $C_4$ ,  $C_{10}$ ) is plugged in along with the coil. Ganged trimmers ( $C_{3A}$ ,  $C_{3B}$ ) serve to peak up the r.f. and mixer circuits. These require readjustment only for large changes in frequency. There is also a series trimmer ( $C_1$ ) in the antenna circuit. The main tuning dial controls only the oscillator bandspread tuning capacitor  $C_{11}$ . I have the bandspread tap on  $L_5$  set so that the tuning rate with the PW-0 dial is only approximately 350 cycles per division. This may seem like too much of a good thing, but it is quite practical. The PW-0 dial is just right for covering the entire band in a hurry as well as for digging a weak one out in a pile-up.

### Constructional Details

Since both construction and servicing are easier if components aren't too crowded, I used a 17 × 12 × 3-inch aluminum chassis. The crystal i.f. strip is a separate subassembly, and I began the construction with this unit. It is assembled on a 1½ × 2 × 10-inch Minibox (Bud).

The high-frequency oscillator is also a sub-assembly. This was familiar v.f.o. ground, so a piece of ½-inch aluminum 3 by 6 inches was used as a base. The chassis is stiffened by a 6-inch square of the same material placed centrally on

<sup>4</sup> Healey, "Notes on the Product Detector," *QST*, Dec., 1957.



This bottom view of the PHJ-1 shows the ganged r.f. trimmers and input-link tuning capacitor in the lower right-hand corner. The two coils comprising the 1690-kc. i.f. transformer,  $T_1$ , are above. The second power-supply filter choke is at upper center.

the chassis, with its front edge flush with the front edge of the chassis. The dial mechanism is mounted on this plate, and the oscillator assembly is mounted on heavy spacers to align the dial and tuning-capacitor shafts. The lead between the grid of the 6J6 and the coil socket is supported on two small stand-off insulators.

The r.f.-stage coil,  $L_1L_2$ , is in the front left-hand corner of the chassis, isolated by an L-shaped baffle shield. The mixer coil,  $L_3L_4$ , is slightly to the rear. The input-link tuning capacitor  $C_1$  and the ganged r.f. trimmer capacitors are underneath this section. The audio and Selectoject circuits are at the right-hand end of the chassis, and the rear portion of the chassis is devoted to power-supply components. Placement of components in these sections is not critical.

The coils of the 1690-kc. i.f. transformer  $T_1$  are wound on separate polystyrene-rod forms. They can be seen in the upper right-hand corner of the chassis in the bottom view. They are fastened to the chassis by means of machine screws tapped into the poly rod. One of the screw holes in the chassis is slotted so that the coupling between the two coils can be adjusted.

### Adjustment

Information on the alignment of the i.f. ampli-

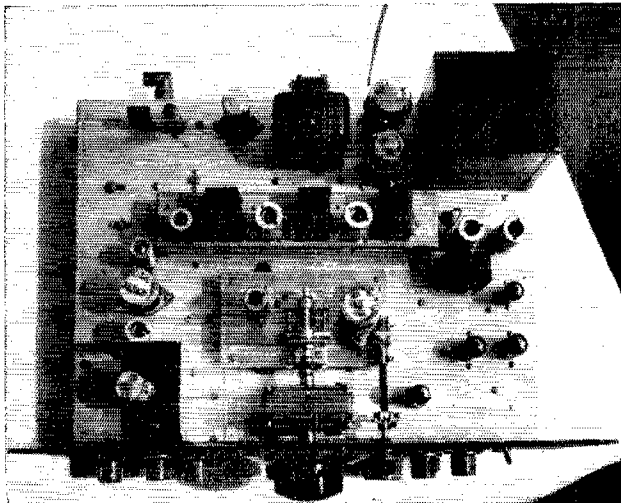
fier will be found in the article by W6YBR.<sup>2</sup> In adjusting the front end, the slider on  $R_7$  should be set to give an output voltage of approximately 180, and the slider on  $R_8$  should be adjusted so that the VR tube will stay ignited with all tubes operating.

Then the h.f. oscillator should be checked for oscillation with the 14-Mc. coils plugged in, using an indicating wavemeter. Starting at minimum capacitance,  $C_{13}$  should be adjusted until oscillation takes place. With  $C_{12}$  set near the center of its range, and  $C_{11}$  set at maximum capacitance,  $C_{10}$  should be adjusted to give an oscillator frequency of approximately 15,600 kc. with the ganged trimmers ( $C_3$ ) set at about three quarters of maximum capacitance,  $C_1$ ,  $C_2$  and  $C_4$  should be peaked on noise.

At this point it should be possible to hear the calibrator signal. Adjust  $C_{10}$  so that the calibrator signal appears near maximum on  $C_{11}$  and check incoming signals to make sure that you have the right calibrator harmonic. Then make a final check on the r.f. trimmers and the tuning of the i.f. transformer  $T_1$ .

The same procedure should be followed in lining up on the 21-Mc. band. The h.f. oscillator frequency in this case should be 22,600 kc.

**QST**



The 12-inch rack-panel chassis provides plenty of space for components. The crystal-controlled b.f.o. and power-supply components are strung out along the rear edge. The tunable h.f. oscillator and crystal i.f. strip immediately behind it occupy the center area. R.f. and mixer stages are to the left, Selectoject and other audio circuits to the right.

# Fixing the Operating Point in the Presence of Temperature and Transistor Variations

BY GILBERT L. BOELKE,\* W2EUP

Transistors are far more sensitive to temperature than are vacuum tubes, and no transistor circuit design is considered satisfactory that does not include provision for overcoming the effects of temperature variations over a reasonable range. This article discusses stabilization principles and describes practical circuit design methods.

## How to Stabilize Your Transistorized Equipment

MANY amateur-designed transistor circuits do not take into consideration the effects of transistor production variations or the effects of temperature on transistor parameters. While some amateur equipment is not called upon to perform under severe environmental conditions, certain transistor parameters suffer comparatively large variations with small changes in temperature. Mobile amateur equipment is subject to variations in temperature from below freezing to as high as 150 degrees F. Portable equipment, too, is required to operate over a wide range of temperatures. Even in the shack, if a transistorized unit is placed on top of a piece of equipment which generates heat it may fail if not temperature-stabilized or compensated. Perhaps the most important consideration of all is the fact that in case of emergency or disaster, conditions are usually much less ideal than in our normal operating sessions.

Production variations between transistors of a given type are very large compared with those of vacuum tubes. These variations are wider in the lower-priced experimenter and entertainment grades than in the more expensive commercial and military types. The practice of designing for temperature stability has the additional advantage that it makes the circuit more tolerant of production variations between transistors. This minimizes the necessity for hand-tailoring circuits — that is, designing them around the particular transistor to be used.

Another bonus is that burnouts and thermal runaway are virtually eliminated.

\* 505 Main St., Ebenezer 24, New York.

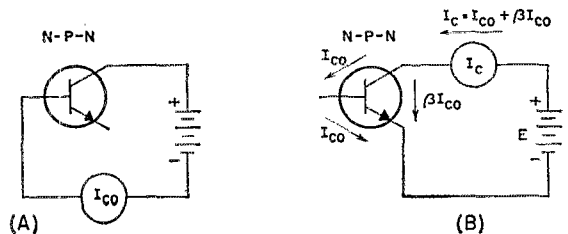
The old saw, "You can't get something for nothing," applies to some degree. The price we must pay is greater circuit complexity, higher current drain, and sometimes a loss in performance.

Silicon transistors are usable at higher temperatures than germanium units, but carry a much larger price tag. The principles described in this discussion apply equally as well to silicon types as to the germanium units.

### Leakage Current

Before we can compensate for variations, we must know what is varying. The worst offender with which we must contend is the leakage current, designated  $I_{co}$ . In normal operation the base-collector junction is reverse biased — that is, the polarity of the battery source is applied in the nonconducting direction. All semiconductor junctions have a leakage current which flows in the reverse direction to normal conduction. In the case of the transistor this current flows between the collector and base. If the supply voltage is applied between collector and emitter — as it is in a grounded-emitter stage — with the base open-circuited, this leakage current must also flow through the base region to the emitter. See Fig. 1. Current flow from base to emitter acts as a forward bias on the transistor, and by transistor action this causes a collector-to-emitter current to flow. The magnitude of this collector-to-emitter current is equal to the base current multiplied by the current gain,  $\beta$ , of the transistor. Therefore, the total collector current,  $I_c$ , is the sum of the collector-to-base current,  $I_{co}$

Fig. 1 — Transistor leakage current,  $I_{co}$ . (A) How it is measured; (B) How it affects the collector current,  $I_c$ .



and the collector-to-emitter current,  $\beta I_{co}$ :

$$I_c = I_{co} + \beta I_{co}$$

In germanium transistors  $I_{co}$  increases approximately 10 per cent per degree Centigrade. This amounts to doubling  $I_{co}$  for an 18-degree Fahrenheit rise. If  $\beta$  would remain constant over this range,  $I_c$  would also double for an 18-degree rise; that is, substituting  $2I_{co}$  for  $I_{co}$  in the equation above:

$$\begin{aligned} I_c &= 2I_{co} + \beta(2I_{co}) \\ &= 2(I_{co} + \beta I_{co}) \end{aligned}$$

Unfortunately,  $\beta$  also increases with temperature, although at a lower rate than  $I_{co}$ . To illustrate the rapid change of collector current with temperature in Fig. 1, let's take an example:

A transistor at 72° F. has  $\beta = 50$ ,  $I_{co} = 10 \mu\text{a}$ . (0.01 ma.). It is connected as in Fig. 1B with a 10-volt supply. What collector current will flow?

$$\begin{aligned} I_c &= I_{co} + \beta I_{co} \\ &= 0.01 + 50(0.01) \\ &= 0.51 \text{ ma.} \end{aligned}$$

What current will flow at 90° F., assuming that  $\beta$  increases 1 per cent per degree F.?

$$\begin{aligned} \text{At } 90^\circ \text{ F. } \beta &= 50 + (0.01)(90 - 72) (50) \\ &= 50 + 0.18 (50) \\ &= 50 + 9 \\ &= 59 \end{aligned}$$

$$\begin{aligned} I_{co} &= 2 \times 0.01 \\ &= 0.02 \text{ ma.} \end{aligned}$$

$$\begin{aligned} \text{then } I_c &= 0.02 + 59(0.02) \\ &= 1.2 \text{ ma. at } 90^\circ \text{ F.} \end{aligned}$$

The internal impedances of a transistor also vary with temperature, but the variation is less than with  $\beta$  or  $I_{co}$ , and does not have as profound an effect on circuit performance. Note that increasing temperature tends to increase the collector current, therefore we must take steps to prevent this current from getting too far from the original operating point within the temperature range we expect to meet. This will be the aim in the principles to follow.

### Design Principles

Here are five general rules to apply to transistor circuits to minimize the effects of temperature changes:

- 1) Limit the temperature range.
- 2) Provide a degenerative d.c. path around the stage.
- 3) Keep d.c. resistance in the base circuit as low as is practical.
- 4) Use temperature compensation.
- 5) Use balanced circuitry to cancel variations caused by temperature changes.

Rules, 1, 4 and 5 could each provide enough material for discussion to fill an article the size of this one. Here the emphasis will be placed on Rule 2, with a preliminary brief discussion of the others.

#### 1) Limiting the Temperature Range

This is perhaps the thing over which we have

the least control. However, we can avoid mounting transistors near tubes, resistors, and other components that get hot. In the case of a mobile rig, keep the transistorized units away from the engine, direct sunlight, and other heat sources. Sometimes the critical problem arises from heat generated within the transistor junction itself. In this case it is necessary to provide a heat sink to conduct heat away from the junction as rapidly as possible. Ventilation, heat-radiating fins and dull black paint, even the use of blowers, should not be overlooked.

#### 3) Keep D.C. Resistance in Base Circuit Low

The example in connection with Fig. 1 illustrated the evils of an open base circuit. If the base were grounded,  $I_c$  would become  $I_{co}$  and it would be independent of  $\beta$ . Of course, such a circuit wouldn't amplify, either, but the lower the resistance we can insert between base and ground the more we reduce the temperature dependence. In the case of R-C coupled audio stages this will reduce the gain since the resistance will load the input-signal source. A transformer-coupled stage (a.f., i.f., or r.f.) could provide for a d.c. short circuit to ground with no loss in gain (this is mentioned by way of example only, since the stage still must have forward bias applied if it is to operate Class A).

#### 4) Temperature Compensation

This refers to the practice of using a temperature-sensing device to vary a voltage, current or resistance in such a way as to cancel the effects of temperature changes, as opposed to stabilizing against them. Temperature compensation is applied principally in circuits which are required to handle large amounts of power, and where efficiency is a prime consideration. It also finds application in correction for drift in d.c. amplifiers.

#### 5) Balanced Circuitry

Here is another broad area which finds limited application in amateur equipment. It is useful in d.c. amplifiers, especially at low levels. This is where having transistors of both p-n-p and n-p-n types becomes advantageous.

#### 2) Degenerative D.C. Path

This heading could be deceptive. The principle is not limited to one stage — in fact, it is more advantageous when applied over more than one stage — but circuit analysis of multiple stages with feedback becomes considerably more complicated than that of a single stage. Also, trial-and-error procedures should be left to the experienced — unless you have a large supply of transistors with which to gain the experience. This discussion will be confined to a single stage.

Fig. 2 shows different configurations for a single Class A audio stage. They are in approximate order of increasing stability, the first (A) being an unstabilized stage, and the last (F) being the most stable. The equations accompanying each circuit can be solved for the necessary

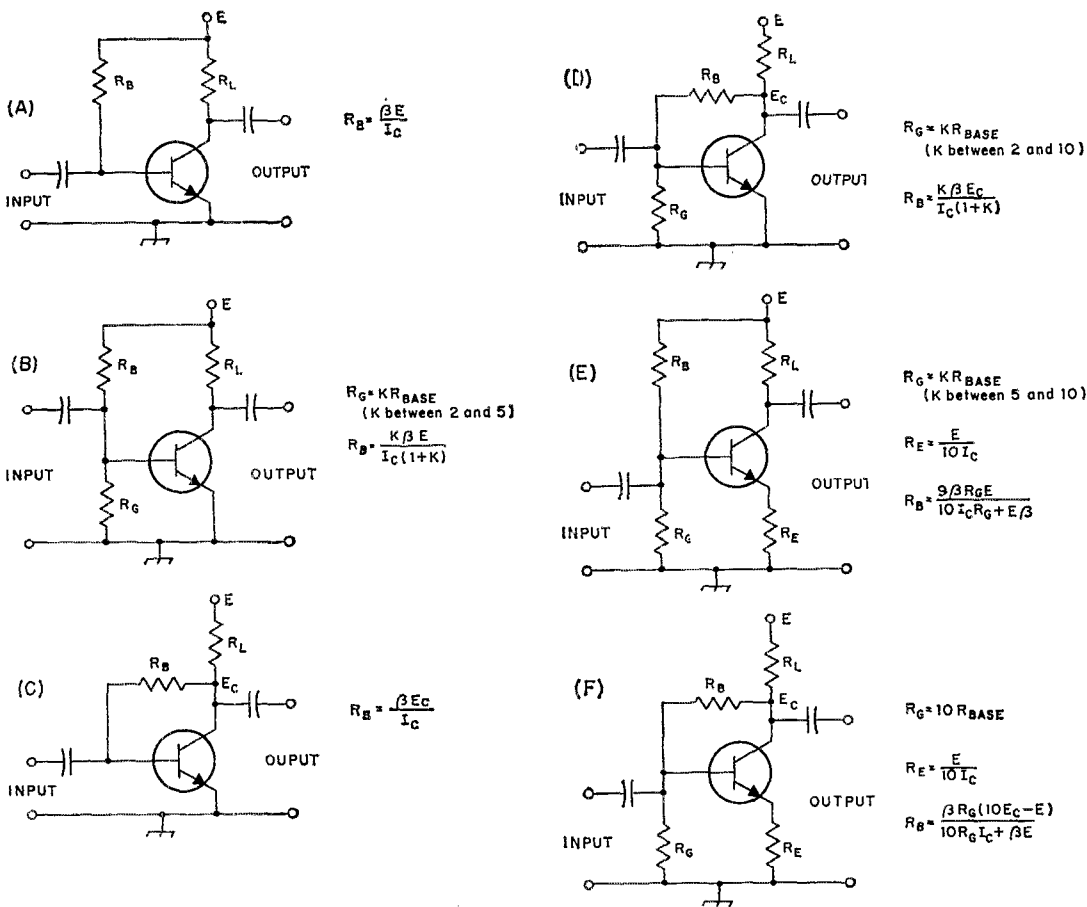


Fig. 2—Bias stabilization circuits for resistance-coupled amplifiers. Equations are based on the assumption that  $I_{co}$  is small at room temperature; in circuits D, E, and F this assumption is valid, but in circuits A, B, and C the value of  $R_B$  will have to be adjusted if  $I_{co}$  is high.

An approximate value for the load resistance,  $R_L$ , is  $E/2I_c$  ( $I_c$  = collector current) although other values may be used to meet specific circuit design requirements, in which case the proper value may be determined from the transistor characteristic curves. When  $R_L = E/2I_c$ , the collector-to-ground voltage,  $E_c$ , is approximately equal to one-half the supply voltage; with other values of  $R_L$ ,  $E_c$  can be found from the curve data.

The value of  $R_G$  may be selected arbitrarily, but should be within the limits shown.  $R_{BASE}$  is usually of the order of 1000 ohms.

resistance values. The supply voltage must be known, the operating point (collector current) determined, and  $R_G$  chosen.

$R_G$  fixes the base circuit resistance; therefore, in accordance with Principle (3), it should be as low in value as is practical. Its value will depend on the base input resistance of the transistor used, the degree of stabilization required, and which circuit is used. Some ballpark indication of the value to use accompanies each circuit. Use lower values for portable and mobile gear, and higher ones for home-station use. If there is doubt as to what operating point to use, consult the transistor ratings for typical operating conditions.

Here is an example to show how the equations are used:

A 2N591 transistor ( $\beta = 70$ ,  $R_{BASE} = 1000$  ohms) is to be used as the first stage in a speech amplifier for a mobile rig. (When the transistor data sheets show maximum, design center, and

minimum values for  $\beta$ , always use the minimum value unless you happen to know the actual

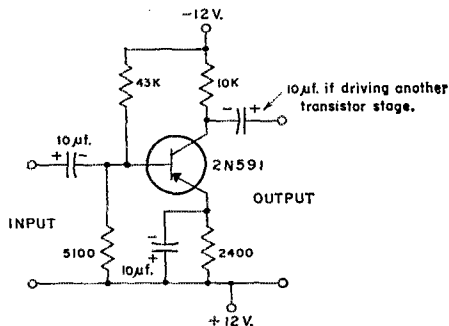


Fig. 3—Example of circuit values based on the circuit of Fig. 2E. With this stabilization the amplifier will operate over a temperature range from below freezing to above 150° F.

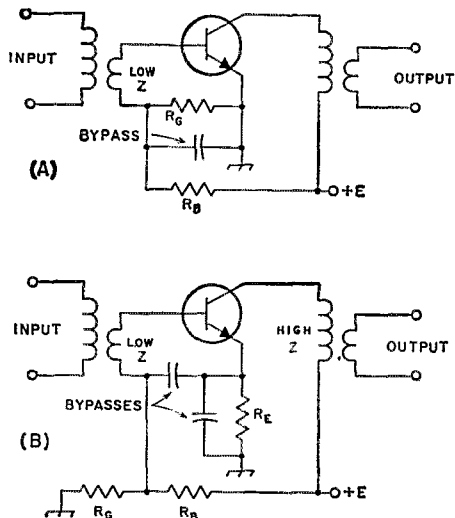


Fig. 4—Transformer-coupled circuits suitable for audio, i.f. and r.f. amplification. The bias stabilization in (A) corresponds to that of Fig. 2B; (B) corresponds to Fig. 2E.

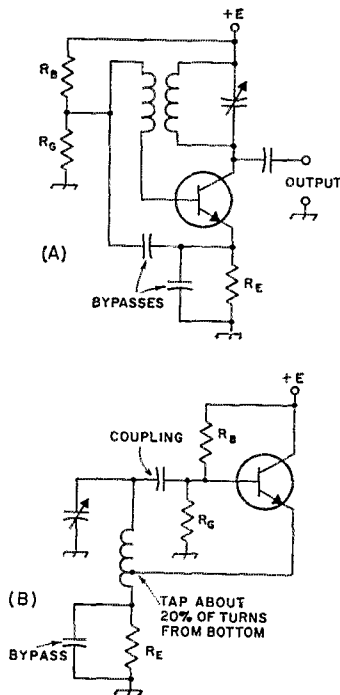


Fig. 5—Oscillator circuits. A) Tickler circuit; (B) Hartley. Stabilization in both circuits is the same as Fig. 2E. Use equations given in Fig. 2E except that  $R_G$  should be equal to  $R_{BASE}$  in (A) above, and  $R_G$  should be 5 to 10 times  $R_{BASE}$  in (B) above.

value of  $\beta$  for your particular transistor.) The battery voltage is 12. Find values of the resistances to be used, the circuit chosen being that of Fig. 2E.

1) Choose operating point and  $R_L$ . From transistor data,  $I_c = 0.5$  ma. A suitable value for  $R_L$  is 10,000 ohms.

2) Choose  $R_G$  equal to  $5R_{BASE} = 5(1000) = 5000$ . Use the nearest standard value, 5100 ohms.

3) Find  $R_E$ :

$$R_E = \frac{E}{10I_c} = \frac{12}{10(0.0005)} = 2400 \text{ ohms.}$$

4) Find  $R_B$ :

$$R_B = \frac{9E\beta R_G}{10I_c R_G + \beta E}$$

$$= \frac{9(12)(70)(5100)}{10(0.0005)(5100) + (70)(12)}$$

$$= 44,600 \text{ ohms (use 43K or 47K).}$$

For maximum gain, the emitter resistor,  $R_E$ , would be bypassed for audio frequencies. The size of the bypass should be such that its reactance at the lowest audio frequency to be amplified is low compared with  $R_E$ . In this case, for a low frequency of 300 c.p.s. a 10- $\mu$ f. bypass would be satisfactory. The resulting schematic of the stage is shown in Fig. 3.

The circuits shown in Fig. 2 can be adapted to transformer coupling as shown in Fig. 4. The transformers could be for either audio, i.f. or r.f. amplification. Note the use of bypass capacitors and transformers to keep the a.c. and d.c. paths independent of each other. Conventional practice in receiver a.v.c.-controlled i.f. stages calls for lifting  $R_G$  from ground and returning it to an a.v.c. line. The d.c. equivalent circuit for an oscillator would be the same as for the circuits of amplifiers. The a.c. configuration would have one transformer with a feedback winding. Figs. 5A and 5B show two arrangements.

The circuits in Figs. 2E and 4B are recommended for general use. The unstabilized stage of Fig. 2A should not be used in the final design of any equipment. It might be appropriate at this time to point out that transistor characteristics also vary with age, especially during the initial period of service. If the circuit of Fig. 2A is used  $R_B$  might require readjustment after a few weeks of operation.

The circuits outlined in this discussion do not apply to power converters or power amplifiers where efficiency is important since the losses in the series resistances would be intolerable. Neither do they apply to d.c. amplifiers, since the d.c. degeneration would reduce the gain as much as it would improve the stability. These and certain other transistor applications must be handled by the other methods mentioned earlier.

It is hoped that the principles, circuits and design equations described will be of help to amateurs wishing to "take a whack" at designing their own transistor circuits.

QST



## • Recent Equipment —

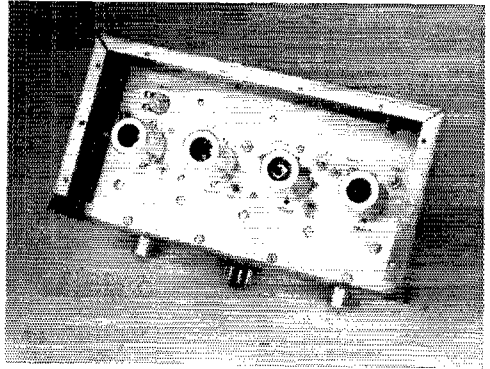
### XC-2 Crystal-Controlled Converter Kit for 2 Meters

THE October 1959 issue of *QST* reported on the Heathkit XC-6 converter for 6 meters. Heath has since brought out a 2-meter companion, the XC-2, which does the same job for 144-Mc. reception that the XC-6 does for 50 Mc., although the circuits and tube complement are not identical.

Like the XC-6, the XC-2 is designed for use with the Mohawk receiver, using a tunable i.f. of 22 to 26 Mc. A 61-Mc. overtone crystal for this i.f. is furnished with the XC-2 kit. However, with a crystal of appropriate frequency the converter can be used with any receiver that can tune a 4-Mc. segment between 22 and 35 Mc., and a convenient chart is provided in the instruction book to help in determining the right crystal frequency to use for i.f.s other than 22 to 26 Mc. The unit pictured here had a 57-Mc. crystal and was used with an NC-300 receiver.

The converter uses four tubes, a 6AM4 grounded-grid first r.f. amplifier, a 6BS8 cascode second r.f. amplifier, a 6EAS triode mixer and pentode i.f. amplifier, and a 12AT7 oscillator and multiplier.

Fig. 1 shows the r.f. amplifier and input circuit used in the XC-2.  $L_1C_1$ , a trap tuned to the i.f. image frequency, gives a high order of rejection for the i.f. image (Heath claims up to 100 db.)  $L_2C_2$  is the antenna input circuit; the



Top view of the XC-2 converter with part of the top cover removed. Two coax connectors, for converter output and antenna input, are mounted on the chassis side, along with the octal power connector. The i.f. image trap capacitor is visible in the top left corner of the photograph.

tube which is known for its low intermodulation characteristics. Instead of the usual series-connected cascode arrangement, Heath uses a parallel-connected circuit which allows using higher plate voltage on the first section for greater signal-handling capacity and higher transconductance.

The triode mixer section of the 6EAS is capacitively coupled to the second r.f. amplifier. Injection voltage from the 12AT7 is coupled through a  $2.2\text{-}\mu\text{f.}$  capacitor to the mixer grid. One half of the 12AT7 is used for the overtone crystal oscillator and the other triode section operates as a frequency multiplier.

The mixer is capacitively coupled to the i.f. amplifier, which uses the pentode section of the 6EAS. Link coupling is used to couple the converter output to the receiver. The converter is designed to match a receiver input impedance of 50 to 70 ohms.

There is no power supply in the converter. Filament and plate power can be taken from a separate power supply or from any source, such as the companion receiver, that can meet the power requirements of 150 volts at 50 ma. and 6.3 volts at 1.375 amp. An eight-prong octal plug is provided on the converter chassis for making power connections.

Physical construction of the converter can be compared to the proverbial battleship. The oscillator circuits are completely enclosed in a shielded compartment in order to reduce the possibility of birdies in the tuning range of the receiver. Each stage is separated from the others by silver-plated shield partitions. Carrying the shielding one step further, antenna and i.f. output connections are made through coaxial jacks using coaxial-connector hoods.

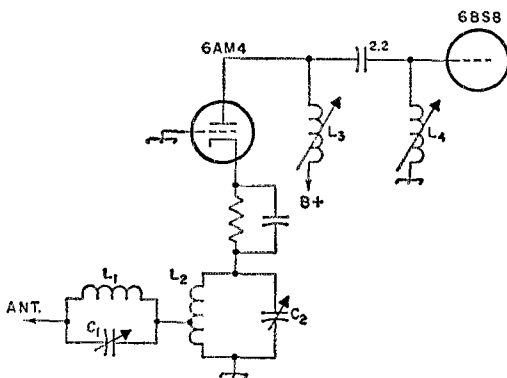
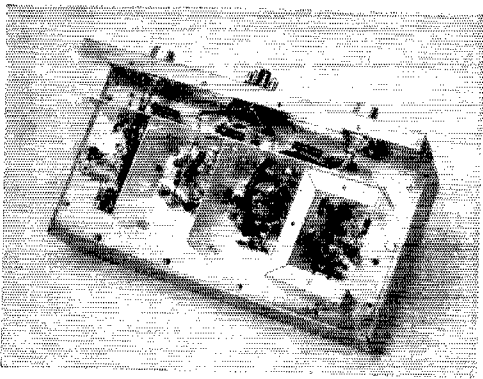


Fig. 1—R.f. amplifier and input circuit of the Heathkit XC-2 converter.

antenna connection (low-impedance) is tapped on at the point giving the best noise figure. On the output side,  $L_3$  and  $L_4$ , coupled through the  $2.2\text{-}\mu\text{f.}$  capacitor, constitute a band-pass circuit tuned for flat response from 144 to 148 Mc.; these coils are resonated with the shunt tube and stray capacitances. All coils are wound with silver-plated wire on ceramic forms to insure high  $Q$  and stability.

The 6BS8 cascode second r.f. amplifier is a



Removing the cabinet and several of the cover plates uncovers the internal baffles and shields shown in this view of the XC-2 converter. The oscillator compartment, at the bottom right, is completely isolated from the other stages when the converter is "buttoned up." Filament and plate power leads to all stages are decoupled by means of feedthrough capacitors and the r.f. chokes visible in the top channel space.

The chassis measures 9 by  $4\frac{3}{4}$  by 2 inches and when fitted in its cabinet (not shown in the photographs) measures  $5\frac{1}{2}$  inches high. The case and cabinet are finished in two-tone green.

The complete assembly weighs  $4\frac{1}{4}$  pounds. There are no operating controls on the XC-2 as tuning and gain setting are done at the receiver.

Complete alignment instructions geared to the type of equipment you might possess are provided in the instruction book. Alignment methods using a sweep generator and oscilloscope, a signal generator, or a 2-meter transmitter are given. Adequate performance can be expected using the latter method, although more precise adjustment can be made when the other methods are used. All the necessary alignment tools are included in the kit. The building and wiring time for the XC-2 kit, excluding alignment time, was approximately  $8\frac{1}{2}$  hours. In the initial testing we had some minor trouble with mixer instability, but this was corrected by connecting a  $5\text{-}\mu\text{f.}$  capacitor from the mixer plate pin to ground.

The measured sensitivity of our converter using the band width of the NC-300 was  $0.3\ \mu\text{v.}$  for a 6-db. signal-plus-noise-to-noise ratio. This should be quite adequate for the v.h.f. enthusiast who wants more than run-of-the-mill performance but isn't ready to invest in a super low-noise converter.

— J. F. L.

## NEW BOOKS

**RCA Receiving Tube Manual, RC-20**, published by Electron Tube Division, Radio Corporation of America, Harrison, N. J.  $8\frac{1}{4}$  x  $5\frac{3}{8}$  inches, 432 pages. Price, \$1.00.

If you have owned earlier editions of the popular RCA Receiving Tube Manual (and who hasn't?) it will suffice to say that it has been revised, expanded and brought up-to-date, now containing technical data on over 760 receiving tubes. In addition to the regular receiving tube line (which includes the new 12 volt automobile tubes) the book lists TV picture tubes (black and white and color), high-fidelity and series-string tubes. The manual contains expanded material on basic tube theory and applications and has several new circuits in the Circuits Section at the back of the book. Among other things, the circuits cover superheterodyne, superregenerative and short-wave receivers, code practice oscillators and various types of amplifiers.

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**How To Get the Most Out of Your VOM**, by Tom Jaski. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y.  $5\frac{1}{2}$  by  $8\frac{1}{2}$  inches, 223 pages, including index, paper cover. Price, \$2.90.

The volt-ohmmeter is probably the radio amateur's most frequently used test instrument. This book describes many new and unusual applications which the ham should find interesting. Also included in the book is information on how to work faster with the v.o.m., how to take care of it, check it, use it as the base for other instruments, extend its range, and increase its accuracy. Data are given for those interested in constructing their own, and the book also analyzes commercial v.o.m.s. both wired and in kit form. The final chapter should be of interest to the experimenter since it covers miscellaneous applications, such as using the v.o.m. for measuring temperature, as a liquid level indicator, a sensitive balance, and as a distributor and regulator adjuster in automobile servicing.

**Model Radio-Control, second edition**, by Edward L. Safford, jr. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. Gernsback Library Book No. 74.  $5\frac{1}{2}$  by  $8\frac{1}{2}$  inches, 192 pages, paper cover. Price, \$2.65.

Radio amateurs who are also radio-control fans will find in this revised and enlarged edition up-to-date information on remote operation of model planes, boats and trains. The book starts out with basic concepts and moves along into coding and coders, transmitters, receivers, decoders, power control circuits and servo motors. Also included is information on the use of transistors in model radio control, together with practical circuits and projects. There is plenty of discussion of the various types of complete systems, along with tips on construction and trouble shooting.

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**Simplified Radio Servicing by Comparison Method**, by M. N. Beitman. Published by Supreme Publications. 47 pages, including index.  $8\frac{1}{2}$  by  $10\frac{3}{4}$  inches, paper cover. Price, \$1.50.

The author claims that by using this manual, 90 percent of the failures encountered in radio can be corrected without the use of special testers or instruments. The comparison method involves the use of simple tests which give electrical, visual or other reactions from the radio components or circuit. From the results observed, it can be determined if the circuit is working properly. If the right result is not obtained, the method tells you what parts or stage to suspect. Using this technique greatly simplifies radio servicing and calls for little technical knowledge and few instruments. The manual starts off with basic fundamentals and electrical facts. It then moves into a.c.-d.c. superheterodyne sets, portables, t.r.f. and transistor receivers. Information is also given on automobile receivers, clock radios, phonographs and intercoms.

— E. L. C.

This is the way the eyelets come packaged when you find them at the notion counter.

# Aluminum Eyelets Make Good Fever Medicine

BY JOHN HOWARD,\* K8MME

**N**OTWITHSTANDING assurances to the contrary by ham gear manufacturers, we sometimes have concern that our compactly built rigs and accessories may be running a temperature. If you have built or purchased equipment that seems to bottle up an excess amount of heat because of inadequate means for ventilation, this idea may be worth trying.

The simple expedient would be to drill a pattern of ventilating holes at the proper places. But the results may not provide the best desired appearance. Raw metal can be seen if holes are drilled through a previously enameled surface. The job loses its "factory made" appearance.

Aluminum eyelets can be purchased at very low cost in the notion department of the average department store. These are refill packages for use with eyelet pliers, but forget the pliers for this use. Also, select the package containing the plain aluminum eyelets, not the colored ones.

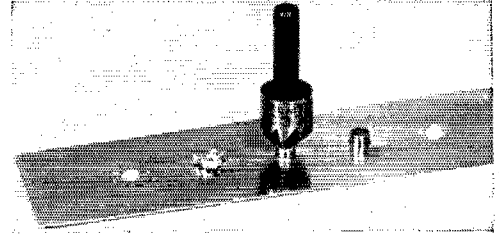
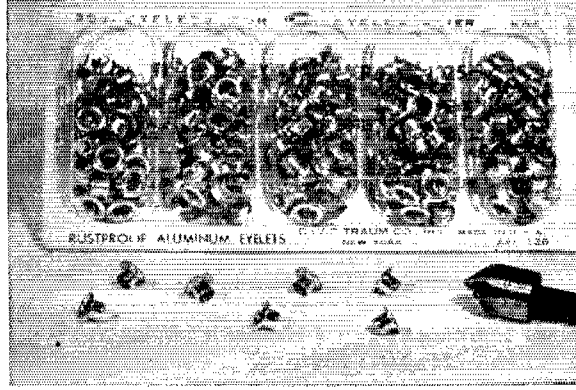
If you consider trying this idea at all, test it first on a scrap sheet of aluminum to see if you like the results, and also to practice the procedure before tackling valuable equipment. Also, don't try it inside a confined space where you won't have room to manipulate the tools used.

Holes  $3/16$  inch in diameter were drilled for example illustrated. The head of each eyelet should rest on a firm surface when cutting the shank and driving it home. A countersink bit placed on the shank of the eyelet and tapped with a light hammer will cut the shank into some eight little tabs, which are then flattened down with a few light taps of the hammer alone. Don't drive too hard or the head of the eyelet may be distorted.

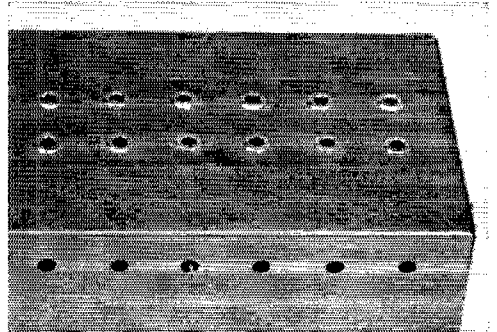
Holes arranged in a pattern  $3/4$  inch apart in each direction give a nice appearance and provide good escape for air.

If you've been frying eggs on the top of your rig, don't be surprised if you find that the cabinet itself may even get a little hotter when the vent holes are provided. Chances are there has been a pocket of heat underneath without very much air motion. As this heat passes through the vent holes the metal top may absorb still more heat than before.

\* Apartment C-107, 1336 Brookline Road, Cleveland Heights 21, Ohio.



An ordinary countersink does the job of spreading the inside end.



The finished job—ventilating holes in the cabinet attractively set off. Compare with the plain holes on the near surface.

One photo shows the difference in appearance between raw holes and holes finished with eyelets.

**QST**

## FEEDBACK

A recheck of the type number of the Arnold Engineering core used by K2BQK (Tetz, "Design and Construction of Transistor Power Converters," April, 1960, *QST*) shows that it should have been 5772-D4 rather than 5387-D4. The dimensions as given in Fig. 6 in the article are correct. Also, to answer a question that has puzzled some readers, K2BQK says that the actual frequency of the oscillator is about 1250 c.p.s. This was the figure that "came out" after winding on 36 primary turns, the maximum number that would fit when using No. 14 wire.



AREC and RACES work closely together but are not identical in Cuyahoga County.

## *How to Keep the AREC Group Productively Busy Between Emergencies*

*No one has been more successful in AREC organization than the author, who received the 1959 Edison Award in recognition of his efforts. In this article, W8AEU tells you some of the secrets which have made the Cuyahoga County AREC group what it is.*

BY WALTER ERMER, SR.\*, W8AEU

# THE AMATEUR RADIO EMERGENCY CORPS AND PUBLIC SERVICE

**T**HE field of Public Service is a vast one indeed, having its roots in our pioneer days.

Since the beginning of our country, neighbor has been helping neighbor without compensation. All around you, you will find evidence of this: in church work, scouting, settlement work, Red Cross, charity drives and many others. But among hobbies, where can you find one that benefits anyone but the participant? For the average amateur, participation in public service activities will open new fields of enjoyment he has never experienced before because he will be having fun with his hobby while at the same time helping his neighbor.

In all phases of radio and TV today, the Federal Communications Commission requires that a station must qualify under PICON (Public Interest, Convenience or Necessity), and that goes for us amateurs too. We must each do our part to solidify the standing of the Amateur Service under PICON. In describing the Amateur Radio Service, our FCC regulations state we are "a noncommercial communications service serving the public especially," but not exclusively, "in emergencies." What have you personally done in the last month or so that qualifies you and your station under PICON?

Since the inception of amateur radio, the name "ham" has been identified with emergency. About a quarter century ago the American Radio Relay League decided that a more definite emergency communications organization was necessary to utilize the amateur facilities to its own and the public's best interest. Thus, the Amateur Radio Emergency Corps was formed. Let us emphasize! The AREC consists only of licensed amateurs; its leaders are amateurs ap-

\* 15328 Edolyn Ave., Cleveland 11, Ohio.

pointed by our own sponsoring agency, the ARRL.

Centralizing the overall organization is the National Emergency Coordinator at ARRL headquarters. Each Section of the ARRL Field Organization (see page 6) has its appointed Section Emergency Coordination. Local Emergency Coordinators are appointed (one in each county). The EC in large metropolitan areas may line up a sufficient number of assistant ECs to handle the major agencies and projects. For example, assistant ECs may be designated to furnish the necessary liaison with police, civil defense, Red Cross, MARS, Civil Air Patrol, the Coast Guard, news dispensing agencies, the Forestry Service, the Weather Bureau, or head projects such as parades, fund drives, emergency nets, long haul traffic, sporting events, road patrol and others. In small communities the above liaison work can be done by fewer assistants, or the EC may find it possible to handle it all himself. A sound local organization with responsible leadership is the foundation on which to build the AREC into a dedicated public service organization, accepted by the public and ready to serve any worthy cause.

It is strange how many hams crawl into a shell and live in a world by themselves. They do great things as a matter of course, but tell no one. Remember, many things which are commonplace to us are news to the public. Only by doing things for the public and then *telling* them about it can we ever raise the standing of ham radio to the high level it deserves. We must promote the name "Amateur Radio Emergency Corps" in local publicity in preference to individual club names or the agencies which we are serving. Let us promote the AREC to the limit

from coast to coast so it is the recognized amateur service organization on a par with such well-known names as the American Red Cross, the Office of Civil and Defense Mobilization — yes, even our own military. And how to do this? There are hams in almost all radio and TV stations. Small newspapers generally welcome our news, although the big metropolitan newspapers are a different story. In Cleveland, after two years of effort by leading amateurs, we succeeded in getting our own weekly column in the *Cleveland Plain Dealer*, written by W8BAH. We also insist that the agencies we serve mention "Amateur Radio Emergency Corps" in their own news releases.

Of greatest importance to the success of any public service project is careful advance planning with the officials in charge of the operation. Every activity requires at least one meeting with project officials. (In some cases we have had as many as eight meetings.) It is good public relations itself for the amateurs to sit in a planning conference with top business and civic leaders. Many times the entire project is molded to fit the communications facilities. Several things to emphasize in the planning: (1) We are important, but we are not the whole show. (2) Although an alert amateur can make suggestions to officials when things get fouled up, our job is only to furnish communications; any other duties should be minimized. (3) All participants must be kept busy or they become unhappy; have it clearly understood where each station's traffic is coming from. (4) Always plan for emergencies that may happen (remember "Murphy's Law"). (5) Work out the publicity for and recognition of the amateur which is so necessary in getting his continued cooperation.

### Civil Defense

Under this heading, let's first try to dispose of a knotty problem faced by many AREC groups. There have been plenty of publications on the subject of RACES organization,<sup>1</sup> so we won't go into that here. What is more needed is to place RACES and AREC in their proper perspective and show how the two can get along together in the same town.

In a very small community where only a handful of amateurs reside, it is logical that AREC and RACES be identical, with the radio officer and the EC the same person. In medium and large communities there is more reason for separation because the basic purpose of each may differ. The amateur in c.d. is specializing to furnish communications for civil defense. The amateur in AREC serves *all* the people through *many* agencies, *one* of which is c.d. If each group keeps its basic purpose in mind, there is no need for any conflict.

<sup>1</sup> A complete bibliography of *QST* articles on civil defense and RACES is available free of charge from ARRL headquarters.

To weld the two groups together in the Cleveland area, the radio officer is an assistant EC; this gives him access to the enormous facilities of the AREC if he finds his own specialized group in c.d. overtaxed in any given situation. The EC and his station are licensed under the RACES program, thus giving him access to c.d. facilities if he finds it necessary. AREC members are encouraged to join RACES and RACES members are encouraged to join AREC. Thus, many of our members have two hats and merely put on the one which fits the occasion. The net result has been a very workable and amiable arrangement which has served to good purpose for many years.

### Severe Weather Warning Network

A very important activity of the AREC is participation in a pre-storm warning network in cooperation with the local weather bureau. Almost all parts of our country, but especially the midwest, are subject to damage from severe thunderstorms or tornadoes. Few people realize that even with modern equipment and highly skilled personnel at our weather bureaus, ground observers for reports on severity are still needed. For example, a tornado could be hidden within a thunderstorm and not show on radar. Regular ground observers often have trouble calling in on the telephone and the weather bureau has trouble calling out because circuits are loaded with calls from worried people. Here is where amateur radio is of great value. Many times during the advance of an oncoming storm the weather bureau may request data from areas where the radar indicates a dense storm cell developing.

After preliminary arrangements are made with the weather bureau for antenna location and operating space, a test should be run to determine if there is any interference to or from other services. The frequency selected should be in the most popular high-frequency or v.h.f. band in the area. Other existing nets on the same band or nets on other bands should be encouraged to check in as a group, if they wish, by placing one of their members owning dual equipment on the AREC net frequency. Every amateur within the area covered by the local weather bureau and desiring to participate should have some member of his family or friends who consistently listen to radio advise him if the words "severe

Helping the Weather Bureau in storm tracking.

September 1960





W8AEU presents an ARRL Public Service Award to W8KKO, who rescued 16 families during floods in June, 1959. On left is W8AJW, on right K8AAG.

thunderstorm" or "possible tornado" appear in any special weather bulletin. Advance arrangements should also be made for those assigned to the weather bureau and the net control stations to alert themselves upon receipt of a warning by any one of the group. Printed forms should be available to key participants for proper recording of information.

Broadcast of "severe thunderstorms" or "possible tornado" in any special weather bulletin is the signal for everyone to get on the air. With the first check in, the station at the weather bureau would list all communities who reported in. The net control station should list all mobiles for future use if damage results.

As the storm passes through each community, one station in that community should forward the following information to his net control and the station at the weather bureau: call, community, whether storm is normal or severe, size of hail (very important!), existence of tornado, exact location of storm, time storm observed, tree limbs broken, trees uprooted, buildings demolished, direction and speed of travel, and any other important facts. *Sighting of a tornado takes precedence over all other traffic.*

After the storm passes through, all stations should remain on standby until cleared by the station at the weather bureau. If destructive winds have been reported, net control should dispatch mobiles to probe the area to report severity and exact area damaged to the weather bureau and police, and remain in the area to provide communications between net control and various authorities involved, such as police, fire, utilities, e.d., Red Cross, etc.

#### **AREC Road Patrol**

Many of our large metropolitan areas now now have limited-access freeways within or around the city which carry a terrific traffic load during the morning and evening rush hours. Telephones on the freeway are generally few and far between, so a motorist having trouble is really in trouble. Even a flat tire can tie up thousands of motorists.

In this kind of operation, emergencies actually become routine and are good practice for both mobiles and net controls. In the Cleveland area literally hundreds of phonic calls of all types are

made in a season. Many are serious. Some are humorous, such as this report from a mobile during the rush hour on an eight-lane freeway: "Intoxicated pedestrian walking east on Shore Drive into heavy westbound traffic, center lane." The police dispatcher thought it was a joke and gave our control station a hard time, but nevertheless the individual was picked up within four minutes. Funny? Maybe — but maybe also we save a life with that call.

The setup in a "road patrol" is quite simple. It requires fixed stations to act as net control during the rush hour on whatever AREC frequencies are used by the mobiles. It is suggested that control duty be scheduled so there isn't too much of a load on any one station. In the winter, during bad weather, it is often advantageous to have two fixed stations on: one to handle the net and one to handle the telephone traffic. It is a good idea to inform the police in advance of your plans; also to make arrangements for the handling of information on traffic jams with the news room of a popular local broadcast station with the understanding, of course, that they plug the "Amateur Radio Emergency Corps" with every broadcast using information emanating from the hams.

From our own experience, we offer the following rules: (1) In reporting accidents, *always* check for injuries and advise police promptly. Give an accurate, detailed report with exact location and suggest to police how they might best get to the scene if traffic is piling up. (2) Report stalled cars only when in a dangerous position or blocking traffic. Flat tires should be reported only when they are on the side exposed to heavy traffic flow, or when otherwise blocking traffic. (3) in reporting disabled trucks, furnish police with the name of the trucking company, so they can notify the owner. (4) Be alert to special situations calling for police action. In the Cleveland area we have handled calls on hit-and-run, burglary, hold-up and drunken driving. (5) Notify broadcast stations of any situation causing a traffic tie-up, with an estimate of how long a delay the motorist can expect. Just as important is a report on the clearing of an obstruction causing a jam so motorists know the way ahead is clear. (6) Any call on behalf of a motorist who is in trouble is most appreciated by the motorist and makes another friend for amateur radio.

#### **Parades**

Here comes the parade! What magical words are those that bring thousands out to march and hundreds of thousands to watch. Everyone loves a parade, and that includes the radio amateur. By using our facilities in parade control, we are permitted to parade our mobiles, all carrying

"Amateur Radio Emergency Corps" signs, a very effective way to keep our name in front of the public.

Adequate communications can render assistance to parade officials in the following particulars: (1) Pre-parade marshalling activities. (2) Prevent "bunching" caused by feeding the parade too fast. (3) Prevent "gaps" by requesting a faster feed, slowing down the pacing car or speeding up the slow pokes. (4) Keep officials informed as to the location and condition of all parts of the parade at all times. (5) Handle emergencies such as equipment breakdown, spectator disorders, etc.

Cars selected for mobile units should not be over two years old and should be washed and polished. Each car should have both a driver and an operator. A sign "Amateur Radio Emergency Corps" should be mounted on the side windows large enough to be read from the curb. A link to the police must be provided either through a portable unit set up at the police station or a fixed station with a telephone. Pre-planning with parade officials before the event is a *must*.

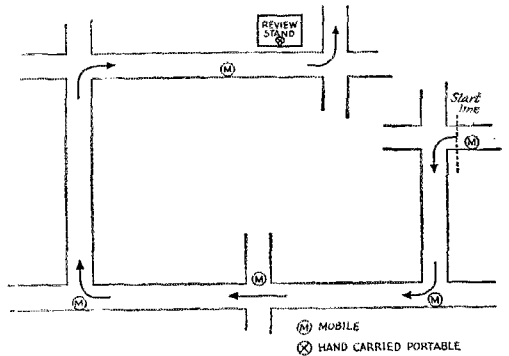
In the Cleveland area we have two types of parades. The first is very highly organized with definite preregistration of units whose attendance in previous years has proved to be reliable. The parade is divided into 8 divisions with an assistant parade marshall in charge of each division. We place a mobile at the head of the parade, one carrying an assistant marshall with each of the eight divisions, and a mobile in the tail position.

The second type of parade is handled differently because of the wide variation in the number of participants. One mobile remains at the starting line and later becomes the tail car. All other mobiles proceed through the parade route in formation about one minute before the starting time, dropping out at prearranged points along the route. The points are so located that the mobiles are not over three blocks apart and the entire parade route is under their surveillance. One mobile is stationed about 100 yards from the reviewing stand and a hand-carried portable is placed with the announcer, thus giving him contact with the entire parade. At the end of the parade, each mobile along the route joins the tail mobile as he passes and the entire group passes the reviewing stand in "flying wedge" formation with words of appreciation from the announcer.

### Health Fund Drives

Enjoy a fund drive? Practically unheard of. Everyone who takes part does so out of a sense of duty. The radio amateur, however, is an exception. He actually *enjoys* himself while using his hobby for some worthy cause. This type of activity is highly recommended as an AREC public service function.

Good communications can smooth out an otherwise-chaotic condition for fund-drive officials. Because a drive is handled mainly by volunteers, many errors are committed and difficult situations arise which are quickly straightened

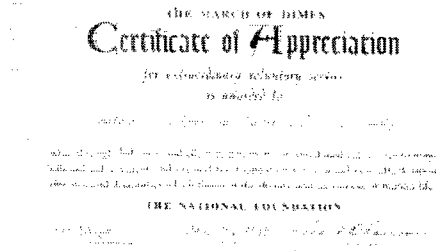


It doesn't take many units to handle parade communications, as can be seen from this typical layout.

out through communications. Instant contact with the mobiles takes care of last minute changes or mixups and lessens the amount of time the money lies in homes or collecting points. Rapid communication will bring immediate help from police if suspicious persons are about or an actual holdup is attempted.

In the Cleveland area we find each fund drive unique because of the many different ways of conducting such campaigns. Generally, in a fund-raising campaign, between 10,000 and 30,000 workers are out ringing doorbells and soliciting. These workers bring the money to their leader who acts as a collection point. Depending on the area of the drive, we may have from 33 to 90 collection points. The problem is to haul the money safely from these collection points to one central point. It is not uncommon for a mobile to have in excess of \$20,000 aboard. Usually, but not always, each mobile will have an armed guard with him who may be a city policeman, a national guardsman or a c.d. policeman authorized to carry arms.

In a typical layout of such a project, each mobile is assigned five collection points, all in the same general area. Each collection point carries a number, so reference over the air can avoid locations, for obvious security reasons. Mobiles break security only when faced with a



Certificates of appreciation from agencies served are helpful in cementing relations. This one is from the March of Dimes.



Working closely with the police department in traffic control.

definite emergency. One or two stations, centrally located, control the mobiles. A link circuit on a separate frequency is set up among portables operating at fund headquarters, the police station and the net control station. Each collection point calls in on the telephone when its funds are all in and a mobile is dispatched for the pickup. From that time on, constant contact is maintained with his net control station until the money is safely disposed of. Police officials have commented that it is safer to have good reliable communications where help can quickly be summoned than to be armed.

#### *Golf Tournament*

Participation in a golf tournament presents some interesting problems, especially when the ham groups know nothing about golf. To us, a "birdie" is a bird, and nothing else.

Nevertheless, our services make the officials' jobs easier, make the event more enjoyable to the public and keep the news services informed. Scores are called in from the course and recorded on scoreboards for the press and the public; special information is furnished the announcer from the 17th tee to the 18th hole; requests for judges' services from the course are fulfilled; emergency service is provided for the public covering injuries, illness, lost children and lost men. Yes, believe it or not, in a recent tournament with 20,000 spectators the Cleveland group had only one lost child but *four lost men*. One of the most serious emergencies was for a man hit by a ball on a recently-healed gall bladder operation. Figure the odds on that one! You have to be ready for any kind of an emergency.

In the layout of a typical project, net control was set up next to the press tent and scoreboard. (Warning: be sure to ask Western Union to install machines which do not cause radio interference — they have them. Also, be sure in advance that you won't get into the p.a. system.) The first nine holes need not be covered by radio because it is sufficient to post the scores directly when the players reach the ninth. Mobiles are recommended for greater reliability than hand-

carried portables and should be spotted at each hole from 10 through 17, located between the green and the next tee and at least 150 feet from the green so the noise from the engine does not disturb the players. These same mobiles can also serve a scoreboard if close by, otherwise additional mobiles must be assigned for that purpose. The mobiles at the greens call in each player's score to the scoreboard as he passes, including information on hole number, player number, player name and number of strokes. Printed forms are used, each form carrying message servicing data.

The scores at the 18th hole are checked and declared "official" before being forwarded by the runner, in writing, to the scoreboard. It may be desirable to provide a portable and a hand-carried unit on a different frequency at the 17th and 18th holes for special information needed by the officials.

In a Cleveland project our six meter boys forwarded 639 scores, recorded on two scoreboards without a single error, and still had time to keep all mobiles informed on the location of all blondes and redheads in "short shorts" on the course. Try and beat that record!

#### *Traffic Control*

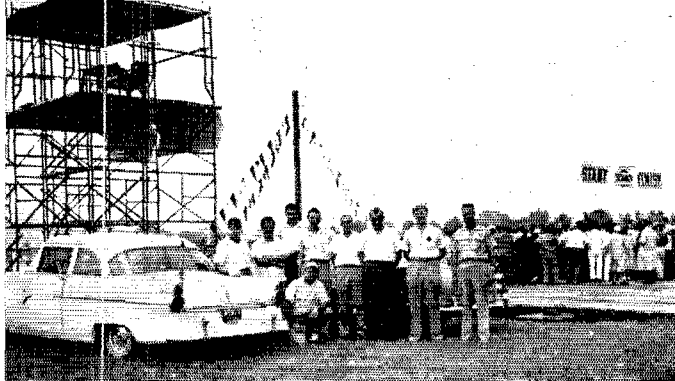
The police departments of large metropolitan areas generally have sufficient communications facilities to handle large-scale traffic problems. In the small community, however, it is a different story, and the amateur can be of real service. In the previously-mentioned golf tournament, for example, there were 7000 cars parked in fields on secondary roads. Five different police groups with no common police frequency were involved. Typical of calls handled in such an event: incoming traffic diverted from one parking area to another as they became filled; establishment of one way traffic at the conclusion of the event; diversion of traffic from the parking lots to ease developing traffic jams; retiming of a traffic light three miles away which caused a three mile traffic tie-up; aid to lost motorists; requests for tow trucks to aid motorists disabled or stuck in the mud; requests for barricades, water, food and relief.

The planning of a project with so many different groups involved is most difficult. Definite arrangements must be made ahead of time for net control to know whom and where to call for any emergency that may develop: fire, ambulance, which police group for the different areas, tow trucks, etc. For example, the village police departments and the park police were contacted by telephone, and they then put the call on their own police frequency; the state police had an AREC mobile parked next to one of their radio cars at all times to relay data for the state police frequency.

The setup for such an event is fairly simple,



The race is over and the boys are tired, but it was worth it. Left to right, W8s NZI BPN QXG PVA OXI AEU OKI, OKI's dad; kneeling, W8BPE.



however. Net control is set up near a telephone and near the headquarters of the event itself to tie in with other amateur services. Mobiles are located at all strategic intersections and a roving mobile covers all roads in the area. The operation is activated before and after the main event when the heavy flow of traffic is on, with plenty of time in between for the ham to become a spectator.

### **Sports Car Races**

Each sporting event requires a tailoring of operations to fit special needs, so let's explain in detail a complex project from which other ECs might gain some ideas for their own projects. The project described is a race held in cooperation with the Cleveland Sports Car Club at the Akron, Ohio, Municipal Airport. The course was laid out on the runways for 250 entries with 15,000 spectators around it. Careful planning is of the utmost importance, so be sure to check out other radio systems and p.a. systems for interference in advance.

Regular communications facilities consisted of a field telephone circuit with temporary lines all around the course and a control point on a platform at the start-finish line. Phones were set up for each flagman on the course. Unfortunately, such telephone circuits have a habit of going out when most needed, so that is where we come in. Our net control was located next to telephone control on the platform and mobiles were stationed with the flagmen to back up the phones around the course. A roving mobile in the infield was also in this network. In case of accident, the nearest mobile would be dispatched to the scene and a hand-carried portable would go with the ambulance or fire engine. This network was on a frequency by itself and was used exclusively for race control work, usually being kept very busy.

Crowd control is also a problem. That many people behind flimsy snow fences around a 3-to-4-mile perimeter can get themselves into a lot of trouble. We have found children sitting on the hay bales at dangerous turns, cases of sun stroke, gate crashers, drunks. Each mobile in crowd control carried a deputy sheriff and sufficient mobiles were used to patrol the entire area between the spectators and the track. Another mobile patrolled the inside of the track to keep people away from dangerous positions. This network

was on an entirely different frequency but net control was placed near the course phones and course radio communications net control so as to provide liaison between all three.

Experience has shown that many members of the public outside the course require contact with drivers and officials on the inside of the track, so a sign was posted on a mobile at the gate indicating that we would handle that traffic. Another roving mobile on the inside with a p.a. system mounted on the roof hunted down the people requested. This was also handled on the crowd control frequency.

Two of the airport's runways were left open at all times for small plane traffic. A mobile was stationed by these runways to keep them clear and to provide transportation to pilots across the open runways and raceway. A portable unit was placed in the airport control tower to provide liaison with air traffic officials. Several times the main runway used for racing was cleared to permit a large plane to land. With good communications, the runway could be cleared before the plane began to make its approach. This part of the operation was also on the crowd control frequency.

### **Lost Children**

Occasionally the amateurs are asked to work with searching parties for various purposes: animals, escaped prisoners — but usually lost children. Generally, these projects are organized by police authority and the amateur's job is to furnish communications for the searchers.

If the search is to be by mobile over city streets, a net control station, either fixed, mobile or portable must be established near the area with proper liaison with authorities. A map should be laid out with the sectors for each mobile radiating from the point last seen. Each mobile must be instructed to start from the point last seen and slowly but methodically work outward, covering every inch of all streets in its sector.

An off-the-road search is much more difficult. A map should be laid out in grids. The net control station should have close liaison with authorities and search officials. If the terrain permits, a cordon of mobiles should cover the roads surrounding the area, within sight of each other in case the person sought should cross the road. *Hand-carried portables should be interspersed*

with the searchers in sufficient numbers to maintain contact with all sections of the searching party. The search should be slow, methodical, according to plan. Sometimes air cover is advantageous, and the plane should also be included in the network.

### Goblin Patrol

For the protection of small fry following the American custom of "trick or treat" and for the suppression of juveniles who have matured in body but not in mind, the AREC can be of great service to the community during the Hallowe'en season by supplementing regular police communications. The best way to set up a net control station next to the police dispatcher and place a regular uniformed policeman with each mobile. Dangerous assignments, of course, should always be handled by the regular police cruisers, amateur mobiles supplementing their routine work. With the heat on, known gangs and characters will seek other areas for their depredations.

Working with the police in such a project as

this will greatly improve the mutual respect of the two groups. The police will find out that the ham is really a communication specialist who thoroughly enjoys himself while he works. The amateurs will come away with a great respect for our law enforcement officers and will set the example as law abiding citizens in the future.

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You might say: "This is all very fine, but what if officials aren't interested in using amateurs for these purposes." In most cases, they will be delighted to give you a chance if you ask for it. But once you *get* that chance, it is up to you to do a job that will impress them so that they will want you to do it again and again, and to do other, similar, public service jobs. The alert EC will always be on the lookout for such opportunities. Remember: advance planning with officials, performance of a creditable job, and *publicity* are of highest importance. We hope the above has given some serviceable ideas in these respects. QST

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## NEW BOOKS

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**Electronic Technology Series**, edited by Alexander Schure. Published by John F. Rider, Publisher, Inc., 480 Canal St., New York 13, N.Y. 5½ by 8½ inches, paper covers. No. 19, *A-C Circuit Analysis*, 104 pages, \$1.80; No. 22, *Vacuum-Tube Characteristics*, 96 pages, \$1.80; No. 26, *Advanced Magnetism and Electromagnetism*, 104 pages, \$2.25; No. 27, *R-F Amplifiers*, 104 pages, \$2.40.

These books continue a series started some years ago; new volumes are not always issued in numerical order. See October, 1958, *QST* for information on previously-published numbers.

No. 19 on alternating-current circuits introduces the reader to fundamental ideas such as the sine wave and its physical basis, the relationship between a.c. voltage and current in resistance, inductance and capacitance, and the meaning and use of the *j* operator. It then proceeds to reactance and impedance, combinations of *L*, *C* and *R*, and the solution of circuits based on these quantities. The treatment does not extend to the use of the inverse quantities, conductance, susceptance and admittance.

No. 22 follows the conventional development of tube principles used by most texts. As the use of the tube as an amplifier is covered in other books in the series, amplification is touched upon only briefly — just enough to round out the picture of the tube as a useful device. Numerical and graphical examples illustrate the use of characteristics curves. Only high-vacuum tubes are considered in this volume.

The treatment of magnetism in No. 26 is more advanced than one finds in texts that introduce the subject as background for radio, but in the sense of detail rather than complexity. It should present no difficulties to a reader who is not terrified by simple algebraic equations. This is a good book for those who have had a more-or-less casual introduction to the subject and would like to know more.

No. 27, on r.f. amplifiers, begins with a section on tuned circuits and ends with one on transistor amplifiers. In between there is a rather general treatment of receiving-type amplifiers, principally from the i.f. viewpoint, and a more extensive discussion of power amplifiers. There are several places in this last-named section where the reader is likely to be left with some misconceptions, but the principal criticism is that it has a rather old-fashioned look, from the

amateur viewpoint — neutralized triodes, push-pull triodes little on tetrodes, nothing about pi networks or s.s.b. linears, and so on.

As in the other books of the series, the technical level in this group is such that an interested amateur should have no difficulty. The accent is on principles rather than practical design. — G.G.

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**Two-Way Radio**, by Allan Lytel. Published by McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y. 6¼ by 9½ inches, 291 pages, including index. Cloth cover. Price, \$9.50.

Although this text is devoted primarily to the commercial two-way radio field, there is information in it of general interest to radio amateurs. Mobile and fixed a.m. and f.m. transmitters and receivers, antennas, trouble shooting and repair, power supplies, and related test equipment are discussed. Recent developments such as s.s.b., d.s.b. and synchronous a.m. are included. There are also data on oscillator circuits, phase-shift modulators, digital pulse codes and split-channel operation.

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**Semiconductors**, edited by N. B. Hannay. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 6½ by 9½, 767 pages, cloth cover. Price, \$15.00.

This is a textbook devoted to the physical chemistry and fundamental physics of semiconductors. Although it is a collection of material from several different contributors, the book is well organized and the chapter arrangement proceeds with good continuity. Beginning with semiconductor principles, chapters follow on the chemistry of semiconductors, crystal growing and diffusion processes. Information is also included on semiconductor properties. The book is probably a little too specialized for the amateur with only a general interest in semiconductors, but is an excellent exposition of principles and phenomena. — E.L.C.

# 1960 VE/W Contest

September 24-25

**T**HE Montreal Amateur Radio Club again proudly announces its annual VE/W Contest and welcomes all VE and W stations to participate. The idea is for Canadian stations to contact the U. S. and Possessions and vice versa. This 1960 Contest takes place on Sept. 24 and 25, starting at 1800 EST on Saturday and ending at 2359 EST Sunday.

The general call for U. S. stations is "CQ VE," while Canadian stations call "CQ W." The exchange consists of contact serial number, RS/RST report, and ARRL section. *Example:* K6SXA called VE7EH, who sends "K6SXA de VE7EH NR7 579 BC K," and K6SXA replies with "VE7EH de K6SXA R HR NR6 589 SAC K."

Please note that log forms are not provided by ARRL. Neither are they provided by MARC. However, the sample provided below will show you the form in constructing a facsimile.

A certificate will be awarded to the top scorer in each section with a handsome trophy going to the over-all contest winner.

Check the rules which follow very carefully. To be eligible your log must be postmarked no later than October 13. Send logs to Gordon H. Webster, VE2BB, 69 Pine Beach Blvd., Dorval, Quebec.

## Rules

1) Any single-operator station in the 73 ARRL Sections may participate. An amateur may enter as mobile, portable,

or fixed, but in only *one* category. Multiple-operator stations are not eligible to compete.

2) All contacts must be made during the period from 1800 EST Sept. 24 to 2359 EST Sept. 25, with a total operating time of no more than 20 hours for each entry. Times on and off the air must be clearly shown in the log.

3) Canadians will work only amateurs in the U. S. and Possessions, and vice versa. VE/VO-to-VE/VO and U. S.-to-U. S. contacts do not count. A station may be worked once on phone and once on c.w. on each frequency-band.

4) The exchange consists of a QSO number, RS or RST report, and ARRL Section. Example of WINJL's message to VE2BB: "VE2BB de WINJL NR1 579 EMass."

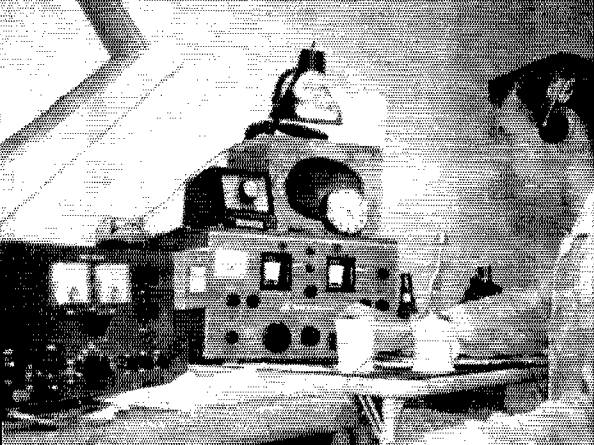
5) *Scoring:* Count two points for a complete exchange of information; incomplete contacts do not count (no fractional breakdown of the two points per QSO). For final score, VE/VO stations will multiply their total contact points by the number of ARRL Sections worked in the U. S. and Possessions, and then by the appropriate power multiplier listed below. For final score, W/K amateurs will multiply their total contact points by the number of Canadian areas (maximum of 9: VE1-VE8 plus VO), then by 7.22 (ratio of U. S.-to-Canadian Sections), then by the appropriate power multiplier, and then by a 2.5 provisional multiplier (based on the ratio of U. S.-to-Canadian log entries received in previous contests). All stations using power inputs of 30 watts or less receive a power multiplier of 2, those using from 31 through 100 watts receive a power multiplier of 1.5, and those using over 100 watts receive a power multiplier of 1.

6) Each entry must be accompanied by the following signed declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations, and I agree that the decision of the contest committee of the Montreal Amateur Radio Club, Inc., shall be final in all cases of dispute."

7) To be deemed valid, all entries must follow the form shown in the sample log and must be postmarked no later than midnight, October 13, 1960. They should be sent to Gordon H. Webster, VE2BB, Contest Chairman, 69 Pine Beach Blvd., Dorval, Quebec, Canada.

## LOG, 1960 VE/W CONTEST

WINJL		C.W.							E. Mass.					
Call .....		C.W., Phone, or Both .....							ARRL Section .....					
Date/Time On or Off Air (EST)	Time of QSO	NR Sent	My Stn.	RST Sent	My Sect.	Freq. Band	Emis- sion	Power Input	NR Rcvd.	His Stn.	RST Rcvd.	His Sect.	New Sects. Wkd.	QSO Pts.
Sept. 24 On 1800	1800	1	WINJL	579	E.Mass.	3555	A1	75	1	VE2BB	599	QUE	1	2
"	1801	2	"	569	"	"	"	"	2	VE3BFF	579	ONT	2	2
"	1802	3	"	579	"	"	"	"	1	VE2ASW	579	QUE	-	2
"	1813	4	"	559	"	7010	"	"	3	VE1EK	579	MAR	3	2
Off 1815														
Total operating time: 15 min.				Bands used: 3.5 & 7 Mc.				3 sects., 8 pts.						
Claimed score: 4 QSOs × 2 (points per contact) × 3 (different sections worked) × 7.22 (section-balancing multiplier for all W/K stations) × 1.5 (power multiplier for 75 watts input) × 2.5 (provisional multiplier for all W/K stations based on ratio of U. S.-to-Canadian logs previously entered) = 650 (rounded).														
I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations, and I agree that the decision of the contest committee of the Montreal Amateur Radio Club, Inc. shall be final in all cases of dispute.														
Signature .....												Call .....		



The Litton Amateur Radio Society (LIARS!) made 204 contacts on 50, 144 and 220 Mc. Here W6ISO bears down at the 2-meter position of the club station, K6SLQ/6.

## June V.H.F. Party Summary

### Spring Contest Takes on Aspects of a V.h.f. Field Day

CONDITIONS make a big difference in a v.h.f. contest, and the big difference in the 1960 June v.h.f. Party was supplied by the ionosphere. At least some sporadic-E skip was worked by 50-Mc. operators in all sections of the country, and some tremendous scores were run up in the more favored areas. But perhaps the greatest factor in the ever-growing activity in our spring and fall contests is the enthusiasm of the groups that "work portable." Nearly one fourth of the 423 stations listed in the final tabulation below were portables, ranging from 1/10-watt battery jobs to multiband setups with all the features of well-equipped home stations.

The Waltham Amateur Radio Association lived up to their reputation as pace-setters for the portables. With first-class equipment on all bands from 50 to 1215 Mc. and a staff of 9 seasoned operators, W1MHL/1, Pack Monadnock Mountain, Peterboro, N. H., outdid all previous contest efforts, making 677 contacts and 42,472 points. These figures and their section multiplier of 58 are all-time records. They had rough competition from W1NBN/1, the station of the Merrimac Valley Radio Club on Mt. Wachusset, a line-of-sight shot just across the Massachusetts state line. W1NBN/1 had 645 contacts on 4 bands for 34,758. These are the first instances of more than 600 contacts being made in any kind of v.h.f. contest.

Top single-operator station was W1UTZ/1, Mt. Equinox, Vt. George worked 275 stations on 5 bands, for 17,212 points. Elsewhere many other portables were making the most of choice locations, and testing out v.h.f. setups that would be going again in the Field Day just two weeks away. Note the West Coast leader's 428 contacts on 50, 144 and 220 Mc. by WA6CID, the station of the Southern California V.H.F. Club, and contact totals over 200 by K6SLQ/6, K6HCQ/6, K6GPG/6, W6GGV/6 and K6UMM/6.

Working from the high spots was not without its hazards. The Greensboro (N. C.) Radio Club made a trip to Roan Mountain, Tenn., one of the higher points in the Great Smokies, and worked through fog and rain the whole time. Temperatures in the low 40s made fur-lined jackets welcome. W4NC/4, atop Mt. Mitchell, highest spot east of the Mississippi, also encountered cold and violent weather. K3IPM/3, Solebury Moun-

tain, near New Hope, Pa., was taken ill after 21 hours of operation, and had to be carried off the mountain.

Phenomenal conditions on 50 Mc. gave W4LIP, Miami, Fla. an opportunity to pile up 320 contacts in 39 sections, for 12,480 points, the country's top score for a home station. Though he has a kilowatt s.s.b. rig available, Vic made most of his s.s.b. contacts with his 5-watt exciter, in order to hold down QRM to others working in the contest locally. Another 50-Mc. leader was W1YL/1, with W1HOY operating. Helen worked 260 stations in 24 sections on 6. K1CRN, Providence, R. I., set the pace for 2-meter men, with 201 stations in 13 sections, for 2613 points.

Use of bands above 200 Mc. reached a new high. The 1215-Mc. band was used effectively by W1UTZ/1, with 5 stations in 4 sections — Eastern and Western New York, New Hampshire and Vermont. Like most others on this band, George used crystal-controlled gear on 1296 Mc. W3JZY/3 was helped along the way to their 23,256-point total by contacts on all bands from 50 to 3500 Mc. The Copperhead V.h.f. Society will bear watching in future parties.

Those who could make use of it found the new c.w. segment of the 50-Mc. band, opened only the previous week, fine for fattening up contact and multiplier totals. Working only 4½ hours, and using 50-Mc. c.w. only, W4FNR, Ft. Lauderdale, Fla., worked 87 stations in 27 sections. C.w. was plentiful on 144 and 220 Mc. as well. Though few v.h.f. operators think of c.w. as a medium of communication between friends ordinarily, more of them are coming to appreciate its contest potential all the time. — E. P. T.

### SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc. B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation.

#### ATLANTIC DIVISION

##### E. Pennsylvania

W3KKN 4598-97-38-ABC	W3CLO 2080-104-20-AB
K3IPM/3 4560-228-20-AB	W3WJC 1700-100-17-AB
K3AUE/3 3648-192-19-AB	W3BXD 1488-93-16-AB
W3DJV 2114-151-14-AB	W3BJG 1176-84-14-AB
	K3KDP 1131-87-13-AB

K3ATL 660-60-11-A  
W3ZEH 640-80-8-AB  
W3JNT 492-41-12-AB  
W3LWO 492-41-12-AB  
K3JEL 416-62-8-A  
K3HRF 408-51-8-A  
K2PUV/3 364-52-7-B  
W3MMV 322-46-7-AB  
K3JPA/3 312-52-6-AB  
W3MKA 188-33-6-AB  
K3HNG 185-33-6-A  
K3JHE 165-33-5-A  
W3JIO 84-28-3-A  
W3DJV/3 75-25-3-B  
W2HJW 68-17-4-B  
W3ZRC 73-25-3-AB  
W3ZHE/3 50-25-2-B  
K3CIV 48-16-3-A  
W3RHT 21-7-3-A  
W3OL/3 (9 ops.)  
43-357-348-37-ABC  
K3BUZ/3 (5 ops.)  
794-331-24-AB  
W3SNM (5 ops.)  
6344-244-26-AB  
W3SST/3 (W3SST, K38 GDI  
(GWQ) 3188-177-18-AB  
W3ARW (W38 A 38 LCK)  
2942-92-27-ABC  
K3JPL (K38 CHL JPL)  
1665-111-15-A  
W3HXX/3 (W38 HXX IQS,  
K3GBB)  
1500-125-12-AB  
K3KTD (K38 DCB KTD)  
21-7-3-A

*Mad.-Del.-D. C.*

W3CQV 3350-114-25-ABCDE  
W3LCC 3250-108-26-ABCDE  
W3DUT 100-91-1-A  
K3JEX 975-65-15-AB  
K3AZH 957-87-11-A  
K3GME 610-61-10-A  
W3JUG 500-50-10-CD  
K3DQA 384-48-8-AB  
W3MSR 292-46-7-B  
W3OPT/3 217-31-7-A  
W3HEB 200-40-5-5  
W3BAY 18-9-2-A  
K3KQN 7-7-1-A  
W3JZ/3 (10 ops.)  
23-256-4-51-ABCDE  
K3HFV (5 ops.)  
3488-186-21-AB  
K3JUK/3 (4 ops.)  
3154-166-19-AB  
W3GCO (5 ops.)  
3060-153-20-AB  
K3CHE (K38 CHE HCP)  
2898-138-21-A  
W3DHQ (W38 DHQ VIDL)  
104-26-4-AB

*S. New Jersey*

W2BLV 3950-100-37-ABC  
K28XN 180-45-4-A  
W2ZKLY 144-36-4-B  
K2JRU 140-35-4-AB  
K2MXN (K2BNS, W2HJF)  
50-25-2-B

*Western New York*

K2ERQ 1586-122-13-A  
K2YCO 1932-53-10-3  
W2ZKF 530-53-10-3  
W2RBO 462-66-7-AB  
K2LMI 300-34-9-B  
W2AKVN 282-47-6-AB  
W2ZRG 245-49-5-AB  
W2KLDI 56-28-2-B  
K2CUQ 42-14-3-AB  
W2MQQ 30-15-2-B  
W2AZUP 18-9-2-B  
W2TOP 18-9-2-B  
W2ALL/2 (4 ops.)  
450-190-49-ABC  
K2RRM/2 (8 ops.)  
7491-237-33-AB  
W2JG/2 (4 ops.)  
7440-223-31-ABC  
K2ODL/2 (8 ops.)  
475-185-29-AB  
K2POX (13 ops.)  
4715-200-23-ABC  
W2ILQ/2 (6 ops.)  
4660-233-20-AB  
W2ALR/2 (6 ops.)  
4560-190-24-AB  
K2OVV/2 (K2OVV, W2EO)  
3045-145-21-A  
W2AJQ (4 ops.)  
1456-112-13-AB  
K2DLM (K28 DLM LZP)  
1395-93-15-B

*Western Pennsylvania*

W3RUE 3248-110-28-ABC  
K3KGC 1680-112-15-A  
K3CHC 1125-75-15-A  
W3GQT 1104-92-12-AB  
K3AMD 731-43-17-AB  
K3NIE 275-13-17-AB  
W3FUH 75-15-5-B  
W3LST 44-11-4-B

W3OOF 2-2-1-B  
W3KWH (4 ops.)  
1008-66-14-ABC

**CENTRAL DIVISION**

*Illinois*

K9URR 984-82-12-AB  
K9DTP 726-66-11-AB  
K9WFB 536-56-6-AB  
K9NYN/9  
304-76-4-B  
K9VVL 248-82-4-B  
W9NZF 124-31-4-B  
K9NYMD 123-41-3-AB  
K9BVVU 73-24-3-AB  
W9TFF/9 29-11-2-A  
K9PZZ 16-8-2-B  
K9UIMH 2-2-1-A  
K9UUM/9 (4 ops.)  
400-40-10-A  
K9CRT/9 (6 ops.)  
333-39-7-AB  
*Indiana*  
K9MMH/9  
1166-106-11-AB  
W9HYV 486-81-6-AB  
K9PNP 114-19-6-A  
W9BDM 76-19-6-AB  
K9SLQ (K98 CJL SLQ)  
376-47-8-AB  
*Wisconsin*  
W9JFP 3991-187-21-ABC  
K9L9Q 1725-115-15-A  
K9MXX 1672-88-19-AB  
W2MTA/9  
1221-111-11-B  
K9PJB 639-71-9-A  
W9TQC 147-21-7-AB  
K9M1W 72-18-4-B  
W9LXF (W9LXF, K9RLP)  
100-25-4-B  
K9LWV/9 (K98 LWFV SNO)  
24-12-2-AB

**DAKOTA DIVISION**

*North Dakota*

W9GNS 700-35-20-A

*South Dakota*

K0UDZ 1273-67-19-A  
K0GRP 396-33-12-AB  
K0YAA 252-21-12-AB  
K9AYW 16-8-2-B

*Minnesota*

K0AKJ 147-67-21-AB  
K0VPR 640-40-16-AB  
K8LML/9 390-39-10-A

**DELTA DIVISION**

*Louisiana*

W5UQR/5  
2457-117-21-A

*Tennessee*

K4KTC 75-15-5-A  
K4GVA/4 (K48 OVA RUF)  
1027-79-13-A  
W4GNF/4 944-59-16-AB

**GREAT LAKES  
DIVISION**

*Michigan*

K8BGZ 2596-118-22-AB  
W8BAN 2180-109-20-AB  
W8PT 814-64-11-BC  
W8PPQ 812-56-14-ABC  
K8PEJ 584-73-8-A  
K8NGR 180-60-3-B  
W8VRH 141-47-3-B  
K8LVL 132-35-3-B  
K8DJK 21-7-3-A  
K8HJQ 18-6-3-A

*Ohio*

K8TOW 1740-116-15-A  
K8NYM 1008-126-8-A  
K8JDI 350-50-7-A  
K8MXX 335-67-5-A  
W8JEN 112-28-4-AB  
W8SPQ 105-35-3-B  
W8SQY 100-25-4-B  
K8LEN 30-15-2-AB  
K8DJB/8 (6 ops.)  
8025-316-25-ABC  
W8SFG (W8SFG, K8KTX)  
2992-128-22-ABC

**HUDSON DIVISION**

*Eastern New York*

K2BVC 6727-190-31-ABC  
K2ISA 2940-79-30-ABCDE  
W2BAH  
1088-86-16-AB  
W2LKP 870-81-15-BC  
W2AZLJ 333-37-9-B  
W2VIMB 164-41-4-B



This is the tent station of W9YCR/0, the Quad City Radio Club of Moline, Ill., set up for the June V.H.F. Party across the Mississippi in Iowa. K9CHZ is at the controls.

K2CWX 96-24-4-B  
K2CQGU (multiple)  
27-401-548-47-ABC  
W2LWI/2 (11 ops.)  
16,790-310-46-ABCD  
W2ROE/2 (4 ops.)  
11,220-327-33-ABC  
W2AF/2 (6 ops.)  
6554-226-29-AB

*N.Y.C.-L.I.*

K2LLZ 1620-108-15-AB  
WA2HRF  
1170-78-15-AB  
K28JP 1122-70-16-A  
K2QJQ 982-83-13-C  
K2RZE 774-86-9-B  
K2UTN 747-83-9-A  
W21KR 376-47-8-B  
WA2EXL 294-49-6-A  
K2AZT 270-45-6-AB  
WA2GPC 222-37-6-B  
K2LAY 195-39-5-A  
W2EYL 155-31-5-A  
W2LJR 112-8-7-C  
K2PNK 108-27-4-A  
K2R8W 105-35-3-B  
W2TUK 48-12-4-A  
K2DFV 32-8-4-B  
K2UMN (4 ops.)  
2040-136-15-B  
WA2IKL (WA28 IKL LBJ)  
147-49-3-A

*Northern New Jersey*

W2GKR 1888-118-18-AB  
K2PPZ 1560-67-15-BCD  
WA2INB 1510-151-10-B  
K2LNS 1240-124-10-B  
W2BBL 882-82-21-AB  
WA2BDP 600-60-10-AB  
W2JAM/4 532-76-7-B  
K2RBD 435-87-5-B  
W2ESX 396-36-11-B  
W2MQP 372-62-6-B  
W2FSB 305-61-5-B  
W2CBB 264-22-12-B  
W2HFI 260-52-5-B  
K2LUK 200-20-10-A  
W2LRO 200-40-5-B  
K2PQE 192-24-8-AB  
W2JFB 132-44-3-B  
WA2OCF 24-8-3-B  
W2VW/2 10-5-2-B  
W2ZVW 8-4-2-A  
WA2AYA 4-4-1-B  
K2BJP/2 (11 ops.)  
9048-229-29-ABCD  
WA2GVF (K2LSX,  
WA2CLT)  
256-32-8-B

**MIDWEST DIVISION**

*Iowa*

K0GOW 765-45-17-A  
K0RTE 378-27-14-AB  
W0BTG 132-22-6-AB  
K0G6Y 52-13-4-B  
K0HBB 44-11-4-B  
W9YCR/0 (6 ops.)  
1920-120-16-AB

*Kansas*

W0QDH/0  
988-52-19-AB  
W0JAS 774-43-18-AB  
K0GIC 752-43-17-AB  
K0RWC 684-38-18-AB  
K0WQM 294-21-14-A

W0YMG 135-45-3-B  
K0AQJ 132-44-3-B  
KN0WGM  
105-35-3-B  
K0GIA 51-17-3-AB  
KN0ADJ 15-15-1-B  
W0HNG 8-4-2-B

*Missouri*

W0LFE 165-33-5-B  
KN0YOM 15-3-1-B  
K0QQC (7 ops.)  
420-60-7-A

*Nebraska*

W0WRT 936-52-18-AB  
K0ODU 420-35-12-AB  
K0SBV 81-27-3-A

**NEW ENGLAND  
DIVISION**

*Connecticut*

WIQVF 6324-186-34-AB  
WIPER 4200-150-28-AB  
W1Y8S 2475-92-25-ABC  
K1DCX 1400-100-14-AB  
W1AW5 1188-66-18-AB  
W1HDO 722-34-19-ABC  
K1CMF 648-72-9-B  
W1MFT 616-29-14-ABCD  
W1JZA 427-61-7-B  
KN1OKU 413-59-7-B  
W1FVV 312-39-8-AB  
W1HDF 275-16-11-ABCD  
K1CAK 144-36-4-B  
W1LGE 119-17-7-AB  
K1IWF/1 78-26-3-B  
KN1MVG 70-35-2-B  
W1UED/15  
57-19-3-B  
45-15-3-A  
W1RNT/1 8-4-2-A  
W1KAC 8277-261-31-ABC  
(4 ops.)  
W1DHT (6 ops.)  
4824-201-24-AB  
W1IPV/1 (W1s IPV NWB)  
1380-69-20-AB  
W1ORS (7 ops.)  
610-61-10-AB  
K1BCI/1 (4 ops.)  
495-55-9-AB  
KN1OSE (KN1OSE,  
K1JOY) 472-59-8-B

*Massachusetts*

K1CXX/1 533-41-13-AB  
K1GAY/1 (5 ops.)  
10,166-276-34-ABC  
K1GSK/1 (K1s GSK BRD,  
W1LWZ) 15-5-3-B

*Eastern Massachusetts*

K1IZM 7272-193-36-ABC  
K1ALJ 6634-214-31-AB  
W1OOP 6844-135-38-ABC  
W1YL/1 6240-160-24-A  
W1AQE 3388-154-22-AB  
W1JSM 1476-123-12-B  
W1BVS 924-66-14-A  
K1FKT 924-77-12-AB  
K1GNW 406-58-7-B  
K1MPF 300-60-5-B  
K1DRX 210-30-7-A  
KN1OSN/4 200-40-5-B  
W1LWZ 13-10-10-AB  
K1NHC 130-28-5-B  
KN1NGI 125-25-5-B

(Continued on page 152)

## Announcing the September V.H.F. QSO Party

**I**F YOU did not get your fill of v.h.f. fun in the June Party, how about giving it a go again? Or if you did get your fill in June, and just plain want more, give the September Party here announced a whirl. In short, it's a ball!

The contest gets under way at 2 p.m. your local standard (not daylight) time Saturday, Sept. 17, and continues until 10 p.m. local standard time Sunday, Sept. 18. The rules are exactly the same as for the party held last June. To raise other participants just call "CQ VHF QSO Party" or "CQ Contest." The only exchange required during contact is ARRL 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 ARRL Sections worked per band. You may work the same stations on different bands to increase both your contact points and multiplier. Please check the rules which follow very carefully.

A certificate will be awarded to the top scorer in each ARRL 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.

Free log forms are available free on request from ARRL. You will find a sample of the log and summary sheet on page 64, June QST. The contest checking crew heaved a sigh of relief at the way you fellows responded to the new form; logs received were extremely neat and easy to check. Please keep it up! Logs must be post-marked no later than October 7.

### Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, Sept. 17, and ends at 10:00 P.M. Local Standard Time, Sunday, Sept. 18. 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 point(s). 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 period.

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 ARRL sections worked per band; i.e., those with which at least one point has been earned. Re-working sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

5) A contact *per band* may be counted for each station worked. Example: W2BLV (S.N.J.) works K1CRQ (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2BLV 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2BLV contacts other Connecticut 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 can provide 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 ARRL section. In addition, the high scoring multi-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 licenses submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than Oct. 7, 1960, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience.

QST

### COMING A.R.R.L. CONVENTIONS

September 2-4 — Pacific Division, San Mateo.

September 10-11 — Central Division, Indianapolis, Indiana.

September 10-11 — Oklahoma State, Oklahoma City, Oklahoma.

September 16-17 — Dakota Division, Minneapolis, Minnesota.

September 16-17 — Eastern Canada, Montreal.

October 7-8 — Great Lakes Division, Cleveland, Ohio.

October 14-15 — Hudson Division, New York City, New York.



DUIRC claims the first mobile station in the world on 50 Mc. on a motor scooter.



# Hints and Kinks

For the Experimenters



## LOW-FREQUENCY PARAMETRIC AMPLIFIER

THE circuit shown in Fig. 1 is a simple 10-Mc. parametric amplifier that can be made to function with only simple test equipment. I used it to get the feel of parametric amplifiers before jumping in at the deep end with a v.h.f. or u.h.f. model.

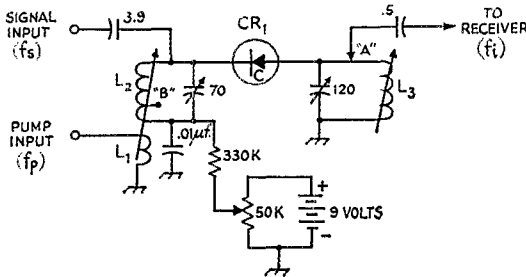


Fig. 1—"Educational" low-frequency parametric amplifier. Unless otherwise indicated, capacitances are in  $\mu\text{mf}$ . CR1—semiconductor capacitor diode (see text).

A grid-dip oscillator is used to resonate the tuned circuits. Coil  $L_2$  is resonated to the input signal frequency,  $f_s$ , and  $L_3$  to the idler frequency,  $f_i$ . The pump is coupled into the signal tank by means of a four-turn link,  $L_1$ , wound on the cold end of  $L_2$ . An r.f. signal generator having a 50-ohm output impedance is used as a pump generator. Output from the device is coupled to the receiver from point "A" or "B". Almost any of the inexpensive capacitor diodes seem to work in this circuit. I used a Vari-Cap with a nominal capacitance of about 47  $\mu\text{mf}$ .

Most of the various parametric amplifier effects described in the literature may be observed by using different combinations of signal, pump, and idler frequencies. Some interesting frequency combinations in Mc. are:

$f_s$	$f_p$	$f_i$
10	14	4
10	14	24
10	20	10

—Richard F. Burns, W9NVC

## HANDY TUBE PULLER

THE sponge rubber cup found inside most vibrators makes a nice tight fit over octal tubes and facilitates removal from their sockets. With a little extra squeezing, it can be used for pulling miniature types, too. The cup measures about  $1\frac{1}{2}$  inches in diameter and about 2 inches in length. To remove the sponge from the vibrator, simply take off the vibrator base.

—Dave Barquist, K9PAK

## FREQUENCY SPOTTER

THE 100-ke. crystal calibrator used in many receivers for calibration purposes can also be used to spot specific frequencies such as net frequencies. Plug in the desired crystal in place of the 100-ke. crystal, and turn on the calibrator — and tune it in. Usually, the harmonics of the "new" crystals are quite strong. Band edge crystals can also be substituted for generating a series of markers. —Julian Greenbaum, W1LIG

## NUT STARTER

THE vinyl jacket covering most coaxial cable makes a handy machine-nut starter. Remove six to eight inch lengths of the covering from the cable. Place the nut on a flat surface and push the vinyl tube over the nut. The flexible vinyl material will grasp the nut and hold it until it is started on that inaccessible machine screw. Vinyl from RG59/U will suffice for nuts most commonly used in amateur construction but larger ones can be handled by RG8/U covering.

—Mike Kaufman, K6VCI

## SAFETY MAT

IT's a standard Navy rule that whenever possible one should stand on a rubber mat when working with electronic equipment. Although most ham shacks don't present the same danger as a steel deck, it is still a good idea to use some sort of an insulated mat when the shack is located in a cellar or other location that is sometimes wet or damp. An old discarded bathtub mat can be used for this purpose.

—Jack Nelson, W2FW

## BEESWAX SUBSTITUTE

THE USUAL method of treating homemade wooden insulators and antenna feeder spreaders is to boil the wood in beeswax. However, beeswax is no longer an easy item to obtain. One inexpensive substitute is "plumbers wax seal" which is available at most plumbing supply houses. It is usually supplied in rings and one ring is more than enough for treating two or three dozen  $1\frac{1}{2} \times 1\frac{1}{4} \times 3$  inch insulators.

—Allen Breiner, W3ZRQ

## INSULATING PAINT

Don't throw away those old plastic toy models that come in kit form. Dissolve the plastic in a solution of acetone and use it as an anticorona or insulating paint. When the acetone evaporates it leaves a thin protective plastic film.

—Edward M. Johnson, K6DTC/KR6UGA

# Project Moon Bounce

*The Story of the First Successful  
Two-Way Amateur Communication via the Moon!*

BY WILLIAM ORR,\* W6SAI

"Oh, Mr. Printer, how many exclamation points have you got? Trot 'em out, as we're going to need them badly, because WE GOT ACROSS!!!!  
— QST, January, 1922

Now, in the cool, silver light of the waning moon, the parabolic antenna looms above the clustered amateurs. It is 0145 Pacific Daylight Time, July 17, 1960, and the participants in the forthcoming drama are not quite awake and only dimly thinking of the historic event soon to happen. It is a quiet time, breathless and serene. The hams (they are all active amateurs and DX enthusiasts) cluster around the two small wooden buildings and the dish antenna, sitting forlornly in the middle of the empty lot in a corner of San Carlos, California. Behind them, the town is asleep, bathed in the glow from the moon, floating large on the horizon.

Quickly the amateurs move to the task. The doors to the buildings are flung open and the interiors are illuminated by the harsh overhead bulbs. The buildings are filled with electronic equipment. The hum of conversation grows and a thermos jug of coffee is opened. Equipment is now running, and a nervous tension is felt by the operators. Is everything working properly? Anxious eyes scan the meters, and two hams struggle with the receiver. One fellow takes a pencil from the table and scribbles on the plywood wall of the receiver shack: "July 17, 1960.

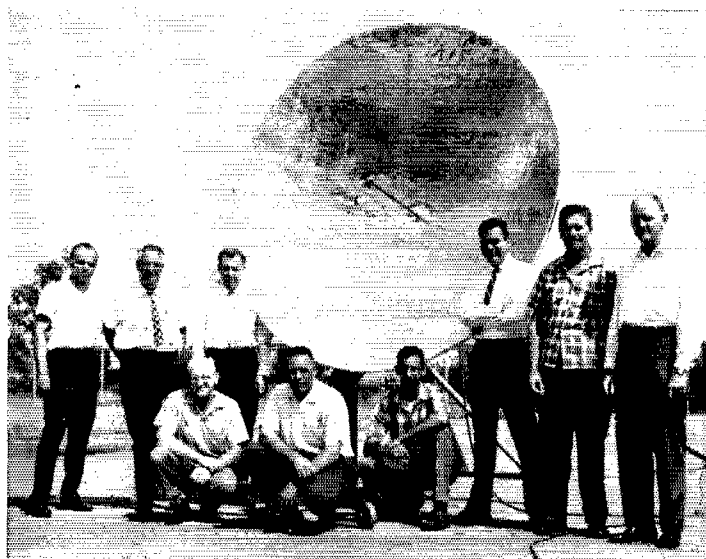
\* c/o Eitel-McCullough, Inc. San Carlos, California

First 1296 Mc. moonbounce transmissions to W1FZJ from W6HB start approximately 0200 PDT."

The equipment is adjusted once again and the u.h.f. klystron springs into life. Willing hands align the dish on the waiting moon. The small test oscillator atop the receiver is monitored loud and clear at 1,296,001 kilocycles. The transmitter is tuned and ready . . .

Across the continent in Medfield, Mass., a second body of amateurs is grouped about a large parabolic dish and a confusion of u.h.f. equipment. The area is covered with recorders, parametric amplifiers, a klystron and its exciter, a sensitive i.f. strip, and various exotic audio filters. As the equipment is brought into tune, the telephone on the operating table rings. The nearest ham scoops up the receiver and listens intently. After a pause, he motions to the others: "The California gang is transmitting to us! You'd better crawl into that receiver and start listening!"

The door to a new concept of amateur communications was flung open on this eventful morning in July, 1960, when the first successful trans-continental moon-bounce test in amateur history took place between the members of the Rhododendron Swamp VHF Society (W1BU) of Medfield, Mass. and the Eimac Gang Radio Club (W6HB) of San Carlos, California. In an instant of time old u.h.f. records and concepts were shattered and swept away, and new, exciting fields were laid open.



The Eimac gang, who carved a niche in history. Standing, left to right: Bob Sutherland, W6UOV; Hank Brown, W6HB; Bill Eitel, W6UF; George Badger, W6RXW; Al Clark, W6MUC; Bob Morwood, K6GJF. Kneeling: Ray Rinaudo, W6KEV; Charles Anderson, W6IVZ; Allan Beer, K6GSO.



It was truly a red-letter day for amateur radio! Two-hundred and thirty-eight thousand miles to the moon and back! No wonder the W1BU gang nearly split W6SAI's ear-drum over the telephone line: "Keep sending! We hear you!"

### **The Beginning**

The amateur u.h.f. moon-bounce story started innocently enough at the time the new Eitel-McCullough plant in San Carlos was dedicated in April, 1959. The idea slowly evolved that it would be newsworthy if the plant could be opened by a radio pulse reflected to California from some distant point via the moon. Finally, through the kind assistance of E. Finley Carter (K6GT), director of Stanford Research Institute, a 10-kilowatt 440-Mc. transmitter located at College, Alaska, equipped with a sixty-foot parabolic "dish" antenna, was made available for the moon-bounce exhibit. Suitable receiving equipment for the California end was built by Granger Associates, Inc. of Palo Alto, California.

The grand opening went off without a hitch! The Eimac hams were amazed at the strength of the 440-Mc. moon-bounce signal! It all looked so easy! W6HB instantly decided that the accomplishment could be duplicated on an amateur level. In his spare time Hank figured that it might be possible to turn the trick on the 1215-1300 Mc. amateur band. A good low-noise "sky window" was available in this frequency region. In addition, only a medium-sized dish would be required, and production tubes were available for this band which would run a full kilowatt input for amateur service.

The project received a tremendous boost when Walt Morrison, W2CXY, contacted Hank and told him of East Coast interest in the undertaking. Accordingly, several Eimac u.h.f. transmitting klystrons were modified to reach a frequency of 1296 Mc. and one was shipped to Walt, and another to Sam Harris, W1FZJ. Shortly thereafter, Sam and Dana Atchley, W1HKK, offered their assistance, which included the loan to W6HB of a brand-new Microwave Associates parametric amplifier! The prospect of a receiver having a noise figure of less than 2 decibels provided the necessary boost in morale, and W6HB enlisted the efforts of Willy Sayer, WA6BAN, to assemble sufficient equipment to set up the west coast terminus for the proposed moon-bounce link!

### **Problems, Problems, Problems!**

The problems were staggering! Where to get a microwave dish? How about the antenna feed system? Frequency stability: How much is required? Hank still shudders when he thinks of this roadblock to progress: "A frequency shift of one cycle at the fundamental frequency of one megacycle results in a shift of 1296 cycles at 1296 Mc. If W1FZJ is listening for us with a 100-cycle passband, he'll be looking for a needle in a haystack if we can't hold our 1296-Mc. frequency within 50 cycles or so of where we plan to be!" How do you key a transmitter and yet have less

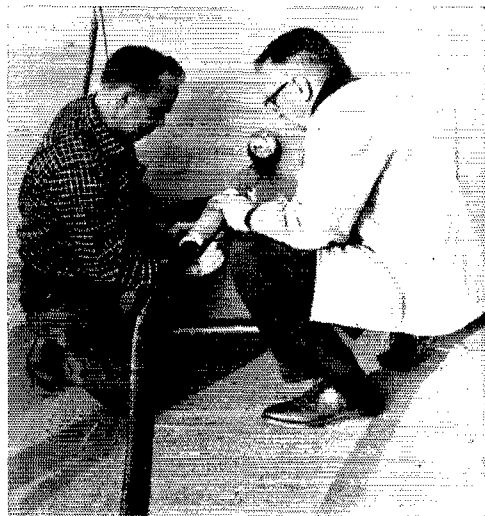
than one cycle of keying chirp reflected back to the oscillator?

### **The Eimac Gang Effort**

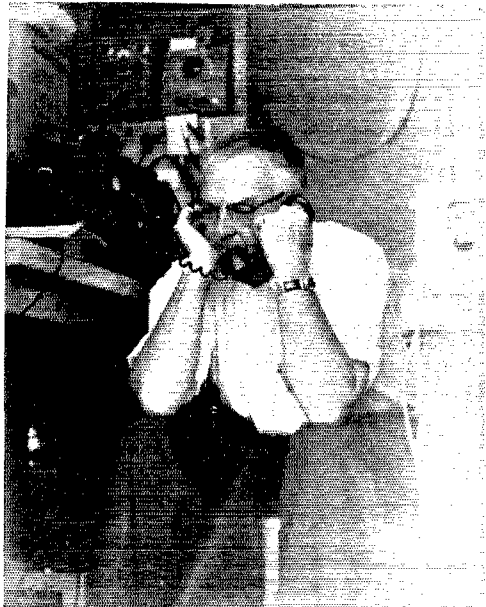
The project was "getting hot" by now! W1FZJ was just about ready to go on 1296 Mc.

During the early days of June protracted discussions took place between Hank, Willy, and Bill Orr, W6SAI, and it was decided to gather all the bits and pieces of 1296 Mc. gear in one place and turn the whole project over to the tender mercies of the Eimac Gang Radio Club, working under the supervision of SAI. In addition, Bill Eitel, W6UF, and Jack McCullough, W6CHE, generously allowed use of the area which has been set aside for various projects of the Eimac Radio Club for the installation of the equipment in the two plywood buildings owned by the Club; and further permitted the Club to use the facilities of the sheet metal shop and the welders (a u.h.f. must!) in order to get the program off to a flying start.

The Club was divided into teams. Bob Sutherland, W6UOV, supervised the receiver team working under Ray Rinaudo, W6KEV, and the antenna team working under Al Clark, W6MUC. The transmitter project was directed by George Badger, W6RXW, and the exciter chain was developed by Willy, WA6BAN. A three-week deadline was set by slave-driver W6SAI and the fur began to fly! As time went by, it became apparent that the exciter could not be completed in time, so an SOS was sent out to Mike Krivohlavek, K6AXN, requesting the loan of his record-breaking 50-watt, 1296-Mc. transmitter. Mike responded immediately, bringing his exciter and his one-megacycle crystal oven. The tempo increased, with the gang working into the small hours of the morning until finally — late Friday evening, July 15 — everything seemed to work perfectly. A telephone call was put



Pretty tough to work fast break-in with this t.r. switch!



Hank Brown, W6HB, anxiously awaits word from the east coast that 1296-Mc. signals are getting through.

through to W1FZJ, arranging for a schedule starting at 2 A.M. Sunday morning, July 17, a time at which the moon would be in full view on both the East and West coasts. The hardest and most nerve-wracking part of the project now began — standby and wait!

#### Results of the Tests

The Eimac Gang's transmitter consisted of an oscillator-multiplier chain driving 2C39A/3CX-100A5 multiplier stages which provided a level of 20 watts or so at 1296 Mc. This exciter drove a DK2500LX klystron, whose cavities had been modified to tune across the 1215-Mc. amateur band. Running one kilowatt input, it was possible to obtain 400 watts or so of output from the klystron amplifier, whose efficiency was somewhat limited by the modifications made to the external cavities. (See the block diagram on p. 11.)

It was only a few minutes after the transmitter was energized and the rusted eight-foot dish was aimed at the moon that the gang at W1BU/W1FZJ first heard the California signal. The historic moon-bounce signal was just above the noise level, and disappeared coyly after a few seconds. Sam tuned his receiver frantically and after a few breathless moments found the signal once again. Yes, the signal was audible: it was right *here* on the dial. "Tell 'em to key the carrier," Sam yelled to Sandy Watson, W8FRA, who was standing by at the telephone link coupling Medfield with San Carlos. After a time lag of a few seconds the weak, wavering carrier disappeared for good. It was lost! "Tell 'em to stop keying and give me a steady carrier!" After frantic circuit adjustment, Sam found the carrier once again, wavering between the noise level and 2 decibels above it.

"I think you have enough keying "yoop" to go right through my passband," exclaimed Sam, as he took over the land-line. "In addition, I think there's a minute amount of instability in your oscillator, and the crystal is being vibrated by people walking around your shack. Can't you do something about it?" The information was hastily relayed to George, W6RXW, who turned off the klystron power supply and dashed from the tiny shack. He returned triumphantly in a few moments, waving a cardboard box and a huge slab of fibrous packing material, scrounged from a nearby waste can! The oscillator was hurriedly mounted on the spongy packing material, and the cardboard box was dropped over the haywire assembly.

"You guys get out of here and take your big feet into the receiving shack," ordered George! "I've got to keep vibration down to a minimum!"

Sure enough! The added stability was sufficient to keep the moon-bounce signal within the razor-sharp passband of the Medfield receiver.

"Sam says he wants us to listen to *his* transmitter," said Hank, who was on the San Carlos end of the land-line. With a sweep of his hand, RXW killed the klystron supply and the exciter, and said, "Will the coaxial switch gang swing into action?"

This joking remark referred to the fact that transfer of the coaxial transmission line from the transmitter to the receiver was accomplished by two club members, armed with box wrenches. The large u.h.f. coaxial fitting had to be taken apart, the transmitter section cast aside, and the receiver section bolted in its place. This task took fifteen minutes or so, and was invariably accompanied by skinned knuckles, banged fingers, and sulfurous language. Armed with a tool box KEV and UOV advanced upon the offending connection, stating they would be willing sacrifices to the good of amateur radio!

"I've figured out that — considering the pec-wee dish and our 500-cycle passband — we just barely *won't* hear him," muttered W6UF as he anxiously watched Ray play with his magic box. "I hope I'm just being conservative." After an eternity Ray straightened up as if he had been electrocuted by a bolt from the heavens. "*I hear him!*" he shouted. W6HB grabbed the extra phones lying on the table and listened intently. He heard the rushing background noise, transformed into a bell-like song by the action of the audio filter. Nothing happened. The onlookers held their breath, and the tension grew about their shoulders. Suddenly Hank and Ray broke into broad smiles and shook hands. "Congratulations, Ray," said Hank, as he removed the phones from his head and handed them to the next eager listener. W6HB slowly walked to the telephone to tell Sam the good news. Yes, the W1BU signal was being heard in California. True, it was unbelievably weak, being in the noise for a majority of the time. Miraculously, the signal would on occasion rear above the en-

(Continued on page 158)

# Project Moon Bounce

*As Seen from Rhododendron Swamp*

BY F. S. HARRIS,\* W1FZJ

**M**OON BOUNCE. The elusive goal of the Rhododendron Swamp V.H.F. Society for five years. Four years ago we heard our first weak and willowy echo on 50 Mc. Three years ago, our first echo on two meters using our railroad-track vertical 128 elements. But always the same problems. Weak and fading echos on a sporadic basis. No one on the other end. Calculated s/n always marginal. Then came the parametric amplifier and the probability of using frequencies heretofore impractical from a receiver noise figure point of view.

1296 Mc. was chosen for the following reasons:

1. It is the first ham band where Faraday polarization shift becomes negligible.
2. Lowest ham band in which galactic and solar noise are at a minimum.
3. Highest ham band on which receiver noise figures of less than 1 db. are possible.
4. Highest ham band where tubes capable of a kw. input are available.
5. The only ham band where we were definitely assured that a competent and reliable group would be duplicating our efforts on the other end.

\* Causeway St., Medfield, Mass.

The aforementioned reasons were all important but the last was really the deciding reason. Three years of hearing an occasional echo of our own without one single schedule with another group convinced us that the biggest problem to solve was the guy on the other end.

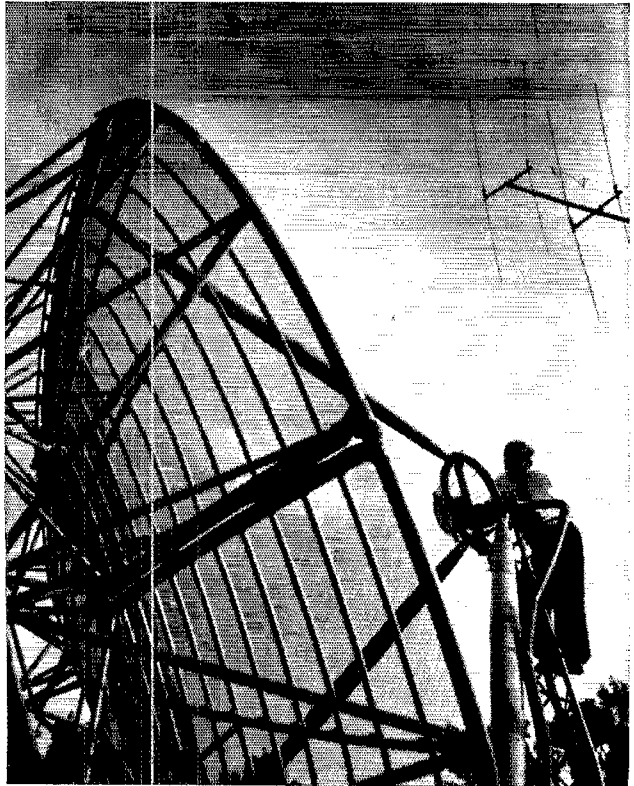
Having made the decision to go ahead, we then divided up the jobs among the various club members and sent out the word to all and sundry that all help would be gratefully accepted.

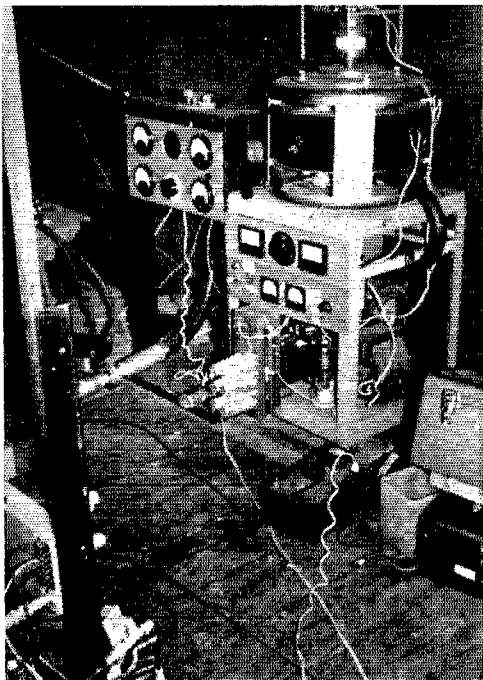
## *Big Problem No. 1*

What do we use for an antenna? Our propagation expert, Gordon Pettingill (W1OUN) gave us the minimum gain we could use to get practical results. A thumping 35 db! Furthermore, the experts insisted on a polar mount for the then non-existent antenna.

By a stroke of good fortune and the sterling efforts of our official procurer, Dana Atchley (W1HKK), we obtained the loan of an eighteen-foot parabolic reflector from the D. S. Kennedy Co. Not only could we borrow it, but it could be easily dismantled for transportation. The transportation division, Fred Collins (W1FRR), Frank Vernon (W1EHF), and Henry Cross

You can get some idea of the size of the dish from this view of Sam giving it the once-over. We don't have a good photo showing the guts of the polar mount and the tracking mechanism, but W1HDQ went up to inspect it and came back with the report that it is a marvel of mechanical ingenuity. (In the upper right of this photo you can see part of Sam's 128-element vertical.)





Kilowatt klystron amplifier used in the 1296-Mc. moon-bounce setup at W1FZJ/W1BU delivers 350 to 400 watts output. Receiving gear is in rack in left foreground. The entire station is housed in a tent directly below the dish antenna, and remotely controlled.

(W1OOP), lost no time searing up a truck complete with several helpers and getting the dish transported from the seacoast at Hingham, Massachusetts, to the mud flats at the RSVHFS.

After an evening spent assembling the dish, I was appalled to discover that I had at last acquired an antenna too heavy for me to lift. Not only was it too heavy to lift, but not a thing on the place was capable of holding it up and pointing it at the moon with anything like the degree of accuracy required.

And so the leaves turned color and fell, and the cold winds came. Fall turned into winter and our aluminum white elephant lay on its back with its arms stretched toward the sky, daring us to prove ourselves worthy of its help. Amateur astronomer Larry Peavy (mechanical designer), and mechanical engineer Frank Le Baron, (W1TQZ), fought the battle of the drawing board. The rest of us argued the merits of el-az versus equatorial mount.

Everyone had his own theory and nobody had a solution which anyone else would agree was satisfactory. Imagine our surprise when our resourceful chief mechanical designer Frank Le Baron requested help in assembling and transporting the new polar mount which he had secretly designed and built. Before first snow fell, the monster was mounted and ready to use. Mechanically, the problems were solved. Electrically, we were caught flat-footed.

### *Big Problem No. 2*

How do you point the antenna at the moon and how do you know where it is? The only answer is with selsyns and motors. The rest of the winter was spent solving this single problem. Differential amplifiers, two-speed selsyn system, servo motors and hours and hours of calibration finally resulted in a system which allowed us to point the dish at the moon with an accuracy of better than one degree. An automatic moontrack device then keeps the dish moving at the same rate as the moon. An optical spotting scope is mounted on the dish for calibration purposes. It has never been used to aim the dish for moon bounce purposes for the single reason that the moon is always behind a cloud!

### *Big Problem No. 3*

Let's get it on the air!


By the middle of May the only remaining problem was to get the project on the air. All the parts were available but getting them hooked up working was a time-consuming job. Help was scarce and many an unsuspecting visitor found himself stringing control wires or running power lines. The Sudbury Radio Club sent a delegation to borrow our generator for Field Day and ended up carrying power supplies and klystrons up to the antenna site. (They never did borrow the generator!) Ted Lanman and Wayne Taft (W1WID) of Tapetone Company stopped in to pass the time of day and ended up spending six hours running power lines from the house to the transmitter site. The word was out! If you don't want to work, don't come over!

And then it was done! The antenna pointed, the transmitter put out r.f., the receiver listened, and if the moon was above the horizon, we could hear our own echo. Not sometimes, not maybe, but all the time.

### *Big Problem No. 4*

Where's those guys in California? The answer to that question was a month in coming. But when it came, it was in the form of a signal on 1295.976 Mc. via the moon. A five-hour battle seemed to prove that signals could be transmitted and received both ways but not quite well enough to make a contact.

The goal had been achieved however. Signals had been sent from California to Massachusetts via the moon on 1296 mc. Four days later signal reports were exchanged both ways. A month from now we expect readable phone signals (s.s.b.). Meanwhile, we are open for schedules anywhere in the world.

Members of the Rhododendron Swamp V.h.f. Society and others who played a major part in the W1BU effort include Hank Cross, W1OOP; Gordon Pettingill, W1OUN; Paul Day, W1PYM; Fred Collins, W1FRR; Frank Le Baron, W1TQZ; Dana Atehley, W1HKK; Wayne Taft, W1WID; Bob Rafuse, W1RUD; Southard Lippincot, W1DDN; Pat Harris, W1HIV; my wife Helen, W1HOY; and Larry Peavy. 

# Happenings of the Month

## Election Notice

### Iran Off Banned List

### Canadian TVI

#### ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1961-1962 terms. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidates for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

#### Executive Committee

The American Radio Relay League  
West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of.....as a candidate for director; and we also nominate.....of.....as a candidate for vice-director; from this division for the 1961-1962 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of an amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of

the 20th day of September, 1960. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are: Central: John G. Doyle, W9GPI, and Philip E. Haller, W9HPG. Hudson: Morton B. Kahn, W2KR, and Lloyd H. Manamon, W2VQR. New England: Milton E. Chaffee, W1EFW, and Carmine A. Polo, W1SJO. Northwestern: R. Rex Roberts, W7CPY, and Harold W. Johnston, W7PN. Roanoke: P. Lanier Anderson, Jr., W4MWH, and Joseph F. Abernethy, W4AKC. Rocky Mountain: Claude M. Maer, Jr., W8IC and John H. Sampson, Jr., W7OCX. Southwestern: Raymond E. Meyers, W6MLZ, and Virgil Talbott, W6GTE. West Gulf: Grady A. Payne, W5ETA, and Robert D. Reed, W5KY.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:  
July 1, 1960.

A. L. HUDLON  
Secretary

#### IRAN OFF BANNED LIST

The government of Iran has withdrawn its objections, filed with the International Telecommunications Union just ten years ago, to communications between its amateurs and those of other countries (actually, Iran did not license amateurs). The prefix is EP, and work with these stations is now permissible.

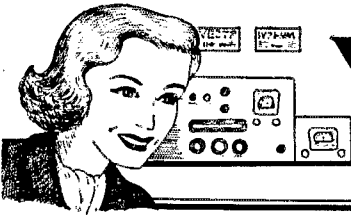
#### MONTANA EXAM POINTS

For some years now, FCC has annually conducted amateur examinations at Butte, Montana. The Commission now finds that, especially since a large number of amateur applicants reside in Great Falls, the latter city will replace Butte in the list for annual exams. The first in Great Falls will be held sometime in September, details available from the district office in Seattle.

#### CANADIAN TVI

Canadian Director Eaton, VE3CJ, has obtained information from the Department of Transport concerning the extent to which their amateur

(Continued on page 168)



# YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,\* W1QON

## YLRL THIRD INTERNATIONAL CONVENTION

Santa Monica, Calif. 1955; Chicago, Ill. 1957; Cambridge, Mass. 1960 — International Conventions of the Young Ladies Radio League One, Two, and Three! Each an outstanding gathering of YLs drawn together by ham radio and stimulated by a mutual interest in the YLRL. The first two have already been recorded in the annals of YL history — hear ye now highlights of the third convention.

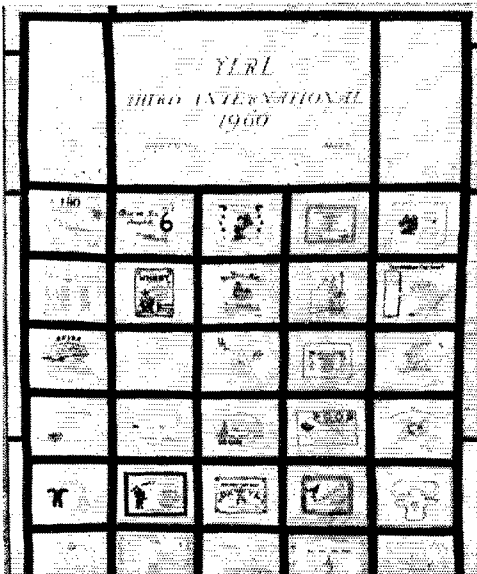
Historic old Harvard Square in Cambridge, Mass. provided the setting for the event the third week end in June 17-19, 1960. The Women Radio Operators of New England was hostess club. For more than a year the convention committee worked on details planned to make each YL who registered at the Hotel Commander glad indeed that she came.

Registration in the afternoon and an informal get-together in the evening introduced the week end on June 17. YLs got down to business early Saturday morning with a YLRL forum, while OMs were guided to interesting spots around the Hub City. Helen Harris, W1HOY, opened the forum and introduced the president of the YLRL Gladys Eastman, W6DXI, who presided over the discussion of YLRL business.

During the luncheon that followed greetings were given by the convention committee and Ethel Smith, founder of the YLRL, Louisa

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

The now famous YLRL certificate bedspread. Wouldn't you know—an OM (W1NUP) won it?



## DATES — 1960 ANNIVERSARY PARTY

The 21st Anniversary Party of the YLRL is scheduled as follows:

C. W. SECTION —

Start Oct. 19, 1960, 12 Noon EST

End Oct. 20, 1960, 6:00 P.M. EST

PHONE SECTION —

Start Nov. 2, 1960, 12 Noon EST

End Nov. 3, 1960, 6:00 P.M. EST

Complete rules next issue.

Sando, W5RZJ, YL editor of *CQ* magazine, Wanda Gluck, K6ENK, editor of *YLRL Harmonics* (by letter), Lillian Beebe, W5EGD/3, YLRL Vice President, Carola Tigerstedt, OH5SM, and W1QON. Miss Edith Rotch, W1ZR, Sister Emiliana, W1HUH, Eloise MacLean, W1FOF, and Dorothy Evans, W1FTJ, were specially introduced as "longtime YLs". Hilda Andrew, W4HWR/2, just back from a tour of duty in Japan with her chaplain OM, spoke briefly of her experiences operating KA2HA.

Following the luncheon there was time to relax in the YLRL hospitality suite or browse for souvenirs in Ye Olde WRONE Gift Shoppe, which was managed by Mary Hinterland, W1CEW, and Mary Hadley, K1ADY. Turns could be taken operating station W1YL on 6, 10, or 75 meters.



The slide illustrated talk by guest banquet speaker Father Dan Linehan, W1HWK, Director of Weston Observatory, brought the audience to a standing ovation.

Highlight of the YL-OM banquet in the evening was Father Dan Linehan, W1HWK, Director of Weston Observatory in Massachusetts who presented his scientific travels in the Antarctic from a "Ham's Eye View".

On Sunday W1HOY and her OM W1FZJ were hosts to about 150 YLs, OMs, and harmonics at

(Continued on page 154)

QST for



Convention DX YL guest of honor, below left, was Carola Tigerstedt, OH5SM, who flew over from Finland just for the occasion.



As President of the Grandmothers YL Club, W9RUJ, above right, feels entitled to wear that old hat!

## Convention



The entire YL convention committee, save one. Seated, l. to r.—W1SVN, KIADY, W1ZEN, K11ZT, K1EKO. Standing—W1VOS, W1RLQ, W1UKR, W1SCS, W1CEW, K11JV, and W1HOY. W1ZJS is missing.



President of WRONE, Helen Harris, WIHOY, and her QM Sam, W1FZJ (who will be the new v.h.f. columnist for QST), welcomed some 150 hams and harmonics to their home in Medfield Sunday afternoon. Helen was in charge of the enormous number of prizes awarded throughout the convention.



K11ZT, left, greets out-of-staters "Little Bo," W4HRC, Kay Barclay, K1JBT, and Louisa Sando, W5RZJ.

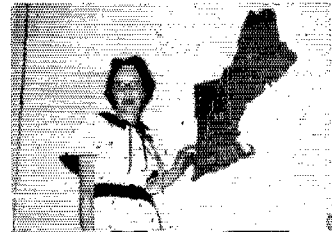
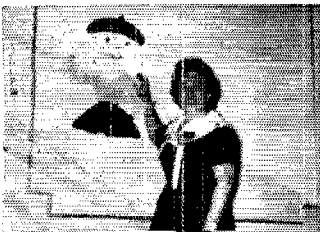


At the left, mobile all the way from California were (l. to r.) Vada Letcher, W6CEE, Gladys Eastman, W6DXI, Pres. of the YLRL, Harryette Barker, W6QGX, and Maxine Willis, W6UHA. The four had also been present at the first YLRL convention in 1955.



Poolside at the WIHOY-FZJ QTH—Mary Jervis, W1CFT, Lillian Byrne, K2JYZ, and Carolyn Currens, W3GTC.

Onie Woodward, W1ZEN, Mildred Doremus, W1SVN, and Blanche Randles, K11ZT, point to a few of the unique convention favors and decorations that popped up everywhere. W1ZEN and W1SVN were convention co-chairmen. K11ZT, along with Edith Shaughnessy, W1ZJS, (not shown) could take credit for the delightful favors.



# Hamfest Calendar

**California** — The Western Single Sideband Association will hold its annual convention at the Mar Monte Hotel in Santa Barbara on the week end of October 1. For further info, write the Western SSB Ass'n, Box 568, San Pedro.

**California** — The annual San Joaquin Valley ARRL Section picnic will be held on Sunday, Sept. 11, at Crane Park in Turlock. Bring your own picnic lunch. There will be transmitter hunts on 6 and 2 meters. Pre-registration is \$1.00, obtainable prior to Sept. 8 from Albert Johnson, K6RPL, 2230 Waldorf, Turlock. More details can be picked up on the SJV net each night at 1830 local time on 39.40 kc.

**Illinois** — The annual W9 DXCC meeting will be held on September 17 beginning at 1300 CDT, in the Tropical Room of the Sheraton Hotel in Chicago. Dinner will be served at 1800. Make your reservations with Mike Hexter, W9FKC, Box 73, Ravinia.

**Illinois** — The annual Peoria Area ARC hamfest will be held on Sunday, September 18, at Exposition Gardens, located at the corner of Northmoor Rd. and N. University, three miles north of town. Watch for signs on Routes 88 and 150. Come rain or shine, as there is plenty of space under cover. Plenty of parking space. Food available, or bring your own. Contests and fun for all, with special activities for the junior ops and XYLs. Advance registration is \$1.00, or \$1.50 at the gate. Advance registrations from Larry Pearsall, W9FDY, 2224 W. Herold Ave., Peoria, prior to Sept. 10.

**Kentucky** — The Blue Grass ARC of Lexington will hold its annual hamfest at Keeneland Race Track on Sunday, September 11. Contests and prizes, activities for the kids, swap and shop, plus refreshments at nominal prices. Transmitters will be in operation on 10, 6, and 2 meters. Registration is \$1.00. Plenty of shelter in case of rain. For further info contact Charlie Brown, K4LVR, 2905 Southview Drive, Lexington.

**Massachusetts** — The Tenth Annual New England DXCC Meeting will be held Saturday, October 1, at Motel 128 on Route 128 at Route 1 South (Exit 57) Dedham. Starting at 5:00 p.m. Bill Loeffler, W1PFA, and Peter Card, W1WDD, will give illustrated lectures on their travels in foreign countries. The W1 QSL Manager, W1GKK, will be present with the W1 DXCC members' QSLs from the bureau. The cost is \$5.00 per person for a roast beef dinner, including gratuity. Please make reservations prior to September 27. Checks for reservations should be made payable

to Philip Baldwin, W1ZW, % WHDH, 50 Morrissey Blvd., Boston 25.

**New Jersey** — The South Jersey Radio Ass'n hamfest will be held at Mollia Farms, Malaga, on Sunday, Sept. 11. No further information available at this writing.

**New York** — The 16th annual hamfest and ladies night of the Oneida Area hams will be held on Saturday, September 24, at the Masonic Temple dining room, 230 Main St., Oneida. Admission is \$3.00 per person, advance registration only, and is limited to the 150-person capacity of the dining hall. Check-in begins at 1700, with the banquet at 1900. For reservations write to Walter L. Babcock, W2RXW, 405 Sayles St., Oneida.

**Ohio** — The Findlay Radio Club will hold its annual hamfest on Sunday, Sept. 11, at Findlay Riverside Park. Families welcome. Ham equipment and ladies' handicraft swap and shop. Mobile talk-in on 3812 kc. Advance registration is \$1.00 per family, or \$1.50 at the park. Tickets and information from Paul A. Chapin, W8KII, RFD 5, Findlay.

**Ohio** — The Greater Cincinnati ARA will sponsor its 23rd annual stag hamfest on Sunday, September 25, at Stricker's Grove on Compton Road, east of Hamilton Ave., in Mt. Healthy. Registration \$2.50 at the gate, which provides you with hot dogs all day long, coffee and donuts 'til noon, beer and pop all day, and a full picnic dinner and supper (all you can eat). Rain or shine. For further information, contact Paul R. Wolf, W8IVE, 1329 Collidge Ave., Cincinnati 30.

**Pennsylvania** — The Radio Association of Erie will hold a hamfest on September 10 at the Sportsmen's Athletic Club, Erie. Registration will begin at 1000. For further information and reservations contact Dick Millhouse, K3ENE, 1143 E. 40th St., Erie.

**Texas** — The Waco hamfest will be held on Sunday, September 4, at the Syrian Club, a few miles southwest of Waco on Highway 84. Food and beverages will be available at moderate prices for those who do not care to bring their own lunches. Registration is \$1.50, and can be obtained from the Waco ARC, Box 1032, Waco.

**Washington** — The Walla Walla Valley ARC will hold its 14th annual picnic on Sunday, September 11, at Wildwood Park in Walla Walla. Activities will begin at 1000 and last until 1600. Full schedule rain or shine. For further information, contact the Walla Walla Valley ARC, Box 941, Walla Walla.

## Strays



While attending the West Gulf Division Convention in Dallas, Texas, Frank Lester, W2AMJ, sales manager of the Hammarlund Mfg. Co., donated a Hammarlund HC-10 Single Sideband Converter to the prize committee. It was won by Frank Lester, W5ATM! W2AMJ is on the right, above. (Photo courtesy of W0DEL.)

K5WIB, an employe of the Post Office for 24 years, warns:

"The general run of hams do not realize the importance of properly addressing QSL cards. Many times the card will say simply KN5XYZ — John, San Antonio, Texas. We in the post office have no alternative but to throw the card away unless it bears the wording *Return Postage Guaranteed* or has a four-cent stamp on it.

"After two years, the Post Office does not recognize a change of address, so be sure you have notified the publishers of the *Call Book*. I know of one case where a General moved four years ago, but never sent a change of address to the *Call Book*.

"The carriers at a sub-station where I am a supervisor, always brought the undelivered cards to me so finally I called this negligent ham. He said he didn't know why the *Call Book* publishers had not received the information from the FCC and he wondered why he wasn't receiving any cards."



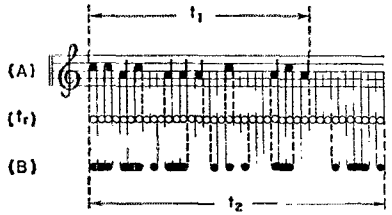
# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## Whoosh!

While copying a rather QSD character whose 14-Mc. radiotelegraph was afflicted with two major ailments — insufficient v.f.o. bypassing and pitiful power-supply regulation — we were struck by the paradoxical solid readability of his signal. Inadvertent f.s.k. proved to be the reason. His dots and “dashes,” though nearly of equal length, were being received on slightly different frequencies. That is, all dots were on one frequency, all dashes on another, a few dozen cycles apart.

The landwire-like intraletter spacing of this fellow's two-toned “all-dot” code was patently superfluous. Once one's mind latched onto the fact that his dots had a pitch lower (or higher) than his “dashes” there really was no need for dash prolongation. The next obvious step (see cut) is to discard those empty dash tails and compress the remaining BeBopBeBop into the maximum required transmission time.



Here A represents our BeBop supercode as derived from traditional B, with  $t_1$  the reference time base (bauds). Required tonal contrast is shown exaggerated.

Comparing A to B it's plain to see that we have a faster tool, speedier in this example by 20 or 25 per cent ( $t_1$  vs.  $t_2$ ). Oh, it's the same old code, really. We've merely changed the dot-dash discriminatory criterion from time to tone. Instead of dits and dahs we now have dits and *dits*, or Be's and Bop's. No change in the code, mind you, just a modernized version neatly applicable to up-to-date v.f.o. design and the trend toward electronic keyers.

Bandwidth? Apparently well within the chirp-swing tolerated on 20 c.w. these days. Capability of pitch differentiation varies from operator to operator, of course; a dozen cycles or so should suffice for sharpies. Consider that, for any given w.p.m. speed, BeBop supercode reduces the basic required dot-rate bandwidth. By this same factor it seems reasonable to presume that manual high-speed c.w. thresholds could be extended significantly.

Next time skip disappears in a good old-fashioned fadeout, round up some locals and try your

\*4822 West Berteau Ave., Chicago 41, Ill.

hand at supercode. Gosh, if we could enable future DXpeditions to work 100 fellows for every 75 they now accommodate, you might be in the bonus twenty-five.

## What:

Some of the summer's 14-Mc. openings have been just like old times, “round the world and ‘round the clock. Fifteen and 40 meters have had their moments, too, according to this month's mailbag. Hop aboard the “How's” Bandwagon now and we'll go visit with friends on

**20 phone**, where W1s APA (back on after quite an illness layoff), BIH, K1DJM, K2TDI\*, W4IUO, K4s DAD LRO ZYI, K6s OHD ROU, VE3CJ, A. Hovey, R. Kemp and C. Morrow fraternize with CO7s AA\* HQ HK, CP8FB (14,184 kc.). GR7CR 14 hours GMT, DJ5BVA, DU5 1AP 14-15, 7SV 12, EA0AA (94), E18P\*, FA8WH (172), FK8AU 7, FO8AC 9, HGs 1BE 1KA 2JF, HI2s JK V, HI8s DGH JBD, HP1ME, HS1B 11, K6LJR/KG6, KB6BH 9, KC6s AQ 9, AS 10, GJ 10, PE 10, KC4USV, KGs 1AA 1BB 4AA 6A1JF 6AJT, KJ6BV\*, KL7CMI/VE8, KM6s BI BU 10, KW6CJ, KX6CA, OE1DH (145), ST2AR\*, TGs 5HC 9CP, TI2AJ, UA0LA 11, UB5s FJ\* VO\*, UP2CG\*, VE8s NN TK, VKs 1AOP of Canberra, 9NT 9, VP8 1RT 2DA 2DU 5BL 7BZ 9AX 9FX, VO8 4AQ (114), 4ERR (113), 9HB 9TED/min\*, VRs 1D (150), 2DK 2DL 6-9, 2DP (235), VSs 1JV\* 14, 9AZ\*, VU2NR\*. Ws, 2AYN/EP 3ZA/EP\* 4HW/KS4, XEs 1FFX 1LF 3AF, YN1s CGC LC, YU2DB (299), YV5s AKU ANE, ZL4JF (130) of the Campbells, 4X4AS, 9M2s BV EB GA and 9Q5AG\*, asterisks (\*) representing single-band protagonists.

**20 c.w.'s** cross-check reads like the *Call Book*, a veritable population DXplosion. The story is told by reporters W1s APA BIH HGT OPB, K1JFF, K2s MBX UYG, WA2KMY (85/40 countries worked/confirmed), W3LOS (109/97), W4s GCB IMG IUO AIR, K4s DAD (55/30), DFT IEX LRA LRO NPE TEA (141/119), ZYI, K5YNA, W6RCV, K6s CJF (103/84), EC ROU (72/36), WA6FCX (61/27), W7s DJU LZP YAQ (41/31), W8KX, K8s IKM (40/26), NHC, W9s CLH JJJ, K9SRR, listener A. Rugg, EL4A, IER, KP4AO and SV0WI who interviewed and eavesdropped on BV3HPT (90) 16, CE8 1DN (1), 2CO 3CB 4FX 5AW 0AD, GMs 2QN 7JK, GOs 2CQ 7HQ 7NR 8IK, CNs 2BK (18) 5-23, 8AC 8AF 8MB, CP3s CD CN (12), CRs 4AX (38), 5AR (104), 6CA 1, CTs 2BO 3AV (34), 23, CXs 1BO 4CX, DL8CM, DMs 2ADL (80), 3ZM (80),



DU8 1NL 1OR (60) 13. 7SV (25). EA8 8BF 0. 8CP (26). 9KO (45) 20. EL4A 19-21. ET2US (68). ETE3CE (63). F9BGC (48). FB8CJ (41). FG7s XC XF (76) 22. FM7WP. FO8AC (37) 7. FO8s AF (95) 0. AW (14). HO (20) 15. FR7ZD (58-90) 4. FY7ZI. GD3FXN. HA1s 1KSA 5FV (64). 5KFR 5. HB-FO (68) of the Swiss military. HC8s 1JU 2CS (73) 3. HE 5CN 3. HK8 3TH 4EL. HL9s KR KS. HP1SB. HZ1s AB (46). HZ, IS1s DKZ (52). ZUI (10) 22. IT1s AGA (17). AVO (75) 2. TAL. JA1-2-3s galore. JAs 400 (70) 21. 4QR 6AWD 6ZD 7AB 7AD. JTIKAB (61) 16. KAs 2DE 2FF 2HT 2JM 2JS 2SN 2DM. KC6s JB (20). WB (29). KGs 1BA 19. 1BB (41). 1BF (18). 4AN 4AO 6AI 6AJ 6AJT 6CY (45) 13. 6IG (40). KM6s BI (36). 18. BT. KR6s FH GY IX (37). MY. KV4AA (80) 20. LUs 1NE 0AC (36). LX1DR. copious LUs. MP4BCR/mm (68). OAs 4HK 7F (49). 8B (63). OD5LX. OX3s JH 5. UD (44). QYIR (6). PJ2s AE (28). AW (52). CQ ME. PYZG. PZ1AA. SUIs AL (75) 1. IM (47). SVs 1AO (44). 0WR (33) 3. TF2s WEV (23). WEZ (43). profuse TIs. antarctic UA1KAE, rarish UA2s BV (76). KAW. UA9s DP KDL (88). KXA UA VB (17). UA0s BI (57). BN (21). CL EH FE FM FR JF (56). KF KM KID KKS KQB KZA LS LT OK (41) 16. UB8s CI CT ID KEP MZ ZJ. UC2s AR (29). AZ (27). BLC OS. UD6s AM 2. AP BB (40) 22. GW (46). UG6AW 3. UH8DA. UI8s AC (74). KAB (37) 2. KBA. UM8KAB. UO5PK (39). UP2AC (20). UO2s AE/mm (69). DB 4. KAR (80). KBA. UR2KAT. VEs 6AAE/SU (148). SDX 0MC 2. VKs 8TF 9DH 9GK 9NT (50) 10-11. 9XK. 6AA (76). 6AB 0IT (47) 5. 0PM. VPs 2KD (11). 3RW 3YG 4IF (146). 6AP (41) 12. 7BK (74). 7NE (57). 8DL (29) 4. 9BN 9BO (21) 12. 9QQ. VO8s 2TV (32) 2. 3HZ (41) 4. 4HT. VR2KD (85) 10. VSs 1AZ 1FZ 1KG (55). 1KL 6DV (39) 15. 9APS (52). W2AYN/EP (87) 31. W8UTQ/3V8. XE3BL. YN4AB. (14) 0. YOs 2BU (10) 20. 8KAE (65) 0. YS10 (8). YV4BE. many YV5s. ZB1s FO (49). HC (28). JW. ZCs 4EX (62). 4IP (46). 4PW (64). 4SS (36). 5AE 5BE (51). ZDs 1AW 9. 2JKO 2JM (36). ZEs 2KG 6JG (87). ZKs 1AK 4-6. 1AR 2AD. ZL4JF (146) 8-9. ZP5s AY 23. LS (11). ZPs 3AZ 3DP 9M. 4S7WP (24). 4X4s BX (16) 15. HZ (33). IE (64). II KP (68). 5A2s CV 7Z. 6Od2s AB NG (86). 7G1A 4. 9M2s EB FS GS 19. GT (89) 15. GU. 9O5s AA LL and PS (84). Some interesting new prefixes, eh?

**15 phone** remains productive for W1FYF, K2UVQ, W4IMG, K4s BQU DFT LRA TEA ZYI, K5WAIN, K6ROU, WA6FCX, W7YAO, Messrs. Hovey, Kemp, Morrow, Rugg, EL4A and KP4AOO thanks to CE8 1BD 5EQ. GN8s CS GO, COs 2WU 7MD 7NR 8ES 8JK. CPs 1BH 5EC. CT1YE. GX1BY. EL4A. FF4s AB AC. FG7XH. FY7YC. HC8s 1HF 2DA 2MW 7RP 8GI. HH8s 2CP 5LA 9DS. HIs 7CJY 2. 3CM 82GH. HKs 1CN 1XT 8DQ. HP1SB. HP1SB/HP5. HR3PD. HV4CN\*. OAs 1C 4AA 4AT 4AX 8D. PJ2CO. PZ1BE. ST2AR\*. TGs 5HC 9As 9DI 9LP 17. TIs 2ACA 2J 22. 2OE 5FLL. 5RV UR2s BU 23. KAE. VK0s IT WH. VPs 2AB 2DA 5RA 6WR 7NE. VO4s DT RF\*. VR2DZ. W2AYN/EP. XEs 1AAP 1GGU 1YF 3BR. XW8AL. YNs 1AW 1SR 6HH. YVs 3DV 20. 4BV 5AMI. ZB1HC. ZL1GH. ZP5s HZ 0Q. 4X4s FZ 22. MG. 5As 3TL 23. 5TM and 9M2BV.

**15 c.w.** supplies CE8 1BD 1DC 3DV. CR5AR 17-18. GVs 1DJ (60). 3AB. DL8AX. ELs 1A (40) 18-19. FAs 8RJ 9VJ. FO8AF (60) 21-22. HA5KDF. HC2IU 23. HI8JOE. HK3RQ. HP1SB. IT1s AI 18. AGA (50) 0. JA8EK. K3IZT/KP6. KA2JS. KG6AJT. KZ5MQN. LZ1ENB. OD5s CN 0. CO (52). OA3D. ST2AR (30) 5 and 22. SV0W 16-22. TF3MB. UAs 9CM 0BC 19. UB5s JX WF. UC2BB. UO5AA. UP2KCB. UQ2AB. UR2AT. VP3RW. VO8s 3HZ 17. 4DB 4HT 20. 4ST 16. VRs 1B 2AS. VSs 5PM (95) 16. 9MB (40) 17-21. WH6DJV 6. XE1s PJ RY. YA1BW 16-22. YN1CRW 0. YVs 3AS (80) 2-3. 3CD 4BE. ZD2AR. ZE6JG 15-16. 4X4s IE 18. RE. 5A1 TN 21. 7G1A (50) 20-21. 9G1CW. 9K2AD 17. 9M2EB and 9O5IG (10) 19-20 for the loss of EL4A, IER, KP4AOO, SV9WI, A. Rugg, W1s HGT OPB, K2s MBX UVQ,

WA2KMY, W4IMG, K4s IEX LRA TEA ZYI, W6RCV, K6s CJF ROU STZ, WA6FCX, W7s DJU POU (64/36), K0s OSV and OSW.

**15 Novice persistence** pays off for WV2JSW (18 worked), KN3KHK (59/50), ex-KN4MPE (54). KN5CGI, KN7KPM (19/7) and KN8TSW to the tune of CE5AW, CM2WS, CO7LG, CP5EL, CT1QN, DLs 4ACN 6GK, EL4A. Fs 2MA 8VN 9LI 9RS. Gs 2YK 3MWM 3NLS, GM3KDA, GW2DDX, HA1KSA, HH2LD, HK2LX, HP1SB, HZIAB, IT1AGA, KA2CR, KG4AH, KH6s AC CYS, KP4AKH, KZ5s BBN MQN, LA4K, LU7AJR, LZ1KSS, OH6OR, OK1CKL, ON4PS, PJ3AD, PYs 1AQ9 1BIM 3APH 4AIR 3OD, PZ1AP, TIZW. UAs 1KAG 2AV, VKs 2AKB 3AN 3FH 4CK 5TQ 7SM, VPs 2SL 3RW 5AA 9EX 9WB, WH6DJV, WL7s DFP DJN, WY4s AST ATY AUO AUO AUY AVI AVT AVW AWX. XE3CE, YVs 3AL 3AS 3DV 4AT 4BH 5APR, ZG4MO, ZLs 1ADH 1FX and 3CV. KN3KHK considers considerable off-frequency and apparent v.f.o. operation by certain Novice licenses. Take care!

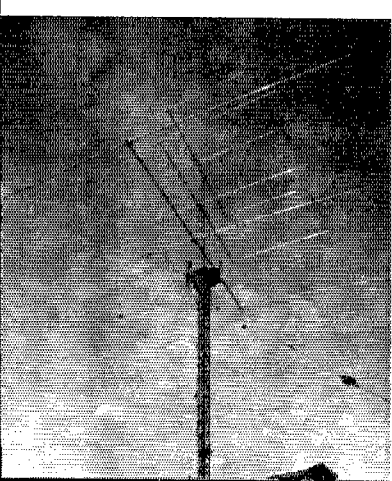
**10 phone** refuses to be shut out this summer. W3HHP, K4s, DPT ZYI, K6s CJF ROU, R. Kemp and EL4A capture such items as CE8 1AGI 8AGI, CO2BZ, CR6A1, EL4A, HK3CR, KZ5GH, LU8 1DAB (460), 6MR 7FAG, PJ3AD (410), PYs 4AYV 5GA. PZ1s BE BF, TG9TI, VP6s EB PV, XE1FW, YN1AW, YVs 1AC 3CN 6BP (580), ZE3JU (11 meters). ZLs 1KW 2HJ 2M 2WS 3AW, ZP9AY (450) and 9M2BV. Ten c.w. surprised K4ZYI and IER with EL4A, PY4HT and ZE3JJ. Hanging out This month should give us a good clew as to how the 28-Mc. land lies for the 1950-'61 season — fingers crossed, OMs.

**40 c.w.** keeps K2MBX, K4s CQA/S LRO TEA ZYI, W6RCV, K6s CJF DV KDS, W7s DJU LZF YAQ, K8s IKM NHC, K9SRR, KV4CI, EL4A and YV1EM quite QRL with COs 8RV 8EM, DU7S 13, EL4A, HK5PT, HP1SB 5, JA8 1BCO 1BLN 1BTG 1BZY 1CE 1CMG 1CPM 1CRB 1CV0 1CWZ 1CZG 1DAY 2AJI 2APC 2ATJ 2UA 3AEB 3REK 3CAF 3CS 7AFD 7AFN 7NX 8BP 8HO 8IM 8JC 8LN 8FO 8QN 8OL 8QN all around breakfast time. KV4CI, LU7LZ 11. PYs 2ZZ 4GA 5. 7AHP 5. SM4BZH/5, SM7BAU/mm, SP6Vs, TI2CMF 5. UAs 3A HI, VKs 2ZO 3MX 5DS 5JE, VPs 6RG 6UN 7BB/mm, VRs 1B (6), 2AS (30), 2DK (4) 7. YU3FU/mm, YVs 1EM 5HL and a few ZLs around 8 and 9. EL4A and W3PHL report these 7-Mc. phone candidates: DJ1BZ, ELs 1H 2AE 8D, FG7XR, KB6BH, PY2QT, TISs ORO WTC, VPs 2DQ 2GAQ 2JHQ 2LX 2SL 3VN 4LP 4LQ 4MM 6TR 9BN 9EI, YN1BS, YV5ANS, ZL3ID, 9G1s CC and CN\*. KN5CGI keeps our 40-meter Novice rubric solvent with a WL7DJN QSO.

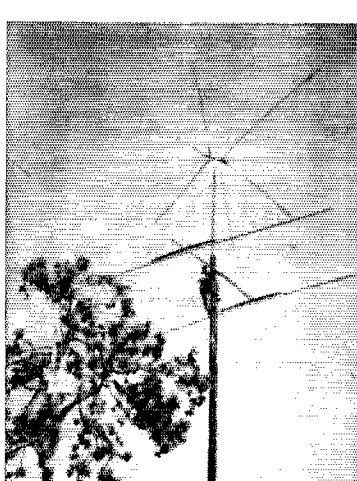
**80 c.w.**, a range to watch as summer static slowly diminishes, finds EL4A, K4ZYI, K6KDS and ISWL doing business with UT3AV (6) 0, DL1FF, DU7S, EI9J, EL4A, several G-men, JAICE, SP2WT, UC2AD, UP2KCB, UQ2AA, UR2AD, VK3MR and ZL4IE.

**160 c.w.** specialists already are tautening their flat-tops in expectant fashion. VP3AD even rushed north for a personal conference with W1BB. Meanwhile, through the summer, ZL3RB maintained 1.8-Mc. schedules with Ws 6KIP 8ANO and 8GDQ, fat and solid two-ways at times. One-sixty c.w. is always well populated on the Continent; International Short Wave League lists DLs 1FF 2AH, GZ2FMV, GD3FBS, GM3s AWF KSI, GW3s, KFA KNZ KWB NAM, OKs 1JN 1KCI 1KFN 1WR 2HU 3KME and E3AE as transatlantic potentials. Multi-bander EL4A is testing with other ELs and hopes to slice through his everpresent atmospherics for some long-haul two-ways this season.

**Where:**  
Asia — "Because of the changing personal situation at VS9MB, the club has decided to clear all QSLs via ISWL



YV5EU's tribander (left) and the seven-band (7 through 144 Mc.) ethereal adornment of W4AZK (right) remind us that winter's on its way up north—secure your skyhook! And why do these OMs busily check their rigging? Possibly because of such tempting DXpeditionary objectives as ZM7DA (center). (Photo via W1VG)



and H8GB, W2QXC, who was designated QSL manager over a year ago but who never received the necessary logs, says that he is returning all V89MB-bound cards, advising rerouting through ISWL who, it is claimed, provides two-day service to the Maldives. . . . "All valid cards received will be answered," vows 4X4HZ (W6DLX) whose address is in the listing to follow. . . . "I have now returned to the U.K.," notifies Terry Owen, formerly of the V89OC staff. "The club station at Masirah is still going strong with five operators. I myself will be on the air with a G or GW call in the near future." Terry can be reached at the Diana Hotel, Borth, Cardiganshire, Wales. . . . Via West Gulf DX Club's *DX Bulletin*: All QSLs for the VU2ANI Andamans operation were mailed as of July 5th. Cards were sent direct if self-addressed envelopes and/or sufficient postage defrayal were provided; others via bureaus. Those who have received no deserved QSLs via either route should communicate with VU2AK. WGDXC also understands that 5A5TR will welcome QSL inquiries concerning his earlier YA11W activity.

**Africa** — From W8KX: "VQ6GM expresses thanks to all Statesiders who have offered their services as his QSL manager. Don is thinking of making a selection before the new season gets under way. At present International Reply Coupons are appreciated, although his XYL must spend considerable time waiting for the local post-office clerks to calculate conversion rates to local postage. . . . "I'll be handling QSLs for CR5AR," states K3AMH. Accord Chuck the usual s.a.s.e. courtesy, of course. . . .

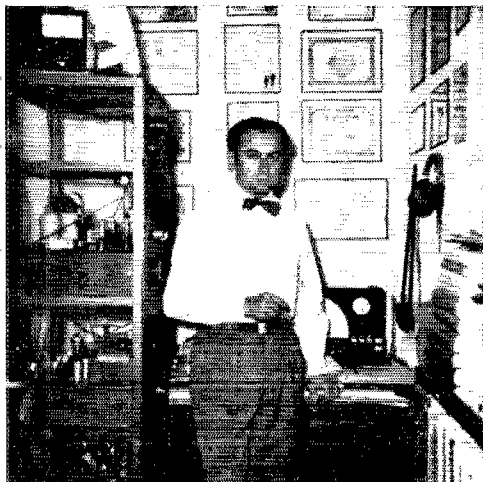
FR7ZD tells W8KX: "I must say that I only reply to QSLs, never send mine first. And I always answer in the same manner received." It pays to operate carefully, gang, for Guy continues: "I sometimes receive QSLs from stations who do not appear in my log, although their calls are quite similar to certain entries." Too bad, but the prime requirement of any QSO is to get your call listed correctly in the other fellow's archives. W8KX also points out that FR7ZD is so well known at his local p.o. that slight variations in address should be of no consequence. . . . W3KVQ confirms his QSL activities in behalf of CT8AV. Ed similarly assists VP2AK, VU2RM, ZD1AW and 487WP — s.a.s.e., naturally. . . .

Regarding recent ST2AR single-band doings resulting from a lively W3ZA visit, Eric writes, "Stateside, Canadian and 4X-Is were asked to QSL via W2JXH, others direct. All cards bearing IRCs and s.a.s.e. were answered immediately." K2TDI indicates that the same procedure applies to W3ZA's V89AZ s.a.s.b. action around the same time. . . . Ex-Z83ES arrived in Montreal about mid-August with QSLs and records, moving K0TAJ to write: "He sent QSLs for all contacts but some naturally went astray. Anyone who has not received a deserved card from Z83ES may secure same by writing to [the address to follow]." . . .

EL4A affirms the Mozambique QSL bureau efforts of YL CR7LU at Box 1234, Beria. . . . "Libya QSL manager 5A5TF will be back on the job in September after a two-month leave in the States," advises 5A17N. "John, 5A5TF (W6LAK), one of the most active hams in Libya, performed bureau chores in Fred's absence." . . . Strange new prefixes emanate from Africa's neopolitical ferment. For instances, OQ6s become 9Q6s, OQ9s are 9U6s, and 6O2s (letter "O") radiate from the new Somali Republic. More on this business in "Where."

**Oceania** — Protest from eminent DX fan ZI4GA via W1WPO of the ARRL Hq. DXCC Desk: "For the past few years I've scratched around in my log of hundreds of W/K contacts to find the entries of those whose QSLs simply state 'QSO VK/ZL Contest, 19' — or who insist on quoting local U.S. time, GMT, plus contest serials, would be of great assistance in getting out cards." Righto — GMT's the thing. . . . VK5NQ tells W4ORT that VK8 is the prefix for Australia's Northern Territory as of this July 1st. VK8TF (ex-VK5TF-VK8TF) is active in residence there now.

**Europe** — Hq. staffer K1LVW informs us that the correct QSL bureau address for Switzerland and Lichtenstein (HB9 HE9 HBI and HB4) now is: USKA, Sursee, Switzerland. . . . "I am now handling QSLs for IGH, Stateside only," says s.w.l. S. Ewing, Sleepy Hollow Rd., Atkinson, N. H. "Hams and s.w.l.s who send accurate reports with s.a.s.e. are assured of QSL." . . . KP4AOO remarks, "While talking with UR2BU I told him I had trouble getting a QSL from UR8AK. Karl said a letter to the Central Radio Club, Box 88-N, Moscow, should do the trick if the guy has me down in his log." W8KX adds, "My Q87 mailings behind the Curtain have not been successful. Are they stopped at 'Box 88'?" . . . IS7ZEI is a collector of canceled postage, a hint from W8KX that may be particularly beneficial if he requests your first and only Sardinia QSO. . . . ITIAGA brings up an old thorn: "My friend ITIBXX is not a member of ARL. Consequently all correspondence and QSLs should be sent to him direct or via me." The new address of ITIBXX follows. It's wise to bear in mind that the QSL bureaus of many overseas societies do not forward cards received for non-members. Ship your QSLs via bureaus only when instructed to do so by stations worked. . . . W8KX confirms that GI3ATH is former DL2XS, V87PH, XZ2HP and ZB2A.



YO3VI is one of the more workable Rumanian entries in amateur radio's perpetual DX derby. (Photo via W5PQA)

"He will gladly QSL those still awaiting confirmation of QSOs made under his old calls and holds logs dating back to 1936."

**South America** — ZP9AY and TE2CMF are new members of the W2CTN superbureau, the full extent of which may be ascertained by consulting your May 1960 "How's" and columns thereafter. . . . G8ES reminds us, "I am QSL manager for Ronald Pinders, VP8EG, Signy Island, South Orkneys. Because there are only two boats or so per year down there it is not advisable to send cards direct. When conditions permit I maintain weekly schedules with Ron during which he passes details of QSOs he has had since the previous exchange. In so keeping the log book up to date I am able to reply to all cards received from those who work him." . . . "As QSL manager for HCCC8 of the Galapagos I would like to report that all cards have now been answered," writes W8MXS who also keeps up to snuff on VP2KJ QSL duties. "If anyone has not yet received his card I will be glad to send another. I have received a number of QSLs for HC8CC, possibly resulting from bootleg activity. HC8CC was supposed to have been our Galapagos call but this became HCCC8 through a typographical error in licensing." . . . "I QSL 100 per cent," asserts YV1EM, supplying his address for the catalog to follow. "One W recently called me 'phony' and that made me mad!" . . . W1BAN informs, "I've made arrangements to act as QSL manager for CP5EL and will confirm any contact made with Ira upon receipt of QSL and s.a.s.e. Log information is checked with CP5EL daily on 15 phone. Incidentally, a long postal strike at Cochabamba resulted in a 500-QSL backlog at CP5EL. He is attempting to get this batch hand-carried out by tourists."

**Hereabouts** — "Please announce that all QSLs for W4HW/KS1 should be sent to me per his instructions," petitions K4BLM. . . . "K4SXO QRT'd in favor of Fiveland in August," apprises K4LRA. "He has handed over to me his QSL responsibilities for VP2s KD KW ML and SL, QSLs for these stations, bearing GMT, with s.a.s.e., should go to me at P.O. Box 85, Kendall, Fla." Jerry could use assistance toward obtaining his own HZ1HZ and CN8GU QSO certifications. . . . K2UYG nominates VR2DK (ten days), VE6AAE/SU (five) and YN4B (four) as QSLers of the Month. . . . KP4AOO requests that those who still need "deserved" cards from him reapply. "While changing QTH [see list to follow] I think some inbound QSLs were inadvertently switched from my 'in' box to my 'out' file, and I want to keep up 100-per-cent QSL for all cards received." Roger will be back at KP4AOO next month or sooner after a visit home. . . . Word from ex-VQ2RH: "Having just moved from Labrador to VE2-land, let me thank you VQ2 stay. I will QSL all contacts as soon as cards are printed — patience, please." . . . "While in Haiti last week I talked with HH2Y," writes KP4VB. "He says he simply cannot afford to get on the air anymore because of the high costs of QSLing. The entire QSL situation isn't good." KP4VB and friends are trying to work something out for the HH gang. There's no denying that fear of QSL complications keeps plenty of dandy DX off DX bands. W2EFN and K9VR/1 (P. Smith, 1911 Richmond Ave., Petersburg, Va.) want to do their share to help lick this problem, offering QSL-agency services to deserving overseas DXers. . . . An interesting crop of



CP3CN delights the DX gang with his homebrew 60-watt, HF-100 and delta-matched dipole down Oruro way. Carlos, a law student, has been turning log pages since 1958. (Photo via W8KX)

QTHs is placed at your disposal by W1s APA BIH FYF UED WPO, K2s QXG TDI UVQ UYG, WAZKMY, W3s H1P INH, KN3KHK, W-4s IMG IUO, K-4s GMR IEX LRA TEA, K5TER, W6RCV, K6s CJF EC OHF STZ, WA6PCX, W7LZF, W8KX, W9JJN, K9VRV/4, K0TAJ, KH6BXU, IT1AGA, ST2AR, VE3CJ, s.w.l.s R. Kemp, C. Morrow, A. Rugg, International Short Wave League, Japan DX Radio Club, Newark News Radio Club, Northern California DX Club, Southern California DX Club, West Gulf DX Club and the VERON DXpress of Holland:

CE3AGI, c/o U. S. Embassy, Santiago, Chile  
 CM8RM, R. Moraete, Box 662, Santiago de Cuba, Cuba  
 CP5EL (via W1BAN)  
 GR5AR (via K3AMH)  
 CR6BA, M. d. Lourdes Marquis, Box 28, Lusio, Angola  
 CR6GR, J. Dias Mendes, Box 305, Lobito, Angola  
 CR7FN, F. Cabacinhas, P.O. Box 1436, Lourenco Marques, Mozambique  
 CR9AH (via W1DWH)  
 ex-F7FD-KA2AA-KA9AA-KR6AA-W4VE-W5M Y-gtc. (to W3NO)  
 G30FK (to VU2RG)  
 HC1KA, T. Jaramillo, ex-HC6KA, Box 1332, Quito, Ecuador  
 HH2OT, Box 1027, Port-au-Prince, Haiti  
 HI8DGH, Box 99, Ciudad Trujillo, D. R.  
 HPI5B, Box 3080, Panama, R. P.  
 HRI1DL, Box 451, Tegucigalpa, Honduras  
 I1GH (see text preceding)  
 IT1BXX, F. la Mantia, 58 via Serradifallo, Palermo, Sicily, Italy  
 JT1KAA, Box 639, Ulan Bator, Mongolian Peoples Republic  
 K3IZT/KG6 (to K3IZT)  
 K61JR/KG6, P.O. Box 145, Agana, Guam, M. I.  
 KA01J, APO 815, San Francisco, Calif.  
 KG6AJR, Box 1147, Agana, Guam, M. I.  
 K61ICD (via W7PHO)  
 KL7FLB (via W4RP)  
 ex-K17PN (via OH2XZ)  
 KP4AO, R. Burt, G-35, Los Angeles, Santurce, P. R.  
 KP4AVK, Box 386, Mayaguez, P. R.  
 KP4VB (via KP4KD)  
 KR5WD (via KV4AA)  
 LZ2KBA, DOSO Radio Club, Tolbuhin 2a, Tirnovo, Bulgaria  
 MP4MAB/4W1, c/o R. Baines, 56 Balmoral Rd., Gillingham, Kent, England  
 OD5CL, P.O. Box 1348, Beirut, Lebanon  
 OD5CO, c/o U. S. Embassy, Beirut, Lebanon  
 OD5CP, Box 528, Beirut, Lebanon  
 OH0NZ (via SM5KK)  
 OK3DG, J. Kremarik, Box 199, Bratislava, Czechoslovakia  
 ex-OQ5s GU IE, P. Hiernaux, 58 Chaussee de Dudzele, Brugge, W. V., Belgium  
 PZ1BE, P.O. Box 981, Paramaribo, Surinam  
 PZ1BF, P.O. Box 184, Paramaribo, Surinam  
 ex-PZ1G (to PZ1BF)  
 RP2NBE, A. Norvartait, Kedainiai, Lithuanian S. S. R.  
 ST2AR (see text preceding)  
 TG9LP, Box 115, Guatemala City, Guatemala  
 TG9RK, Box 70, Guatemala City, Guatemala  
 T1ZCMF (via W2CTN)  
 TI2J, Apartado 12, San Jose, Costa Rica  
 UA9KOG, Box 44, Novosibirsk, Siberia, U.S.S.R.

UP2CG, Box 17, Shantlay, Lithuanian S.S.R.  
 VK4RQ, Box 94, Broadway, Brisbane, Queensland, Australia

VK5BP/8 or VK8BP (via VK5NO)  
 VK8TF, H. Fuller, Box 41, Darwin, N.T., Australia  
 VK0WH (to VK2AWH)  
 ex-V02RH, R. Harvey, C.P. 250, Mont Joli, P. Q., Canada  
 VP2s KD KW ML SL (via K4LRA; see text preceding)  
 VP2KJ (via W8MKS)  
 VP8EG (via G8KS)  
 VP90Q, Friendship Vale School, Devonshire, Bermuda  
 VO4HX, Box 14301, Nairobi, Kenya  
 VR2DP (via VR2AS)  
 VS5GS, G. Scott, Box 300, Brunei, Brunei  
 VS5JS (via VS5GS)  
 VS90A, RAF Det., Masirah Island, BFPO 69, London, England  
 VS90G (see text preceding)  
 VU2NR, B. Raju, Airport, Hyderabad, India (or via W0ZSZ)  
 W3ZA/EP (via W2LXH)  
 W4HHW/KS4 (via K4BLM)  
 W8UTQ/3V8, c/o U.S. Embassy, Tunis, Tunisia  
 W9DVM/mm (via W4RP)  
 XE1GGU, Juarez 127, Toluca, Mexico  
 XEs 5A 6A 0LT/XE5 (via LMRE)  
 XZ2AD (via W0UUV)  
 ex-Y1IIV (to 5A5TR)  
 YN1GRU, M. Gonzales, Apartado 540, Managua, Nicaragua  
 YV1EM, F. Bencini, Croele Petroleum Corp., District la Salina, Apartado 172, Maracaibo, Venezuela  
 YV3AS, Box 13, Barquisimeto, Lara, Venezuela  
 YV3DV, Carona, Venezuela  
 YV5AKU, Box 2234, Caracas, Venezuela  
 YV5ANI, Box 4459, Caracas, Venezuela  
 YV6BP, G. Gonzales, Box 79, Barcelona, Venezuela  
 YV6BR, R. Bassoli, Box 4109, Puerto la Cruz, Venezuela  
 ZA2BAK, M.aj. M. Bakiri, K.K. Perpitheshem, SHNUM, Tirana, Albania  
 ZD2HJG, H. Groves, c/o Decca, Ikotansa, Calabar, Nigeria  
 ZD2IHP, c/o R. Skelton, 81 Riddons Rd., Grove Pk., London S.E. 12, England  
 ZP9AY (via W2CTN)  
 ZLs 3VB 4JF 5AA 5AC (via ZL2GX)  
 ZS3DM, Box 1061, Windhoek, Southwest Africa  
 ex-ZS3ES, E. Gerrits, c/o F. P. Turville, 42 Devon Ave., Westmount, Montreal, P. Q., Canada  
 ZS3L, L. Theron, Box 1100, Windhoek, Southwest Africa  
 3A2DA (to G3CWL)  
 4S7GE, Pallepola via Matale, Ceylon  
 4X4HZ, F. P. la Fantasia (W6DLX), Postbox 2, Cointrin Airport, Geneva, Switzerland  
 4X4MG, M. Murevitch, 129 Katzenelson St., Givataim, Israel  
 5A1TN, D. Eymann, 7272 ABWG HedRonSec, Material, Box 498, APO 231, New York, N. Y.  
 5A5TR, P.O. Box 170, Tripoli, Libya  
 9M2BV (to VE3BV or VE3QE)  
 9Q5IG (formerly OQ5IG; via W2CTN)

NOTE: Preceding addresses are necessarily neither accurate nor "official" You take your chances.

## Whence:

Europe -- SSA (Sweden) invites your participation in the 2nd Scandinavian Activity Contest, a DX free-for-all scheduled for (c.w.) 1500 GMT on the 17th to 1800 on the 18th, and (phone) same times on the 24th-25th this month. Non-Scandinavians will attempt to work as many LA LA/p OH OH0 OX OY OZ and SL/SM brethren as possible on bands 3.5 through 28 Mc. The war-cry is "CQ SAC" on c.w., "CQ Scandinavia" on voice, and the serial exchange is the usual RS- or RST-report with consecutive QSO number attached (RST001, RST002, etc.). You earn one point for each completed QSO, this total to be multiplied by the number of band-prefixes accumulated (multipliers are the eight prefixes aforementioned, SL/SM going as one; at eight available per band, 40 would be a clean sweep) Log transcript with scoring-summary sheet should be mailed no later than October 15, 1960, to SSA contest manager SM7ID, K. Friden, Box 2005, Kristianstad 2, Sweden, for a shot at certificates to be awarded to high scorers in single- and multiplier categories. Here's an excellent chance to work toward such shnazzy Scandinavian wallpaper as OZCCA, WALA, WASM, etc. -- *skoll!* and fire away . . . "DXCC<sup>2</sup>" No. 30 is filed by OK1GT, the first Czech to meet the modest requirements specified on page 69, July 1959 QST. "Wasn't easy . . . On receipt of s.a.s.e., K2UVQ volunteers info on East German WADM and SOP certifications as received from DM2AHH . . . IT1AGA reports neighbor IT1BXX back at his DX dials after a three-year layoff, phone exclusively from 3.5 through 28 Mc. His new cube quad is a big thing on 15 or 20 around 1500-1800 and 2200-2400 GMT . . . SV6WI reached the 108/48 DX mark with concentrated 14- and 21-Mc. effort. "SV6WR is also very active here on

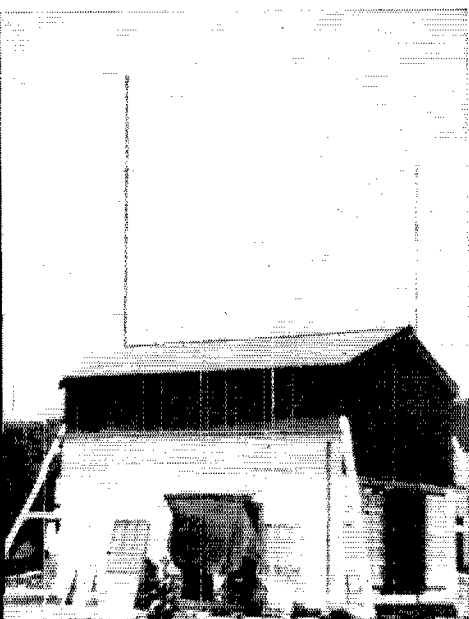
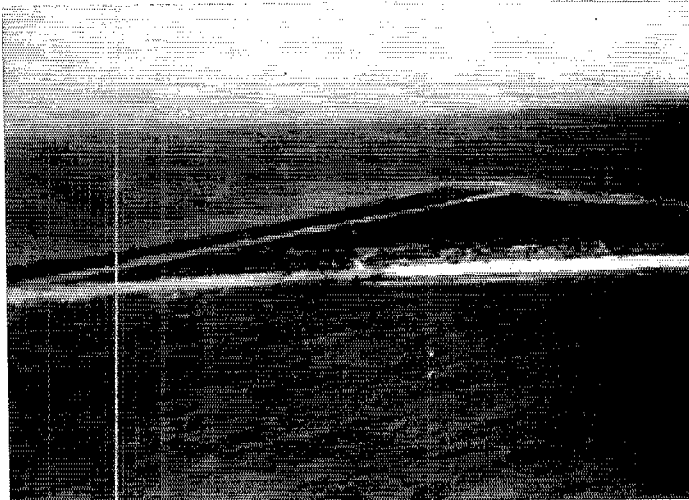
15 and 20 with 500 watts to a three-element rotary. Neither of us has been very active on 28 and 21 Mc. because of poor conditions. Most SVs seem to be on phone, so we will hold the c.w. fort." SV1AI continues to pace the nationals with his ubiquitous 25-watt phone and rotary dipole . . . . . WA6CYT, stationed in England as a frustrated s.w.l., desires to hear from the gang at 7500th ABRON, APO 125, New York, N. Y. . . . . "Had the privilege of giving OK1CG his first Tulare county contact toward WACC," testifies K6ROU. "Jim's QSL commented favorably on U. S. ham spirit." . . . . . VE3PV and friends were delighted by a personal visit from SM6CZF in June . . . . . HB9ET, through DL9LI, confirms July 14-Mc. s.s.b. and c.w. activity by HB1s HH/8 and TU/8 in Liechtenstein . . . . . W1UED finds W4KFG (ex-KI7PN) enjoying the DX facilities of OH2XZ, while K2RKN returned to our side after a session as OH2QZ. WA6FCX collided with OH2AA/2 on 21 Mc., a Finnish field day installation . . . . . K6CJF finds K6MYF savoring the DX end as DL4LU . . . . . JDXRC of Japan suggests that DXers with robust collections of CT1 pasteboards check with Instituto do Vinho do Porto, Opporto, Portugal, concerning the Port Wine Award.

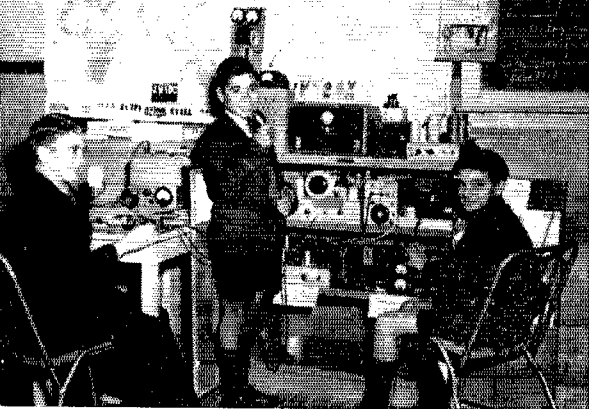
**Oceania** — NZART (New Zealand) urges your attendance at a venerable DX function known as the annual V K / ZL DX Contest, a festivity wherein non-VK/ZLs work as many VK/ZLs as possible and, quite naturally, vice versa. The phone period extends from 1000 GMT, October 1, to 1000, the 2nd; c.w. forces take the field between the same times October 8 and 9. The serial exchange is the customary RS- or RST-report plus consecutive QSO number (RST001, RST002, etc.) commencing with 001. *Scoring:* One point per QSO, each station workable once per band. The final score is derived by multiplying the total contacts on all bands by the total number of VK/ZL districts worked on all bands. (ZL1 through ZL5, VK1 through VK8, no VK8). List date, GMT, band, call and serials sent/received in that order, indicating contact and contact points for each QSO in adjacent right-hand columns. Use a separate log for each band, underlining each new district worked. Attach a summary sheet bearing total claimed score, a brief station description and a signed declaration that rules have been observed, then mail the works no later than January 20, 1961, to NZART, Box 489, Wellington, N. Z., for a chance at handsome certifications dreamed up by ZL2GX . . . . . From VK5NQ via Ws 3INH 40RT and KL7AZZ: VK5BP/8 or VK8BP operation will start early this month on a 24-hour-per-day schedule. VK5s BP and NQ will push 80 watts of c.w. on 7, 14 and 21 Mc. till midmonth . . . . . Accompanying 60,000 bunches of bananas, SM7BAU/mm regales

KG6ICD supplied over two kilo QSOs to DXers in 85 countries from rare Marcus in late June. A seagull's-eye-view of the island appears at right, the gang's teahouse-style shack at lower left with 10-, 15- and 20-meter beams in view. Pausing for refreshments, l. to r., are DXpeditioners W7YBI, s.w.l. Tom, Ws 7OCD 2VRP and 5EUM. These photos come courtesy W7PHO, QSL aide for KG6ICD.

**K6DV and other Pacific Coasters** on the low edge of 40 . . . . . "K6LJR/KG6 is a new General who chases DX on 20 phone," states K6OHD. Mike also has VR1D pegged as ex-ZL1ABZ-VR2DQ . . . . . K2UYG reports ZL2GX having his hands full as emcee of ZL4JF 14-Mc. phone rituals. Many of the gang refuse to stay in queue. One school of thought on this angle believes in free DX enterprise, the other in a planned and more orderly DX economy . . . . . Fr. Tom of KC6TM has a group of young Micronesians up to about 8 w.p.m. in their quest for ham tickets on Truk. He writes W1UED or ARRL Hq., "Since these islands are so far apart, communications is a big thing and it's natural for our boys to want to get into amateur radio. They are now anxious to get on the air for themselves but, to be perfectly honest, our old gear is just too worn out to even smoke." Funds available for this commendable purpose are negligible — any ideas? If so, communicate directly with KC6TM and his batch of eager would-be DX hounds . . . . . Further Oceaniagrams via VERON and WGDXC: Traffic commitments restrict Macquarie QSO output at VK8WH who is most active at 0700 GMT near 14,110 kc. . . . . KH6OR looks forward to more DX sessions while visiting Johnston Island, . . . . . ZL2GX reports ZL3VB of the Chathams quite raisable on Sundays at 0430-0530 GMT, 14,010 kc. preferred; also that VR1D should be on tap for another year or so.

**Africa** — Things are happening so fast on the once Dark Continent that it's difficult to keep up with developments. For example, where's the Malagasy Republic? What happened to good old Ubangi-Shari? And who the heck is 6O2AB? This year actually sees an almost brand new Africa, so we might as well dash down the list of 1960 changes chronologically to get a little perspective. Starting things off on New Year's Day, the French trust territory of Cameroons became the Cameroon Republic. April 7 saw another French trust, Togoland, gain independence. On May 18 the 4.3 million folk inhabiting Chad, French Congo and Ubangi-Shari became citizens of the Union of Central African Republics. June 20 was the birth date of the Mali Federation which comprises the former French colonies of Senegal and Sudan. Eight days later old Madagascar formally became the Malagasy Republic. June 30 will go down in history as the day when the mammoth Congo Republic commended a troublous history. Next month Nigeria's 34 millions will become independent of England. That should conclude the agenda for 1960; it's obvious that it will be some time before geographical and political stability obtains in these areas. The dust not only hasn't settled yet — it hasn't even stopped being stirred up. Map and geography textbook publishers are digging in for





VK2AXK's accent on youth is refreshing. Junior ops John, Tony and Paul, left to right, are scholars at St. Joseph's Tech School, Sydney, site of VK2AXK/p. Chief operator Lee writes, "We have worked nearly 500 W/Ks with our junk-box 40-watt rig but only 218 QSLs have been received in reply to 471 sent out." C'mon, fellows, let's QSL.

quite a siege, for there's more confusion to come in '61  
 "Still plugging along on DX bands but the going is getting rough," writes EL4A (W7VCB). "Rainy-season lightning cooked my 100-ft.-high 20-meter vertical."  
 Libyan notes courtesy 5A1TN: "Twenty-meter mainstay 5A1TN completed a transistorized audio oscillator and will soon be heard battling it out with the high-speed boys. . . Sidewinder 5A1TI heads for Germany and a DL4 call, leaving his 3-el. 14-Mc. twirler with 5A5TA. . . G4FN, in Tripoli on holiday, recently radiated s.s.b. from 5A1TN." . . . W3ZA and host Eric worked some 68 s.s.b. countries from ST2AR in late June with a KWM-1 and quad antenna on 14 and 21 Mc. . . From W8KX: FR7ZD, screen-modulating his 813 final with a 6V6 and receiving with a trusty S-20R, has collected one hundred countries since firing up a year or so ago. A session with a W6TOU sideband loaner should help boost Guy's totals. . . More from the DXtensive files of W8KX: "With the departure of VQ6s AB LQ NG RS and ST, VQ6GM expects to be just about the only active amateur in that area unless incoming replacements are DX-minded. Don previously signed GM3BYM, G3BYM and SU1GM. He's often active on 20 meters, 0200-0400 GMT, and 15 meters at 1800-1900, also on 10, 40 and 80 when conditions are favorable. VQ6GM expects to remain there till December of next year, then possibly shift to Cyprus or Singapore."  
 K6EC notes FQ8HO anxious to work Idaho, Mont., Nev., Utah and Wyo. for ARRL's coveted WAS diploma. . . SARL's Southwest Africa branch offers a distinctive certification to any DXer who confirms fifteen QSOs with SARL-member ZS3s, five contacts on each of 10, 15 and 20 meters, no time limit designated. Check with SARL Divn. 3, P.O. Box 1100, Windhoek, Southwest Africa, for full WASWA (Worked All Southwest Africa) details. . . CT3AF checks out for Brazil, according to K6OHD. . . Africa addenda via NNRC, VERON and WGDXC: Ex-XW8AH hopes to remain active on 14-Mc. sideband as WBUTQ/3V8 for another year. . . FB8AA is said to have doubled Kerguelens workability. . . Ex-SU1FX, now ZD2GUP, periodically forsakes his 20-meter screen modulation for 40-meter c.w. probes around 0630 (MT. . . ZS61F planned to follow a July ZS7M visit with a Bechuanaland look-see.

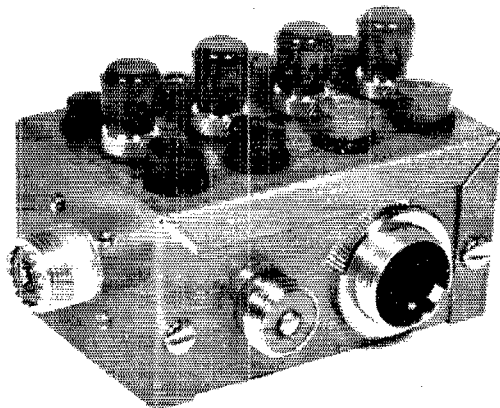
Asia — ARRL Director VE3CJ comments: "VE3BV has been on the air as 9M2BV since July 3 with 60 watts of a.m. and simple doublets on 10, 20 and 40, the latter band for local rag chews. He says the best bet for Malaya contacts right now appears to be 9M2EB, an RAF chap with triband beam, etc. Twenty appears to be 9M2BV's best band and he tries especially for VEs on week ends."  
 "I'm on leave in the U.K. from VU-land using my newly acquired G30FK call on 15 and 20," writes VU2RG, ex-AP2N. Norman expects to return to India some time this month. . . W50ZI laments from far away, "It seems that whenever Uncle Sam sends me overseas, the authorities in the country to which I'm sent put the clamps on amateur radio licensing just before I get there. In 1955 it was Turkey; this year it's Thailand. Some HSIs are hamming, but newcomers seem to be out of luck." Pat is willing to consider DXpeditionary work over his way and seeks suggestions from interested parties. Write Capt. L. Rose, SigC USA, Det. VA, USARELAI, JUSMAG, APO 146, San Francisco, Calif. He formerly signed DL4FL. . . K6OHD finds KA2BM shutting down for removal to Hawaii. . . W2AYN/EP has another year or so in Iran, according to K2UYG. . . Orientation by NCDXC, VERON and WGDXC: MP4MALB/4W1 (MP4BDA) started 20-meter phoners in late June by unleashing some 200 Yemen QSOs in a brief spree, KSSNA of ET2US has 4W1 aspirations, too. . . This is the month when 9N1GW hopes to put his KWA1-1 on 14,010, 14,190, 14,348, 21,040 and 21,405 kc. from Sikkim, Bhutan and/or East Pakistan. AP2CR also is still game for the latter. . . VU2NR, encouraged by W3RIS and friends,

anticipates a Laccadives strike early next year. . . BV1USC's WANSK writes, "A new location here will be much more comfortable to operate from. Our schedule is fairly consistent: 1200-1600 GMT, Tuesdays and Fridays, and 1100-1200 Saturdays, usually between 14,300 and 14,330 kc., single-sideband."

South America — "Ex-P21G of 1946-'47 is back in action again as P21BF on 10 phone," enlightens W3HLIP. "P21BE is another fresh 10-meter entry." . . Those *Espanol*-speaking phones fitting about on certain July week ends were participating in a DX affair sponsored by LCRA of Colombia. . . CP5EL and XYL will be there for two more years," assures WIBAN. "They are very busy with their missionary work but Ira finds time to get on 21,260 kc. daily at 1130 GMT, also occasionally around 0100." . . YV1EM is temporarily rockbound on 7010 kc. with an SSB-1 rig and SP-600 but, by the time this gets around, Franco probably will be all set for 14-Mc. c.w. and sideband sport. YV1EM is ex-1IANF. . . W8AIXS credits HC8GI's helpfulness in piloting the HCCCS party through the tricky Galapagos early this year.

Hereabouts — XE9QIT/XE5, ensconced on the Alacran reefs 80 miles off Yucatan, shook up the gang with a 2-watt 15- and 20-meter DX program in July. It was W1s GPX and QLT on location with a botanical research group. An encore is scheduled for next summer. . . It's good to welcome W4NO back home from EYFD and overseas DX wars. Fred, terminating a 30-year service career, observes: "I believe ham radio is a fine hobby for the retired person and I'm counting on having lots of fun. I don't expect to sweat out many new ones but I'll probably be in there pitching from time to time!" W4NO was first franchised as 8A1D way back around 1916. . . K3KMO, recently DL4WA-W4UWA, toys with Corn and/or Great Corn DXpeditionary thoughts. . . KV4CI, lately KV4CI/mm on a coastal run aboard SS *Elizabeth*, has become a serious student of 7-Mc. DX propagation. On June 15th Pat was intrigued by successive QSOs with JA3s BEK and CB around 1000-1100 GMT, a long-path opening de luxe. WTKR will appreciate QSL hints concerning CT3AB (worked in 1956), LZ1AH ('57), LZ2FN and 4X4IB (both '58). . . K8BX continues to welcome inquiries about his *Directory of Certificates* as outlined here last month. Chf has a few other literary DX projects in mind. . . W8KOC envious W5CBL and K5LKG holding forth from cool Sondrestrom and KG1FR. . . An s.r.o. DX crowd jammed WGDXC's hospitality pad at the ARRL West Gulf Division conclave, Dallas, in June.

Ten Years Ago in "How's DX?" — In anticipation of a whopping 28-Mc. DX season, your September 1950 opener urges overseas 10-meter phoners to clearly indicate their intended post-CQ tuning procedures. . . Eighty is prostrated by QRN but 40-meter men manage KJ6AJ, LU7ZA and ZD4AB. . . Twenty c.w. is the hangout of AP2N, C3s CL DD WW, FQV/F, FB8ZZ, FKSSAL, FY8AC, HZIAB, KG6CX/KH6, LA6JB of Spitzbergen, ALD7X, M13M, M15FM, OY3GO, PKs 1LK 3JT 3TT 4KS 4V1 5CC 5RU 6NL 6VK, Crete's SV1TW, TA3AA, VK1s PG YG, VR1s A, W9BFE/KJ6, XU1NK and ZC6PR. . . Fine phones reported on 14 Mc.: EK1MD, EP5EE, HL1US, HS1SS, JA9JF of Iwo Jima, LX1DC, OE13AA, PJ5RX, PKs 1LB 4DA 7HL, TAGCVU, VR3C, ZC6Gs DH JM and 3V8BB. . . Ten's phone flock warms up on FD3RD, PJ5FN and ZD4AH, while KV44A writes on TA3FAS's 160-meter intentions. . . Random grapes from the DX vine: PYs threaten Trinidad Island action. . . PKs are reported leaving the air in large numbers. . . ITV seems to beearing its r.a.c. head on DX bands. . . There's a new certification available for 20 HP QSLs. . . Pictures of popular DU1VVS and TA3FAS dress out the offering while poor Jeeves gets hot under the collar. QST



The idea here is to assemble what you need for your junction box. The possibilities and uses are limited only by the size of box you use and your imagination.

## How About a JUNKtion Box?

BY JOHN HOWARD,\* K8MME

**P**ICTURED is not a magnetic storm in a Mini-box, but a very useful contrivance, if you've taken the trouble to put it together before you actually need it. The name comes from the fact that you will no doubt find most of the parts in your own junk box and put them to good work for you.

How many times have you wanted to connect a coax fitting to common antenna terminals to test a receiver or temporarily switch antennas? Or put your mobile mike on the fixed station, check a microphone output with a meter, or make various other connections for which existing terminals or fittings are contrary?

Look over all your gear, accessories, and test equipment, and figure out what assortment of

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jacks, terminals, and the like will relate them one to the other. Position them conveniently on a small box. Interconnect all hot terminals. Be sure to provide an assortment of common ground connections. You may want a second circuit incorporated, such as to handle a remote-control microphone hook-up.

In the example illustrated are provisions for two different microphone sockets, female coax fitting, military- and standard-type phone jacks, improved-type phone jacks, and an assortment of phone-tip and banana jacks as well as binding posts.

Hiding itself in shame on the end of the box not shown in the illustration is even a 110-volt tap that could take a light bulb for emergency dummy load, but which will no doubt serve more approved purposes in time to come. Q57

Okay, so you've been basking in the sun all summer—bully for you. But have you given any thought to what is coming later on? Snow, wind, ice! So, let's get out and check those guy wires and halyards. And just to scare you into action, here's a picture of what happened to K3HKK's tri-bander last winter, when the winter breezes took charge.





CONDUCTED BY EDWARD P. TILTON,\* W1HDO

As this department changes hands (see later comments) it might well change headings, too, if this month's headline news is any criterion. *The World Above 420 Mc.* would be more appropriate. For our last effort in the field of v.h.f. reporting we could hardly have dreamed up a more exciting swan song than the two items handed to us within a few days of each other just before our last deadline!

First came the thrilling word of a coast-to-coast QSO on 1296 Mc. via the moon, and then almost before we'd recovered our breath came news of a breakthrough on 432 Mc. across the Pacific. The latter story is one of frustration as well as glory for KH6UK, for though his 432-Mc. signal made it across the 2540 miles from Oahu to Palos Verdes, he was unable to hear W6NLZ to make it an authentic two-way record.

Having set the propagation world on its ear twice by their transpacific QSOs on 144 and 220 Mc., John Chambers, W6NLZ, and Ralph Thomas, KH6UK, had been trying 432 Mc. for some time. Procedure was similar to that which produced the results before: a liaison QSO on 14,095 kc. followed by automatic transmitting tests on 432 Mc. by KH6UK. At 2010 PST July 20, W6NLZ began to hear the u.h.f. signal weakly. It faded in and out of the noise at first, but built up slowly to an S8 level by 2300. It held strong for about an hour and then dropped off slowly, until by 0340, when John finally gave up, KH6UK was barely discernible in the noise.

Time and again as the signal built up, Tommy listened on 432 Mc. for W6NLZ, but in vain. The signal was in again the following night at 1907 PST, and again at 2007, 2025 and 2100, though always weak. Still no reception the other way, and by the time the trouble was traced to a bad 416B in the r.f. amplifier at KH6UK, and a replacement made, the signal was gone for good. It remains now to see whether there will be another chance this year. The first 144-Mc. QSO was made July 8, 1957. It was repeated Aug. 18 of that year. The 220-Mc. break came on June 22, 1959.

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Worldwide DX by moon reflection has been a dream of v.h.f. enthusiasts for years. That it was at least a possibility was demonstrated soon after World War II, when the Signal Corps bounced signals from the moon with modified radar equipment.<sup>1</sup> Prospects were none too encouraging, however. The experiment used power far above the amateur limit, a tremendous bill-

\* V.H.F. Editor, QST.

<sup>1</sup> Kauffman — "A DX Record: To the Moon and Back" May, 1946, QST, p. 65.

## RECORDS

### Two-Way Work

- 50 Mc.: LU3EX — JA6FR  
12,000 Miles — March 24, 1956
- 144 Mc.: W6NLZ — KH6UK  
2540 Miles — July 8, 1957
- 220 Mc.: W6NLZ — KH6UK  
2540 Miles — June 22, 1959
- 420 Mc.: SM6ANR — G3KFO  
650 Miles — June 13, 1959
- 1215 Mc.: W1BU — W6HB  
2700 Miles — July 21, 1960
- 2300 Mc.: W6IFE/6 — W6ET/6  
150 Miles — October 5, 1947
- \*3300 Mc.: W6IFE/6 — W6VIX/6  
190 Miles — June 9, 1956
- 5650 Mc.: W6VIX/6 — K6MBL  
34 Miles — October 12, 1957
- 10,000 Mc.: W7JIP/7 — W7LHL/7  
265 Miles — July 31, 1960
- 21,000 Mc.: W2UKL/2 — W2RDL/2  
14 Miles — Oct. 18, 1958
- Above 30,000 Mc.: W6NSV/6 — K6YYF/6  
500 Feet — July 17, 1957
- \*Band now 3500-3700 Mc.

board array, and a complex receiver with a bandwidth measured in cycles. Even with all this, signals were weak and wavery.

Still, it was enough to fire the imagination of good hams, and soon a number were hard at work on 144-Mc. equipment that might have a chance in the lunar DX race. Just 10 years ago, W3GKP and W4AO recorded one faint beep that sounded authentic, but worked another 2½ years before they got returns strong enough to be sure that they were moon-reflected echoes of the W4AO 2-meter signal.<sup>2</sup>

Since that time untold ham-hours have been invested in the construction of huge arrays intended for 144-Mc. moon-bounce work. W2NLY, W1FZJ and W6QKI heard their own echoes, after a fashion, but it was all too clear that real communication via the moon on 144 Mc. was well-nigh impossible within the framework of amateur regulations.

Broadness of pattern with even the largest practical array was the limiting factor at 144 Mc., so in recent years the push has been higher in frequency. 432 would look good but for the 50-watt power limit, so 1296 Mc. was the objective. The development of parametric amplifiers, delivering receiver noise figures close to 1 db., made this look like the moon-bounce band, if there were to be one.

<sup>2</sup> "Lunar DX On 144 Mc.!" March, 1953, QST, p. 11.



Last month, W1FZJ announced through his CQ column that his setup was at last producing consistent moon echoes. It had been in the works for months, and if you've heard little of W1FZJ elsewhere in ham radio, you can see the reason now in his backyard — perhaps the most amazing combination of mechanics and electronics ever assembled in one ham station.

The challenge hurled by W1FZJ in the name of the Rhododendron Swamp V.h.f. Society of Medfield, Mass., W1BU, was not long in being picked up by the Eimac Radio Club, of San Carlos, Cal. The rest of the story is told (on pages 10, 62, and 65) elsewhere in this issue. That the equipment involved is quite some stages up from a 1296-Mc. Communicator detracts not one bit from the glory won by W1BU and W6HB for their historic achievement. The first amateur QSO via the moon rates as one of the top stories ever told in these pages.

Beginning next month this department will have a new byline, but the name and call will be familiar. The man behind W1FZJ-W1BU-W1HOV has long since established his position as one of the outstanding inhabitants of the world above 50 Mc. Through years as one of the world's outstanding big-antenna enthusiasts, first as W8UKS and more recently as W1FZJ, and through his work as v.h.f. columnist for CQ, Sam Harris has earned the respect of v.h.f. men everywhere. It is with the sure feeling that our baby, now almost come of age, will be in the best possible hands that we turn over this space to W1FZJ to do with as he sees fit.

This change is made in order to give the writer more time to work on the technical aspects of ARRL's coverage of the bands from 50 Mc. up.

We hope that this will mean more and better v.h.f. articles in QST and other ARRL publications. It will mean, certainly, no slackening of interest in a work that has made life both pleasant and rewarding for one who has been so fortunate as to have devoted 21 of his 30 years in ham radio to working at his hobby. If you, QST's readers, give Sam the cooperation you've given me, he'll have it made!

**Here and There**

For many years we've wondered at the lack of summer contacts with Alaska on 50 Mc. "No activity" was a logical explanation until recently, but for the past few summers

**2-METER STANDINGS**

Figures are states, U. S. call areas, and mileage to most distant station worked.

W1RFX	32	8	1300	W5UNH	6	3	1200
W1AZK	28	8	1205	W5YYO	5	3	1330
W1RCS	27	7	1150				
W1RFU	27	7	1120	W4WSQ	14	5	1390
W1AJR	23	7	1130	W6NLS	12	5	2540
W1MMN	21	7	1090	W6DNG	9	5	1040
W1HDQ	21	6	1020	W6AJF	6	3	800
W11ZY	20	7	1180	W6ZL	5	3	1400
W1CRQ	19	6	920	W6MMU	3	2	950
W1AFO	17	6	920				
K1AFR	17	6	675	W7VMP	15	5	1280
W1CLH	17	5	450	W7JRG	13	4	1040
				W7CJM	5	2	670
W2NLY	37	8	1390	W7LHL	4	2	1050
W2CNV	37	8	1360	W7JTP	4	2	900
W2ORI	37	8	1320	W7JU	4	2	353
K2GQI	33	8	1200				
W2AZL	29	8	1050	W8KAY	38	8	1020
K2IEJ	27	8	1060	W8SDJ	35	8	990
W2BLV	27	8	1020	W8PT	34	8	985
W2AMJ	25	6	960	W8PFX	34	8	980
W2DWJ	23	7	950	W8LOF	33	8	1060
K2HOD	23	7	950	W8SPG	33	8	1040
W2PAU	23	6	753	W8AMH	32	6	910
W2RXG	22	7	1090	W8SVL	30	8	1080
W28MX	22	6	940	W8EHW	29	8	860
K2CEX	22	8	910	W8LPD	29	8	850
W2LWJ	21	6	700	W8WRN	28	8	680
W2ESX	20	6	750	W8BAX	28	8	960
W2WZR	19	7	1040	W8AGU	27	8	1050
W2UTH	19	7	880	W8NOH	26	8	975
W2RGV	19	6	720	W8DX	26	8	720
K2RLG	17	6	980	W8LJC	25	8	800
				W8JVV	25	8	940
W3RUE	32	8	1100	W8FBN	23	8	540
W3GKP	30	8	1180	W8LCY	23	7	680
W38GA	30	8	1070	W8BLN	21	6	610
W3TDF	29	8	1050	W8GTK	17	7	550
W3CGA	28	8	1110	W8NRM	17	7	550
W38GA	27	7	700				
W3EPH	22	8	1000	W9KLR	41	9	1160
W3BYF	22	6	660	W9WOK	40	9	1170
W3LNA	21	7	720	W9AAB	39	9	1090
W3NKM	20	7	730	W9AAG	32	8	1050
W3LZD	20	7	650	W9REM	31	8	850
				W9ZIH	30	8	830
W4HLQ	38	8	1150	K9AAJ	27	8	1070
W4HHK	36	9	1280	W9LYC	27	8	950
W4ZXL	34	8	950	W9BQC	27	8	820
W4LTU	31	8	1160	W9PBP	27	8	820
W4ALO	30	8	1120	W9OJL	26	8	910
W4AIKJ	28	8	850	W9ZHL	25	8	700
W4UMF	28	8	1110	W9BPV	25	7	1030
W4VLA	26	8	1000	K9AQP	24	7	900
W4QOM	25	8	1040	W9JPF	22	7	825
W4VNH	24	8	850	W9KPS	22	7	600
K4FTS	24	6	765	W9CUX	21	7	800
W4JCU	23	6	720	W9OEY	20	7	750
W4VVE	21	6	720	W9PMM	19	6	800
W4RNU	20	7	1080	W9ALU	18	7	800
W4TLY	20	7	1000				
W4TKZ	20	6	720	W0BFB	32	9	1180
W4OLK	20	6	720	W0SMJ	29	9	1075
W4ABJ	20	7	880	W0ILD	28	8	1030
W4CPZ	18	6	650	W0QDH	24	9	1300
W4RFR	18	7	820	W0RUF	23	7	900
W4MDA	17	6	750	W0VW	21	6	830
K4YUX	16	8	830	W0UOP	21	7	900
W4LNG	15	6	1080	W0TGC	21	7	870
				W0RYG	20	8	925
W5RCI	34	9	1215	W0IC	19	7	1245
W5AJG	29	9	1360	W0IFS	16	6	1100
W5DFU	28	9	1300				
W5LPG	25	7	1000	VE3DIR	30	8	1330
W5PZ	25	8	1300	VE3AIB	28	8	1340
W5KTD	23	8	1200	VE3BQN	19	7	790
W5JWL	21	7	1150	VE3DER	17	8	1340
W5FYZ	18	6	1040	VE3AGG	17	7	1300
W5ML	16	5	700	VE3HW	15	7	1350
W5PSC	12	5	1390	VE2AGK	13	6	550
W5BZ	12	5	1250	VE3HPB	14	6	715
W5CWV	11	5	1180	VE7EJ	2	1	365
W5NDE	11	5	625				
W5VY	10	3	1200	KH6UK	1	2	2540
W5SWV	10	3	600				

**220- and 420-Mc. STANDINGS**

**220 Mc.**

W1AZK	9	3	412	W4UBY	7	5	320
W1HDQ	11	5	450	W4UMF	11	5	420
W1OOP	12	4	400	W5AJG	3	2	1050
W1RFU	15	5	480	W5RCL	3	5	700
W1UHE	11	4	385	W6NLS	3	2	2540
W2AOC	13	5	450	K6GTG	2	2	240
K2AXQ	8	3	230	W6MMU	2	2	225
K2CBA	10	4	325	K7ICW	1	1	250
K2GQI	3	14	840	K8AJU	10	4	1050
W2DWJ	14	6	440	W8LJG	9	5	475
W2DZA	12	5	410	W8LPD	6	4	480
K2KIB	8	3	200	W8NRM	8	4	390
W2LRJ	10	4	250	W8PT	10	5	550
W2NTY	10	4	200	W8TFL	6	4	520
K2PPZ	11	4	190	W9AAG	9	4	600
K2QJQ	10	4	260	W9EQC	11	5	740
W3ABQ	4	3	180	W9JCS	5	2	340
W3FEY	8	4	296	W9JFP	9	4	540
W3KKN	10	4	255	W9OVL	6	3	475
W3LCC	8	5	300	W9TFD	4	4	605
W3ZBA	15	5	425	W9ZIH	10	5	500
W3RUE	6	4	225	K0DGU	5	3	425
W3UJG	11	5	400	K0ITF	6	3	515
W3ZRF	5	4	112	KH6UK	1	1	2540
K4TFU	8	4	400	VE3AIB	7	4	450

**420 Mc.**

W1HDQ	8	3	210	K8EOF	6	3	250
W1MFT	4	3	125	W3FEY	5	2	225
W1RFU	7	4	410	W4HHK	3	3	550
W1OOP	10	3	390	W4VVE	4	4	110
W1UHE	6	4	430	W5ETZ	3	2	400
W2AOD	6	4	290	W5RCL	6	3	600
W2BLV	11	5	360	W7LHL	2	1	190
W2DWJ	7	4	196	W8HCC	3	2	365
K2CBA	5	3	225	W8TRC	3	2	250
W2DZA	5	3	130	W8JLC	4	3	275
W2NTY	3	2	100	W8NRM	3	2	390
W2OTA	6	3	150	W8RQI	4	2	270
K2UUR	7	3	175	W9GAB	7	4	600

KL7AUV has been trying hard, almost without result. But, it can happen. On the night of July 13, K6ZEH, Porterville, Cal., was tuning the low end of the 50-Mc. band with the beam northwest when she came across some weak c.w. It was KL7AUV, on automatic. Norma worried that the signal would fade out before Jack did any listening, but shortly the signal began to build up and he stood by. Both K6ZEH and OM W6FZA got in quick contacts.

No other signals from the north were in at this time, and the only other DX heard was W0TH, Denver. Not a peep was heard from the W7s and VE7s who normally barrel in on any E<sub>s</sub> opening to the north. Was this multiple-hop E<sub>s</sub>, or an extension of the auroral zone propagation that brought results for KG1FN last year?

Propagation across, through and near the auroral zone represents a wonderful opportunity for 6-meter men to help gather information on an almost unknown phenomenon, particularly if U. S. hams will work at it, and we can get more activity of a consistent kind in Northwestern Canada and in Alaska. VE4KF, Norwood, Manitoba, writes that "occasionally" he hears stations in Viking and Edmonton, Alberta. This happens around 2300 local time, usually when the band is dead as far as U. S. stations are concerned. He wishes, as do we, that there were more hams in Northern Canada who could work on 6. VE8s please note! And to everyone else: there just *might* be something coming from the north. Aim that way frequently — and *transmit*, preferably on c.w. Don't forget, as announced last month, KL7FLC (formerly KG1FN) is looking for you, if nobody else is!

Late report via W6BJI: On the night of July 15 VE8BY heard the following 50-Mc. stations: VE4CV/4 K1NQB K1ICM K4FRO/1 K4IGW K1OUI K8NHV K1JIW. All were on phone, and very strong. VE8BY was on c.w., and was unable to attract anyone's attention. Need we say more?

Six-meter men who need Nevada will be glad to know that the state is represented by several regulars, including K7HRW K7ILB and W7MAH, all of Reno. They monitor and work near 50.1 Mc., but are v.f.o. controlled and can move up or down as conditions or emission require. They will be on Slide Mountain, 9000-foot elevation near Reno, in the September V.h.f. Party.

Despite almost daily E<sub>s</sub> in June and July, some experienced operators complain that double-hop was not up to expectations in 1960. The log of W7RT would seem to refute this. John worked K4EDS and K4FHU, Birmingham, Ala., K4GGJ and K4CBC, Memphis, Tenn., W4IUI, West Palm Beach, Fla., K5UUZ, Corinth, Miss., and K5VFY, Wilson, Ark., July 12. K5VFY gave W7RT his 49th s.t.c.

Next day 32 stations all over the west were worked and at 1950 PST, K1LWL, Fayville, Mass. was added. Heard were K1AAA K1DWO and numerous unidentified Is. W1HDS was heard on c.w. during the July 15 aurora, the only eastern signal heard, though Montana, Oregon and British Columbia were in at the time via normal auroral propagation. All stations were heard with the beam at W7RT aimed northeast.

Because of the lesser DX opportunities now that we have passed the sunspot peak, the Phoenix V.h.f. Radio Club has reduced requirements for its certificate award for stations outside the original 48 states. Such operators now need only 5 Phoenix confirmations. Those in the "south 48" must have 10. Correspondence on the award should go to Box 6602, Phoenix, Ariz. First Phoenix award to a South American went to LU3DCA, XE1PG1, who made it the hard way, with 10 confirmations, was the first amateur outside the country to qualify.

Attention v.h.f. sidebanders: K2PCC is compiling a directory of active sideband stations. He would like from you the name, address and call, operating frequency (crystal or v.f.o.), operating times and any net schedules for v.h.f.

s.s.b. activity. Address Phillip Gural, K2PCG, 191 Hillside Ave., Livingston, N. J. This note in July QST brought in only about a dozen replies.

Special to 2-meter sidebanders: W6TTB announces a push to work 2-meter DX via sideband during the months of August, September and October, when propagation can be expected to be at its best. Don asks well-equipped sideband stations to congregate on 144.01 Mc. and be prepared to work voice break-in with any DX station that appears. Monitor the frequency as much as possible and acknowledge any weak or DX signals heard. Only trouble with this idea is the frequency; a good many c.w. operators are already using this channel in the same way. We hope that the sideband project can be moved to a higher spot, to the mutual advantage of all concerned.

Anyone like to work Russia on 144 Mc.? According to K3CUI who sent us the translation from *Radio*, the club station of the Kharkov State University is running round-the-clock tests on 144 Mc. Automatic c.w. is run 23 hours daily, with one hour for phone. This phone hour moves along one hour daily, starting at 2100 GMT the first day of each month. Report reception to Radio Measurement Department, University Street No. 16, Kharkov 3, Ukrainian SSR, USSR. Or you can work UB5KCE on lower bands and the operator will shift to 144 Mc. and take off the automatic keyer for an attempted QSO.

This should be some kind of record for a low-power QSO. W2JTE has a transmitter using a tunnel diode as a crystal-controlled oscillator on 48 Mc. Putting the third harmonic of this into his 2-meter beam he was able to get a readable c.w. signal across to K2LMDG, some 10 miles distant. As the input to the tunnel diode was of the order of a microwatt, one can just imagine what the actual power at 144 Mc. was!

We've had many glowing reports from builders of the 2-meter converter described by W2AZL in December QST. Almost without exception it has worked superbly, and without a hitch. Some complain that they are unable to obtain the tubes specified, even though we pointed out other numbers that could be substituted. If you want duplicates of the originals, here are the numbers to ask for, in makes other than Western Electric: 417A — 5842, 404A — 5847, 396A — 5670. This info is from W0TIO, one of the happy constructors of the converter.

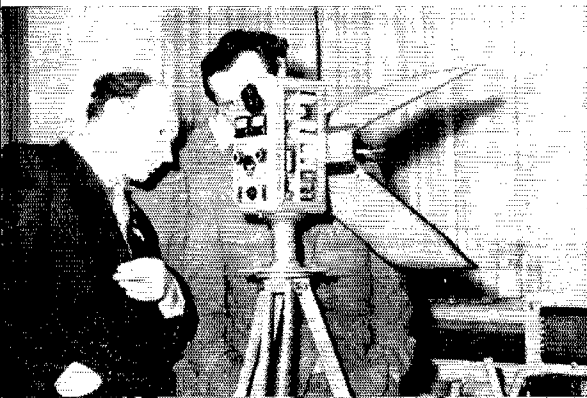
The aurora of July 15 was widespread and accompanied in some areas by excellent tropospheric propagation on 144 Mc. Via W5FYZ, W5RCI, Marks, Miss., reports working W4MKT, Winston-Salem, N. C., via aurora in mid-afternoon, and many Middle West stations in the evening during the tropospheric opening. W5FYZ, Minden, La., worked W9UNN W9QXP W9BOZ W9ZIH and W8PT. Ernie used s.s.b. in the contact with W9QXP, and raised W8PT on that mode. He has 500 watts to a 4X250B on c.w. and s.s.b., and 200 watts a.m. The antenna is a 10-over-10.

Anyone for f.s.k. on 144 Mc.? W5AJC, Dallas, sends in some nice copy made on the 250-mile path to W5DDJ, Houston. This path works solidly on c.w., regardless of season, but in winter it is almost useless for a.m. phone, and about 75 per-cent effective on s.s.b. Results with f.s.k. have shown it to be vastly superior to audio shift. Tests are made daily at 0700 CST, and anyone with f.s.k. gear is invited to join in.

The article in July QST by K9OIV has focussed attention on the possibilities and problems inherent in the utilization of the large stocks of commercial f.m. gear now available for amateur service. Since all this is fixed-frequency equipment, a major problem is what frequency to use, and where. Obviously there has to be some sort of overall plan for the country if the fellow who is using such equipment for mobile work is to get anything out of his installation when he travels outside his local area. It was with this in mind that K4ZAD asked (June QST, p. 75) that groups with f.m. gear send him their operating frequencies for compilation. On the basis of information received, and some study of the problem, Tom now suggests that wideband f.m. groups:

1. Pick frequencies within the RACES bands, 53.35 to 53.75, 145.17 to 145.71 and 146.79 to 147.35 Mc.

Feature of the Prague session was exhibition of amateur and commercial v.h.f. gear. OK1VMK, left, shows off his 1215-Mc. transceiver. It employs a 5794 pencil triode, salvaged from American-made radiosonde equipment that frequently comes down in Czechoslovakia.—Photos by OK1PM



QST for

2. Use 40-ke. channels on 6 and 60-ke. channels on 2, starting at 53.4, 145.2 and 146.82 Mc. This does not yield the maximum number of channels, but it puts presently-used frequencies on primary channels.

3. Where TVI is a problem on 6, choose 52.525 (Midwest) or 52.58 Mc. (Eastern U. S.), these being frequencies already in use.

Of the channels suggested in (1) those known to be in use already are as follows: 53.44 — Upper New York State, 53.6 — Midwest, 53.84 — Minneapolis area, 145.26 — Ohio, Upper N. Y., Lynchburg, Va., 145.44 — Boise, Idaho, 145.5 — Memphis, Tenn., and possible 2nd channel for Lynchburg, 146.94 — Chicago area, 147.18 — Chicago area (Chicago may move present 147.5 to this frequency to bring it into RACES segment), 147.3 — Midwest, K4ZAD will include all information sent to him in his forthcoming f.m. net directory. Send your data to 508 Oakridge Blvd., Lynchburg, Va.

K5MYG writes that the Dallas area has had f.m. in the works for 3 years. Primary frequency is 146.97, secondary 147.09. No units are on the secondary frequency as yet. Hams in the Dallas-Ft. Worth area who are interested in wideband f.m. may contact K5MYG, 4701 Harper Drive, Mesquite, Texas.

### V.h.f. in Czechoslovakia

On an extended tour of Europe, David Axe, W7AGJ, had an opportunity to visit Prague, and to meet many OK v.h.f. enthusiasts there, including V.h.f. Manager OK1VR. Dave reports that of the some 1250 amateur stations in Czechoslovakia about 30 percent are equipped for v.h.f. operation. Their bands are 86 Mc. and all higher bands that we have, except 220. Because 380 of the licensed stations are clubs, each with 10 to 15 operators, the number of hams is much larger than the 1250 stations would indicate.

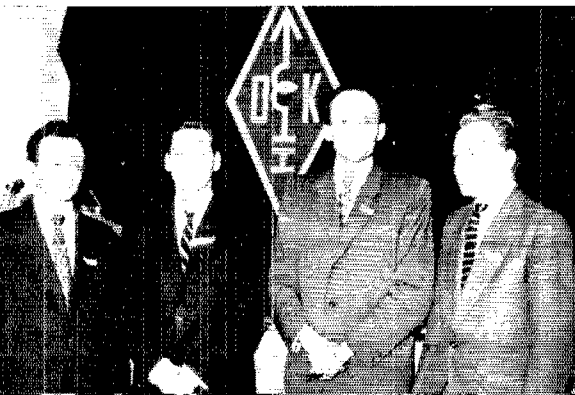
The most popular band is 144 Mc., where transmitters and converters are largely crystal controlled. Most stations use large Yagi arrays, and there is a growing interest in meteor scatter and other forms of v.h.f. DX. The record is 945 miles, which is about as far as one can go and still find 2-meter activity in Europe. The 420-Mc. band is widely used, mostly for local work with simple gear, though a few stations have equipment of advanced design. Superregenerative transceivers are used to some extent on 1215 Mc. These employ RCA pencil triodes, salvaged from American-made radiosondes that come down in Czechoslovakia from West Germany. One of these is shown in an accompanying photograph.

Dave attended a v.h.f. meeting in the A. S. Popov Research Institute for Communications Techniques (named after the "inventor" of radio) in Prague, and met v.h.f. enthusiasts from all parts of the country. This session featured fine exhibits of commercial and amateur gear. The club station, OK1KRC, provided facilities for measuring the noise figure of v.h.f. converters brought in by visiting amateurs. Here W7AGJ met OK3YY, who then travelled with him over much of the country, acting as interpreter. The trip included a visit to the home station of OK3YY in Bratislava.

### 220 Mc. and Up

The matter of where to go in the 220-Mc. band for effective weak-signal work is still very much up in the air. So far we have just one definite opinion, that from W3ANX,

Personalities attending the v.h.f. meeting in Prague, Czechoslovakia, included, left to right, OK2VCG, W7AGJ, OK1VR, V.h.f. Manager, and OK3YY. OK2VCG is a leading meteor-scatter enthusiast.



Pittsburgh, who is against moving away from the low end. He has a point, too: the problem of the fellow with the ham-bands-only communications receiver and a converter with its crystal hidden inside and wired into the circuit. But the low end is no good for weak-signal searching if you have TV birdies all over the place. (Receiver oscillators and spurious responses from Channel 13 are the worst offenders.)

The problem is where to go. So far we have the following suggestions for a "low end": 221.4, 221.5, 222, 222.5 and 223 Mc. Since most receivers do not provide usable tuning rate for more than 500 kc. at a time, it can be seen that we are getting nowhere up to now. The Mt. Airy V.h.f. Club has provided crystals for its Pack Rats Net on 221.4 Mc. These were sent out free of charge to everyone who has ever reported in. This is probably the only mass movement to a frequency away from the low end in the East, and we've heard some of the Philadelphia area gang on the low end in recent evenings. So far, at W1HDQ we have yet to hear a signal above 220.4 since the talk of moving started, though the general idea seems to be that 221.4 Mc. will be used for the net and 222 Mc. for a 1X channel.

West Coast operators favor higher frequencies. W6NZV, Tiburon, and K6IBY, Costa Mesa, Cal., suggest 222.5 Mc. W6FZA, Porterville, W6BJL, Fresno, and K6RNQ, Oakland, are working above 223 Mc. exclusively in their long-haul work, and they find 223 to 223.5 Mc. completely free of nonamateur interference.

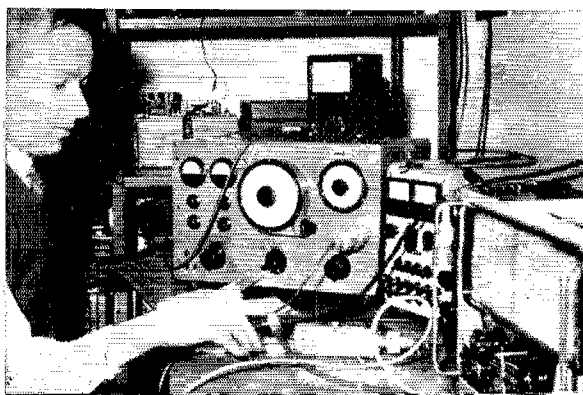
K6RNQ writes that he had little luck with a long Yagi, and upon trying a small 5-element job it appeared to work better than the long one. Bob now uses a box of 4 5-element Yagis, and with this array he has had his first QSOs with W6BJL and W6FZA, 150 and 220 miles, respectively, over very rough country at the Oakland end. K6RNQ has 850 watts c.w. and 340 watts phone on 223 Mc. W6FZA has 600 watts c.w. and s.s.b. feeding a 16-element beam on 223.35. W6BJL has 200 watts c.w. and phone on 223.38 Mc. His array is a long Yagi. Tuesday at 2100 PDT is 223-Mc. sked time. Bob reports about 10 stations active in the Bay Area, not including a group on 224.1 with MAR equipment and fixed-frequency receivers. Antenna polarization is horizontal. Southern California verticals please note!

The night of July 18 was fine for tropospheric propagation along the North Atlantic Seaboard. K2UUR, Parlin, N.J., worked W1AJR, Middletown, R. I., with S9-plus signals on 432 Mc. This is a 200-mile path. Everything from New England to Maryland and Delaware (the latter two states represented by W3GGR and W3CGV) was pounding in, but as is so often the case the range was limited by activity, rather than propagation. The same could be said that night for 220 Mc.: at W1HDQ everyone out to 300 miles was coming in fine, but there were no weak signals.

K2UUR has a crystal-controlled converter on 1296 Mc., and a 2C39 tripler with about 10 watts output. W3GGR is also on 1296 Mc. Another fellow who would like business on 1296 Mc. is W3FEY, Lancaster, Pa. George is on 1296.45 Mc. with a 2C39 tripler putting 15 to 20 watts into a 30-inch dish.

A nice haul for 432 Mc. is W4HIEK, Collierville, Tenn. to W5HTZ, Wewoka, Okla., more than 400 miles. They worked three times in June, and on the last night, the 28th, W5HTZ also worked W5RCI, Marks, Miss., about 350 miles. Signals were S9-plus on voice, which gives some idea of the DX potential of the band — if there were only more activity in the right places.

The facilities of the club station, OK1KRC, were made available for testing equipment brought to the v.h.f. meeting by OK amateurs. Here OK3YY measures noise figure of a 144-Mc. crystal-controlled converter.



Toledo to Chicago is being covered on 432 Mc. of late, and some of the Toledo gang have also worked W9GAB, Beloit, Wis., 290 miles. W8s JLQ RQI HRC and UST work W9ZIH and W9OJI regularly via weak-signal c.w. W0DEN, Iowa City, Iowa, has worked W9GAB and the Chicago stations. Impressive equipment is standard on 432. W8JLQ has a 96-element collinear, as does W8RQI. W8HRC has 48, W9OJI 64, W9ZIH 80, and W8UST 48 elements. Nearly all have 4X150 straight-through amplifiers, running at high efficiency. All this work is done by operating solely on 432 Mc. Several of the group have no equipment on any lower band.

### OES Notes

**K1AII, Plymouth, Mass.**— In some aurora openings a 5-element Yagi has given better results than a long one, possibly due to the sharper vertical lobe of the latter. Upward tilting of the larger beam might help.

Activity on c.w. during June V.h.f. Party brought in several sections not worked by any phone station in the area. W4RAMU was workable on c.w. for 10 minutes or more preceding the appearance of strong sporadic-E phone signals.

**K1CHY, Norwood, Mass.**— Increasing activity above 51 Mc., to avoid QRM of various kinds lower in the band.

**K1CIG, Manchester, N. H.**— Activity on 50 Mc. at high level, but need more on 144 and 220 Mc. Suspect many operators to the south seldom turn their antennas in our direction.

**K1CXX, Auburn, Maine**— Observed aurora on 50 Mc. nights of June 3, 4, 6, 22, 25, 26, 28 and 29.

**W4ZAKK, Peekskill, N. Y.**— Area now has more than 20 stations on 145.32 Mc., with this frequency monitored throughout the evening and most days.

50-Mc. DX conditions observed by monitoring Channel 2, from New York City. Picture flutter and occasionally frying noise on sound indicate co-channel interference, usually due to sporadic-E propagation.

**W2LWI, Wappingers Falls, N. Y.**— R.f. feedback in 220-Mc. rig due to impedance bump in transmission line introduced by coaxial relay and "u.h.f." fittings corrected by mounting the relay right at the transmitter. This rig worked well in June V.h.f. Party, making 46 contacts in 14 sections for W2LWI/2.

Home-station 2-meter antenna struck by lightning, destroying phasing lines and rotator. Grounded tower probably prevented more than minor damage to equipment inside the station.

**W3RTV, Pittsburgh, Pa.**— N.f.m. adapter added to 75A-3 used with v.h.f. converters very helpful on f.m. signals that are unreadable with slope detection. Attempting to promote more 50-Mc. c.w. activity through Greater Pittsburgh V.h.f. Society. N.f.m. and c.w. make good low-cost no-TV setup for v.h.f. operation.

**K4E1I, Cleveland, Ga.**— Will be on 50 and 144 Mc. weekends from nearby Bald Mountain, highest point in Georgia.

**K4EUS, Chester, Va.**— Heard W4RMU, Jacksonville, Fla., on 144 Mc. at 2200 EST June 14. W8KAY, Akron, Ohio, heard frequently during his 2115 EST sked with W4LTU. Pair of 4X250Bs per W0IC, October, 1959, QST about ready to go on 2 and 6.

**K4DZP, Hialeah, Fla.**— Since erection of 4 10-element Yagis for 144 Mc. have been able to work K4XC, Melbourne, 150 miles, regularly, using only 3 watts output on a.m. phone. Have also worked W4RMU, 300 miles. K4XC maintains nightly contact with Jacksonville and Miami, giving reliable coverage of most of the Florida East Coast on 144 Mc. CO2VY, Havana, is also worked frequently.

**W4FWH, Doraville, Ga.**— At least 40 states, Cuba, Mexico and Canada heard on 50 Mc. during June. W2AZL 144-Mc. converter (December QST) worked fine on first try. Converting AN/TRC-8 to 220 Mc.

**W4KDH, Chatham, Va.**— Worked from VE3DIR, Toronto, to W4RMU during June. Am on 144.05 Mc. nightly, with 650 watts output. Also interested in 50-Mc. skeds.

**K4KYL, Knoxville, Tenn.**— Having trouble with spurious responses in converter from TV Channels 6 and 10 about 1 mile away. Would appreciate suggestions.

W4RMU, Jacksonville, Fla. — Worked W4KDH on 144-Mc. c.w. 3 nights running; signals peaking 569. Work WILUN, Seckonk, Mass., regularly on 50 Mc. at 0700 Sundays.

**W4TLC, Greenville, S. C.**— Have 4X250B on 145.1 and 220.2 Mc., a.f.m. or c.w. Would like skeds for September V.h.f. Party, or at other times during fall tropo season, Monday, Wednesday or Friday evenings.

**W61EY, La Mesa, Cal.**— 50-Mc. DX reported in S. Cal. 21 days in June. Prospective purchasers of APX-6 surplus units for conversion to 1215 Mc. should be warned that there are two versions of this transponder, the APX-6 and the APX-6B. Latter is newer model, but less desirable for amateur purposes, as it does not have Vecdel dials for frequency adjustment. Conversion is more difficult and the tuned circuits less readily calibrated than with the earlier model. *Editor's note:* The conversion described in this issue is for the early version only.

**K7BBO, Tacoma, Wash.**— PY reported heard in Tacoma area June 20.

**W7EGN, Whitefish, Mont.**— Have observed aurora effects on TV several times when no amateur activity was heard. Suspect many v.h.f. men don't realize that aurora is good in summer months. Watch for streaks on TV picture, especially low channels, and stations in generally northerly directions, or with TV antenna aimed north.

**W8BFF, Kalamazoo, Mich.**— 50-Mc. DX observed 17 days in June.

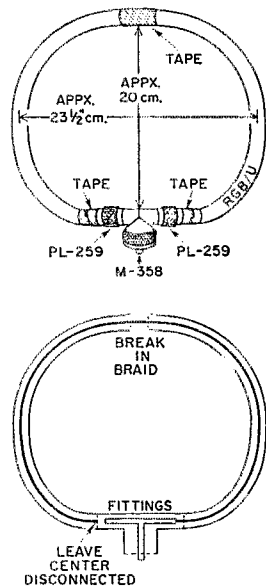
**K8BGZ, Lansing, Mich.**— Keeping skeds 5 nights per week on 50-Mc. c.w. with W8GHX, Tipp City, Ohio, 200 miles. Contacts made consistently except under severe thunderstorm conditions.

**W9BUB, Chicago, Ill.**— Experimenting with tunnel diode preamplifiers at 50 Mc. Major problem seems to be the varying antenna and receiver impedances across the band.

**K9MLI, Winnetka, Ill.**— Direction-finding loop for 28 to 144 Mc. shown in Fig. 1. It is a simplified version of the design shown in the *ARRL Antenna Book*, requiring no tuning. The loop of RG8/U can be peaked for any part of the 50-Mc. band by pruning the length, but it has the same directional property (nulls perpendicular to plane of loop) all through the v.h.f. range. Resonance affects only signal strength, not pattern. Put PL-259 fittings at each end of a 27-inch piece of coax, but leave inner conductor unconnected at one end. Cut off the outside braid (but not the insulation underneath) from about one inch at the center, and tape the break for weatherproofing. Bend into a circle and attach ends to an M-358 Tee connector. Methods for mounting such a loop for mobile transmitter hunting are shown in the *Antenna Book*.

A shielded loop such as this has low pickup, but works well close in, after the approximate location of the hidden transmitter has been determined. Unshielded loops or tilted whips may be used at greater distances. If pruning of the loop for maximum sensitivity is to be done, fittings may be attached temporarily without soldering.

Fig. 1—Direction-finding loop for v.h.f. use described by K9MLI. With dimensions shown, it has peak response in the 50-Mc. band, but it can be used from 28 to 144 Mc. as well, with reduced pickup.



*Late Report*—New 10,000-Mc. record by previous holders, July 31. Details next month.



# Correspondence From Members -

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

## LIVELY HAZARD

Being associated with the electrical industry, I feel obligated to pass on some cold statistics, in the hope that "only 110" may receive more respect. This is not a scare campaign. However, some eyes may be opened, and perhaps a life saved.

A summary of fatal accidents reported during 1958, within the electric light and power industry, was compiled from detailed reports submitted to the Edison Electric Institute Accident Prevention Committee. A reprint of this review appears in the January issue of *Distribution* (G.E. Co.) magazine. Of the total of 65 cases of fatal electric shock, seven were the result of contact with standard secondary house service voltage. The seven fatalities listed comprised five experienced linemen, one helper and one serviceman.

Should not this be a lesson to the scoffers who "work 110 hot," fail to ground chasses or cabinets, or otherwise invite unsafe practices? — Robert V. Austin, W5DVB, Ann Arbor, Michigan.

## DL4 QSL BUREAU

We here at the DL4 QSL Bureau would certainly appreciate your help. We are at the present time swamped with QSL cards, and as usual, we are not receiving self addressed, stamped envelopes from the DL4s. Many stations have over 100 QSL cards stacked up here at DL4HAB, and our space is limited!

It is a common belief that, since most of the amateurs here in western Germany are in the armed forces, QSL card envelopes can be forwarded through "official mail" channels, but this is not correct. The Army post office regulations that we work under do not consider QSL cards as official mail. Consequently we have to have postage, or the cards do not go out. Our correct address is:

DL4 QSL Bureau  
50th Communications Squadron, % DL4HAB  
APO 109,  
New York City, New York.

The telephone number is Hahn Air Base, 7222, and our MARS call sign, AJ3CO.

Send as many envelopes as you please, but please send them with postage affixed, and with your correct address on the envelope. Eight cents postage (or the equivalent in Bundespost stamps) is sufficient for 12 to 15 QSL cards. The size of the envelope is immaterial to us. However, if you don't want your QSL cards folded, send the larger size envelope. — S/SGT Len Loop, W4UQ/DL4UK, S/SGT Dick Uhrmacher, K0VKH/DL4VF. QSL Managers, DL4HAB

## BACKWARD IS JEEVES

In the cartoon in July QST, page 73, Jeeves proves that using the old bean is easy, but I'll bet that the transmitting operator is really going into fits — having to send everything backwards! — Dick Luftin, K4RJM Piedmont, Alabama.

## THE BRAILLE TECHNICAL PRESS

Concerning the item, "Hear That Meter Reader," in August QST, there are a few facts which I feel need clarification.

The *Braille Technical Press* is not supported by any funds provided by the Library of Congress, although the Library does subscribe to it for a number of regional lending libraries for the blind throughout the country. This, I believe, is a most serious error since the *Braille Technical Press* is supported in the main by radio amateurs, a few manufacturers, jobbers and other interested individuals, as well as by braille

readers who can afford to pay for their subscriptions. If a person is unable to afford the subscription, he may receive it free upon request.

The *BTP* is not a series of reprints from national magazines, but is written particularly for the blind. We do, however, occasionally reprint articles from such magazines as *QST*.

The three instruments mentioned in the article — auditory circuit analyzer, auditory meter reader and transistorized gimmick, are all developments of the writer in conjunction with our efforts involving *Braille Technical Press*. Complete information regarding the construction and use of each instrument is published in our magazine as it is developed.

My only purpose in writing is to keep the record straight and particularly to avoid any misunderstanding on the part of our benefactors. — Robert W. Gunderson, Editor, The Braille Technical Press.

## A SECOND . . .

I echo the sentiments of Ted Huddle (K8OEQ) and would like to commend him on his article "Togetherness" in June QST. I sincerely hope that every reader of QST has read it and will take it to heart. — Dave Zveier, K3JSX, Sunbury, Pa.

## SPLIT CHANNELS

I was very interested to read the letter from W2AOE, on page 50 of QST for May, concerning a suggestion for dividing the phone bands into definite channels.

In the *USGB Bulletin* for January, 1960, I suggested a similar scheme, under the title "Sophisticated Sideband." The actual channels that I suggested were different from those of W2AOE, but the basic idea is the same. I am sure that if some such scheme were voluntarily adopted it would result in a considerable reduction in QRN, and the sooner we start the better.

My article actually went a little further, in suggesting that a tight control on the frequency of the channels be adopted, so that the sideband receiver could be a switched tuned affair, hopping from one channel to the next. This would help those who still experience some difficulty in achieving the precision of tuning necessary for s.s.b.

I would like to draw the attention of the IARU to W2AOE's and my own suggestions, so that some band plan (voluntary) can be devised, and the actual channels be decided on, so that we can go ahead and design our new equipment on these lines. — C. W. Cragg, G8HDU, Gloucestershire, England.

## NTS QRM

We members of the NTS need full cooperation of all of hamdom in the problem of down-and-out uncalled-for QRN. I understand that we are treading open territory even when on net frequency but the 80-meter band is large and that is where the area nets meet on c.w. I'm not complaining so much because we have to fight QRN when we shift off net frequency to clear traffic as when some lid (you heard me) sets at almost zero beat with the NCS, tunes up for about five minutes and then without apparently ever checking the frequency starts blaring CQ at about 8 w.p.m. I'm young compared to most of my colleagues on the nets (16 by the time you read this) but if I must face such conditions when they are totally unwarranted by all standards of good operating then I may lose my taste for traffic handling very soon.

When you hear a call of CQ EAN or CQ PAN on 3670 kc. or CQ PAN on 3675, is it asking to much to back off about two kc. and let these area nets function? . . . — Douglas E. Thompson, K8OTJ, Bay City, Michigan.





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator  
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, WIZJE, Administrative Aide  
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr., Phone

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**S.s.b. Use Makes More Occupancy Feasible.** Here is a practical reminder that s.s.b. on a spot-frequency and taking narrower spectrum space definitely steps up the comfortable occupancy of our phone band segments. W8KYK, Canton, Ohio writes to tell us of a round table in progress on 3945 kc. which included W4AUZ and a number of other stations. It appears that the group was experiencing "monkey chatter" from an adjacent s.s.b. QSO. He then relates, "W4AUZ was up to this situation. Reporting that he would be back in a second, he zeroed the other round table group. Then at the first pause he suggested that all in it switch sidebands to get rid of the junk on the frequency(!). Without comment all concerned switched, whereupon W4AUZ rejoined the first group successfully. . . ."

The technique of moving up and down a little bit by changing sidebands is a simple one, a tool that can be given considerable use in handling interference problems as they arise.



This new Jeep is a unit of the Massachusetts Radio Emergency Corps, a group of amateurs dedicated to public service with headquarters in Worcester, Mass. K1DAA, shown in the photo, is in charge of the group.

**W2GFO Suspension Reduced; Additional FCC Suspensions Made to Curb Unidentified Communications, Profanity, and Neglect of Proper Logging.** We again report data from currently released FCC information on the suspensions of amateur operator licenses.

FCC ordered (May 13, 1960) that the Advanced Class Amateur Radio Operator License (W2GFO) of Robert N. Green, East Brunswick, N. J. BE SUSPENDED for a period of four months, modifying the Commission's suspension order of Dec. 17, 1959, which had been a suspension "for the remainder of the license term," until July 17, 1962. The initial action was taken, *it appearing* that in June 1959, said licensee operated W2GFO on 21,215.7 kc. using A3 emission, a violation of Sec. 12.111 (e), and *it further appearing* that licensee failed to respond to repeated notices of the violation. In a statement under oath, the licensee Apr. 11, 1960, requested FCC consideration of written statements in mitigation or justification of the violations of Sec. 12.155 and 12.111 (e). The new FCC order establishing a four-month operator license suspension became effective from May 19, 1960.

FCC took under consideration the suspension of the Technician Class Amateur Radio Operator License of Jerry E. Gastil (K6DYD) Sun Valley, Calif. *it appearing* that on or about Jan. 9, 1960 (1) licensee used and operated radio transmitting equipment without a license, in violation of Sec. 301 of the Communications Act of 1934; *it further appearing* (2) that licensee transmitted communications containing obscene, indecent or profane words, language or meaning in violation of Sec. 12.157 of FCC rules; likewise (3) licensee on above date, sent unidentified radio communications, a violation of Sec. 12.159, and (4) between May 24, 1958 and Feb. 25, 1960 and particularly on Dec. 12, 1959 failed to maintain an accurate log of station operation, a violation of Sec. 12.136. The Federal Communications Commission ordered (Apr. 1, 1960) that the Technician Class Amateur Operator License of Jerry E. Gastil BE SUSPENDED for the remainder of the license term scheduled to expire Jan. 20, 1965. This action was effective from Apr. 24, 1960.

FCC took under consideration the suspension of the General Class Amateur Radio Operator License of Thomas E. Prichard (W6LCH) Sunland, Calif., *it appearing* that the said licensee, on or about Jan. 9, 1960, used and operated radio transmitting equipment without a license, a violation of Sec. 301 of the Communications Act, and *it further appearing* that licensee transmitted communications containing obscene, indecent or profane words, language or meaning, in violation of Sec. 12.157 and that licensee transmitted unidentified radio communications or signals at this time, a violation of Sec. 12.159 of FCC rules. The Federal Communications Commission ordered (April 1, 1960) that the General Class Operator License of Thomas E. Prichard, Sunland, Calif., BE SUSPENDED for the remainder of the license term. This action was effective from April 28, 1960.

—F. E. H.



# With the AREC

The annual AREC Simulated Emergency Test is scheduled, this year, for the week end of Oct. 8-9. This is just to call your attention to it, in case the bulletin to ECs on this subject fails to reach you enough in advance of those dates to provide adequate planning. Full announcement will be in October QST, as usual. Meanwhile, start making your plans now for the SET!

On March 1 a serious wreck on the Santa Fe railroad near Wasco, Calif., called out amateurs of the Mission Trail Net for assistance in providing communications, inasmuch as wire facilities in and out of Wasco were disrupted. W6ZCC/mobile was first on the air. K6RZM formed an emergency net on 3860 kc., and within a short time this net was functioning under the control of WA6BDT. The net continued to operate for over three hours, gathering information from the scene of the wreck and Bakersfield hospitals where dead and injured were being taken. Other stations taking part were K6s APE IEZ IUX OOW NXT and W6UZG.

Oklahoma amateurs were busy in late April and early May. Before, during and after Operation Alert, the various groups were actively concerned in real emergency operations. In the latter part of April and early May Southwestern Oklahoma was hit by tornados, Pocasset receiving considerable damage and loss of communications. The Chickasha AREC group moved into the area with emergency equipment and four operators (K6s JQH UHZ UTK and RJI) to work with civil defense out of Chickasha. W5LIR from El Reno also worked with this group. Almost immediately afterward, the southern part of Oklahoma was hit by a tornado and the Weather Bureau was out of business. W5s AZO HHG UYQ and K5SKA were quickly on the job and W5UYQ's station was put up at the bureau. EC W5ORH and his gang set up operations immediately after the storm and the operation expanded rapidly as amateurs deployed to assist in routing traffic around damaged areas. Among those mentioned in this operation are K5s RRQ LLV TBR VRL SHX, W5s VCJ KBY HXL.

On May 5 the storms struck Sapulpa and Wilburton. The Tulsa mobile group came to the aid of Creek County EC K5CCO and his AREC gang. All communications into and out of Wilburton were cut off. AREC groups from McAlester and Muskogee moved in to assist, under ECs W5UAO and K5RCW respectively. W5UAO/5 hit the air about midnight, May 5, and made contact with the Red Cross in St. Louis. For 40 hours this contact was maintained as the only link between Wilburton and the outside world. Of great help was a 40-foot antenna fastened to the top of the flagpole in front of the courthouse. W5AZO obtained a clear channel on 3860 from FCC, which was relinquished at 0630 May 7, but emergency traffic continued to flow over the circuit until May 8.

McAlester amateurs who traveled 32 miles to assist at W5UAO/5 and then, upon returning, also assisted from their home stations, included K6s GBR MZJ ESO OFA MYT TLD, W5s IQG AKH HEL BGC JSB BLE OQM, KN5VVX. Some of the more helpful of the hundreds of other amateurs who assisted were K6s MES MIB MYS USA BAY ELG WIE, W6s LXH DRZ LGB FU JCW VLW WAX WZN GNE IQD.

Flood troubles developed in the Timmins, Ont., area from May 5 through May 15 as continued rainfall and melting snows inundated large areas and disrupted communications. On May 8, VE3DQL was contacted by the c.d. coordinator and asked to provide radio equipment. He, along with VE3DSJ and VE3DVT, proceeded to flood-control headquarters and set up equipment. As the water continued to rise and headquarters was shifted from place to place, on May 11 a permanent base station was installed in a hotel at the river's edge and operation was instituted on a 12-hour-per-day basis using 75 and 6 meters, including

one mobile in a boat, two in cars, two portables and two six-meter hand-carried units. One of the mobiles was established at the helicopter base five miles distant and was instrumental in getting a rescue copter to a sick woman on a farm in the flooded area within 20 minutes after the need became known. The work of the amateurs also resulted in getting food and pure water to isolated farms and homes, hay for cattle, coordinating the movement of milk from farms to dairies and supplying food to a herd of registered Jersey cattle marooned on a small piece of ground.

The radio-equipped boat transported children from flooded farms into Timmins and through its communications links had Red Cross and Salvation Army personnel on hand to look after them.

On May 14 the dam at Ivanhoe Lake burst, flooding the village of Foley. VE3DQL flew into the area on May 15 but found government radios still operational; however, he was able to relieve an operator who had been on duty for 36 continuous hours. After returning to Timmins, operation was continued on a standby basis for 24 hours. — VE3DQL.

The Topeka 2 Meter Emergency Weather Net was alerted on May 19 when tornados were in the area. An operator was dispatched to the Weather Bureau to operate the station there and mobile units were sent to Carbondale, Rossville and Auburn. The c.d. trailer was set up in Meridan and the Red Cross station in Topeka was also activated. Communications were established between the control station of the 2-meter net, the Red Cross and the Weather Bureau via amateur radio. Operations were resumed the following day after a six-hour suspension when it was discovered that telephone lines were too overloaded to carry all emergency calls. Thereafter there was continuous operation until May 22 at 1600. Participating amateurs: K6s JMF BBI PSD, W6s MXG KOL ICV UPU ECF WGN JLY.

Colorado amateurs answered an emergency call to assist in the search for a man and his son reported lost in the Middle Creek area on June 5. Within 5 minutes some of the amateurs were on their way and within 45 minutes traffic was being handled from the search area. The lost pair were found at 1030 and the rescued man talked with his wife by amateur radio, mobile to mobile. Amateurs who took part: K6s BOH (EC) MZN OET TTN KZI UMP OHW IFC DNA VMB TAB, W6s NIT (SEC) ANO DML LVS TWA WUR. — K6BOH.

Four amateurs brought aid to victims of a June 12 traffic accident near Sacramento, Calif. W6OYJ/mobile passed the scene of the accident and called for assistance on 2 meters. The call was answered by W6RRN/6, the Delta Amateur Radio Club, which was operating portable in the ARRL v.h.f. QSO party; WA6FUF was at the mike. He handed the message to W6RRN at the six-meter position, who gave it to W6YGZ in Stockton. The latter informed the Highway Patrol and an ambulance was dispatched immediately. W6OYJ/mobile stood by at the scene until the ambulance arrived. — WA6FUF.

When three youths were reported missing on Lake Champlain on June 15, WA2DAC, asst. EC for Clinton County, N. Y., offered police communications assistance. Equipment on two meters was put under the control of KN1NKU while W1VSA sent the Burlington (Vt.) Amateur Club mobile unit to the lake. W1OJV/mobile went aboard the Chittenden County sheriff's cutter, while W2JPB set up his station on the New York side to handle liaison between New York and Vermont State Police. Although the youths were not found, it was not through lack of trying. The following additional amateurs are listed among the participants: K1s GBH HCZ, W1s PDT TBG DAF NLO BRO KOO, K2s HJC HJD RTL PQV, W2OZY, WA2s MAR GCH, WV2LWB. — WA2DAC.

On June 25, a little Canadian girl vacationing with her parents near Old Orchard Beach, Me., wandered off and precipitated an extensive search in which amateur radio was involved. On June 26, K1ANM reported to the chief of police of Saco, Maine, who was in charge of the search, then contacted K1JDA and within 5 minutes nine transmitting units of the Cumberland County Emergency Net were on the way to the search area. W1ECB/mobile became net control, deploying K1BAY, W1AHM, W1UMQ, W1WST

and himself at strategic spots in the search area. KIKSQ went afoot with a hand-carried unit, and a call went out for more operators. This was heard by KILSJ at Field Day headquarters of the Portland Amateur Wireless Assn. at Cape Elizabeth and four additional operators (K7s DPM DWQ GVQ LFP) took off to assist. As the search got under way, K1GTG was relaying from Saco to Portland; K1MBI was in contact with the Brunswick Naval Air Station and W1BCB/mobile was in contact with the Portland Airport control tower which ran liaison with the Portland Civil Air Patrol. Happily, the girl was found shortly before noon, insect-bitten and exhausted but very much alive.

During the disastrous fire at Markle, Ind., on June 27, K9WHA gave the alarm on the Indiana Phone Net when all other communication was severed; W9HUF contacted the Huntington Fire Dept.; K9LXD contacted state police; W9CHO operated mobile; and W9IHG was net control and maintained order. The fire chief from Markle stated that

if it had not been for the quick-thinking action of the amateurs, the town of Markle would have been a complete loss. — W9SFD, SCM Indiana.

The regular session of the 10-meter Thunderhead Net in Cleveland on June 29 was interrupted by a report that three juveniles were breaking glass in a rubbish collection in the Westpark area. The three youngsters were located by W8AEU and W8QXG, who then contacted police. By the time the police broadcast was made, the youngsters moved to a different location, so another contact was made; the amateurs had kept them under constant surveillance, taking no other action and the youngsters were completely unaware they were being watched although often the mobile was in plain sight. After the pickup was made, the boys were put to work with dust pan and broom cleaning up the streets in Westpark. Net control was K8AAG, assisted by W8MAE. — W8AEU.

On July 11 a tornado hit Slayton, Minn., leaving the town without power. EC W0MZR and his Nobles County AREC group moved in with four mobiles and set up one as a base station, patrolling the devastated town with the other three, reporting fires, vandalism and guiding emergency equipment to various parts of town. The group was released at 0030. Those taking part: W0s IZU KXW UMD, K0s ABD QBI IZD. — W0TUS, SEC Minn.

Thirty-three SECs reported on behalf of 12,058 AREC members for May. This beats last May by 7 reports and over 3,000 AREC members. Ohio and Montana submit their first reports for 1960, bringing the total heard from to 38. This shows two things: (1) that we're past the half-way mark for 1960, and (2) that those SECs who report at all are pretty consistent. Of the 33 reported for May, 23 have reported every month this year. How about getting us past the halfway mark consistently, each month?

Sections reported: Ga., S. Texas, E. Mass., Ind., Wash., Me., Wyo., Mich., Ohio, San Joaquin Valley, E. Fla., E. Bay, N. Texas, Mont., N. Mex., S. Dak., Nevada, Wis., Colo., NYC-LL Minn., Ore., Utah, Ala., Santa Clara Valley, Kans., Va., E. Pa., Ill., Maritime, Okla., Ont., Vt.

### BRASS POUNDERS LEAGUE

Winners of BPL Certificate for June traffic:

Call	orig.	Recd.	Rel.	Del.	Total
K2UTV	101	2040	1990	40	4171
W3CUL	285	1906	1582	301	4074
W0LXC	16	1000	925	74	2015
W0LGC	684	468	411	55	1618
W2ACIG	28	786	777	9	1600
K2THC	53	731	737	11	1552
W0SCA	2	765	759	2	1528
W4PL	19	578	511	49	1157
W6WPF	9	546	517	29	1101
K1FDF	98	476	398	64	1036
W9TUS	72	376	311	117	979
W6GYH	196	360	343	11	910
K9ONK	102	392	370	18	882
W3VR	61	397	362	22	842
W7DZX	4	409	389	28	830
W9DYG	12	415	366	22	813
K6BPI	52	427	243	84	806
W3IVS	17	382	350	32	781
VE2AZI/W1	20	361	348	10	739
W6EOT	10	369	314	13	706
K2YJL	21	327	300	12	690
W7PGY	32	321	272	27	652
W1JXD	8	313	290	23	634
K4SJJ	139	251	210	21	621
K2UBG	185	219	188	22	614
W8UPE	21	289	242	45	597
W2EZR	28	287	274	17	586
W18MU	6	281	262	31	580
W0BDR	64	289	203	2	558
K1MMQ	218	168	147	17	550
K4AKP	11	266	237	33	547
K5WIC	22	256	234	34	546
W7BA	22	270	243	27	543
W9DO	16	254	61	209	544
K4QLG	316	120	41	57	534
W9TT	43	251	95	144	533
W7BDU	3	265	361	3	532
K4ZHV	78	328	210	11	527
W9IDM	10	265	352	0	527
K2UCY	12	248	244	16	520
W5ZHN	32	241	162	79	514
K6SXX	46	241	181	45	513
Late Reports:					
VE2AZI/W1 (May)	30	871	834	25	1760
VE2AZI/W1 (Apr.)	51	694	658	27	1430
K6SXX (May)	44	314	236	62	656

### More-Than-One-Operator Stations

Call	orig.	Recd.	Rel.	Del.	Total
W8ZJB	216	457	405	4	1082
K6MCA	138	376	355	14	883
K6WAH	30	320	216	104	670

BPL for 100 or more originations plus-deliveries

K0LJT	243	W4SEL	120	K3UFT	102
W4ZMH	210	K4YOQ	118	W8DAE	102
K2DEL	190	K7BKH	116	VE2VT	102
W42CNS/	W4DNU/6	114	Late Reports:		
VE8	175	K6ZCR	114	K4HJK (May)	134
W9DGA	143	W42CF	113	K4CNY/4 (May)	133
W1TXL	124	K2RBY	108	K4TBE (May)	132
W4GCB	120	W2EBR	103	KNINKS (May)	111

### More-Than-One-Operator Station

K2MQW/2 180

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K1CAU, W2EW, K2UCY, W6DEF, W7HUT. The BPL is open to all amateurs in the United States, Canada, Cuba and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard ARRL form.

### RACES News

During July we visited OCDM Operational Headquarters in Battle Creek, Mich., to confer with officials on the revision of their frequency plan for RACES, known as

Technical Bulletin four-dash-two (TB4-2). Also brought in to confer were W2BGO, chairman of the United States Civil Defense Amateur Radio Alliance (USCDARA), and W2QGL, a member of the original USCDARA frequency committee and co-author of the original USCDARA plan. Sitting in for OCDM were our old friend Charlie Dewey W8LBN; Leo Haisman, W8KA, the new OCDM RACES coordinator; D. C. Summerford; and Bob Arrowsmith, K5DFA.

After a day and a half of discussions, TB4-2 came out looking not too much like the original proposal made by OCDM. Everybody agreed that a nationally-uniform RACES frequency plan was desirable, but of course there was plenty of skirmishing about the details. To make a long story short, and although the final plan is subject to higher approval in OCDM circles, these are the principles generally agreed upon:

- 1) The introduction will contain a definite statement to the effect that these frequencies are non-exclusive.
- 2) RACES plans submitted subsequent to June 30, 1961, which are not in compliance with the plan will not be approved by OCDM.
- 3) State RACES frequencies are allocated in the 3500-3550 and 7100-7125 kc. segments; other high frequency segments are channelized, phone band frequencies with a.s.b. (3A3a) in mind.
- 4) Channelization of the 28, 50 and 144 Mc. RACES segments will be in accordance with the "ABCD plan" of the USCDARA (p. 61, May '53 QST), and variations of this plan will govern channelization on 220 Mc. and any u.h.f. RACES segments.

No, don't ask us or OCDM for TB4-2 just yet. We'll let you know when it is available.





## 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 Sept. 21 at 2130 Eastern Daylight Time (0130 GMT, Sept. 22). Identical texts will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6QWP only will be transmitted Sept. 1 at 2100 PDST (0400 GMT, Sept. 2) on 3590 and 7129 kc.

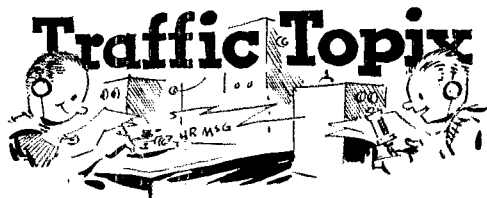
Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 PDST (0130 GMT). Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text sometimes is reversed. To improve your list, hook up your own key and audio oscillator and attempt to send in step with W1AW.

**Date**      **Subject of Practice Text from July QST**  
 Sept. 2: *Antenna Patterns from the Sun*, p. 11  
 Sept. 8: *How to Make a Sideswiper*, p. 28  
 Sept. 12: *Two-Meter F.M. for . . . Communication*, p. 33  
 Sept. 15: *Lightweight Utility Mast*, p. 30  
 Sept. 27: *High-Frequency Satellite Scatter*, p. 36  
 Sept. 29: *Retreading An Old-Timer*, p. 50  
 Sept. 30: *A Console for the Home Station*, p. 48



The South County Amateur Radio Society furnished communications for the annual Fourth of July parade in Redwood City, as customary, using c.d. and Red Cross units. Here, at their stations along the parade route, are K6OTR/6 (Red Cross) and W6WWJ-3 (RACES), operated by W6TJJ and W6KJW respectively.



You've heard of Murphy's Law: "If anything can possibly go wrong, it will?" This applies to all contests, especially Field Day, and has wider applications than just amateur radio; but it applies also to traffic nets. We're just beginning to get a taste of what's in store for us in the upcoming low sunspot cycle. Conditions are getting pretty lousy already. That's when Old Man Murphy is in his glory.

Let's take a hypothetical situation. You are NCS of a big net. In monitoring the net frequency before net time, you note with dismay that all signals are weak and watery. Static crashes abound. A couple of the stronger stations on the band are rag chewing on the net frequency. It's hot and sticky in the shack, and a neighbor down the street is running a rock crusher in his basement. Local television sets are gargling all over the band, sounding louder than usual because signals are weaker than usual. You say a mental prayer for light traffic and competent net operators and call the net.

You guessed it. Every station reporting in has a wad of traffic. Some of them have comments to offer but you don't get them so you have to ask them to repeat, then find out they're just trying to tell you conditions are mighty poor. Joe wants an "informal" with Pete. Mike has 24 messages to clear but must QNO in fifteen minutes. Jake wants to know how to route traffic for Liberia. You tell a couple of stations to move up ten to clear some traffic but you have to repeat the instructions three times; then in five minutes they come back and tell you they couldn't copy. K4LID starts a slow CQ on the net frequency. Some clunker calls in and asks what net this is, and can you take a message to East Over-shoe, Ark.; then he sends it without a preamble. K4LID finishes his CQ, listens for five seconds, then starts up again.

Yes, if anything can go wrong, it will. After an hour of

this, you QNF the net, having cleared about 25% of the traffic. Oh well, maybe conditions will be better next time.

Maybe. But don't count on it. Just make a mental note to send a gold medal to the net stations who reported in on such a night; and count on them to do so again and again, regardless of conditions. If we don't always get all the traffic cleared, by gum, it isn't because we don't always try.

June net reports:

Net	Sessions	Check-ins	Traffic
7290	44	1241	457
20 Meter SSB	..	621	2877
Mike Farad E & T	48	384	604
N. Tex.-Okla. Traffic	30	768	338
Early Bird Transcon	30	..	172
Hudson Traffic	30	343	226
Interstate Phone	15	191	351
Eastern Area Slow	30	195	72
Transcontinental Phone	..	..	1965

**National Traffic System.** We can do a lot of bragging about NTS, and we have a right to do so. But right now we want to point out some things that are wrong with it and how they can be corrected. No organization is so perfect that it cannot be improved, and NTS is certainly no exception to this rule.

The thing most wrong with NTS is that net member convenience continues to take precedence, generally speaking, over organizational requirements. By this we mean that each net conducts its session at a time, on a frequency, and in a manner most convenient to most of the members without consideration of whether or not this is in accordance with the NTS time schedule. There is room for *some* leeway, but there are limits. A prime factor in setting up your NTS net, whether it be at section, region or area level, *must* be the time schedule if we are to realize the benefits of system.

Operating procedure, we regret to say, even at area levels, leaves a lot to be desired. This is manifested mostly in minor things which can all be corrected with a little effort on the part of each individual — effort in reading up on the proper procedure and putting it into practice on the nets; effort in breaking old bad habits, not only so that *you'll* be doing it properly, but also so the newcomers won't learn incorrectly by imitating you. Most of our procedures have a darned good reason behind them.

The tendency to "break and flee" when the going is tough is one we should fight. It's mighty easy, when signals are weak and QRM is bad, to say QNP. How about making it a point of pride *never* to use that signal until you have given the assigned task a good hard try. If you ask for a fill and don't get it the first time, try it again, and again. Don't give up so easily. Admitting defeat should come mighty hard to a good traffic man.

Some of the traffic still shows evidence of extreme sloppiness. Remember, a garbled message can mean only one thing: somewhere along the line someone QSL'd either without having received it correctly or written it legibly. Make sure that someone is not you.

We're all in favor of ragchewing, but not on NTS nets. A comment dropped in here and there as and if time permits adds a little to the enjoyment of net operation, but when such is permitted to slow down the traffic handling process it is a deterrent. Stop telling the NCS your long tale of woe. He doesn't care where you got your traffic, what kind of traffic it is or how important it is. He doesn't care *why* you can't go to region if he asks you to and you refuse. And if he's interested in your help or advice, he'll ask for them; otherwise, just shaddap.

We NTSers are probably as fraternal a group as you'll find in ham radio, but during QNF we have a job to do and we ought to *do* it. Before and after the net and at conventions we'll be buddies. The tighter our organization is and the more efficiently we operate, the better buddies we'll be. Okay, buddy?

#### June reports:

Net	Ses- sions	Traffic	Rate	Average	Representa- tion (%)
1RN.....	29	419	.432	14.4	75.8 <sup>1</sup>
2RN.....	60	607	.538	10.1	96.7
3RN.....	60	488	.354	8.1	96.1
4RN.....	60	754	.352	12.6	91.9
RN5.....	60	741	.369	12.4	88.3
RN6.....	56	1041	.338	18.6	86.1
RN7.....	59	532	.288	9.0	41.4
9RN.....	53	780	.482	14.7	77.4
TEN.....	60	835	.510	13.9	60.6
ECN.....	15	46	.160	3.1	57.8 <sup>1</sup>
TWN.....	41	271	.246	6.4	60.0
EAN.....	29	1152	.783	39.7	97.7
CAN.....	30	1174	.756	39.1	100.0
PAN.....	30	1364	.705	45.3	100.0
Sections <sup>2</sup> .....	1033	5767		5.6	
TCC Eastern	99 <sup>3</sup>	438			
TCC Central	60 <sup>3</sup>	804			
TCC Pacific	117 <sup>3</sup>	965			

Summary... 1676 18178 EAN 9.5 CAN/PAN  
Record..... 1318 15839 .857 15.9 100.0

<sup>1</sup> Region net representation based on one session per night. Others are based on two sessions per night.

<sup>2</sup> Section nets reporting: SCN (Calif.); BUN (Utah); MDSD (Md.-Del.-D. C.); NJN (N. J.); WIN, WSSN (Wis.); Iowa 75 Meters; AENT, AENP, AENP Morning, AENO, AENB (Ala.); FAITN, GN, FPTN (Fla.); NEB (Nebr.); QMN (Mich.); S. Dak. CW, S. Dak. 75 Meters, S. Dak. 40 Meters; Tenn. C.W.; WVN (W. Va.); SCN (S. C.); TLOCN (Iowa); WSN (Wash.); VFN (Va.); KYN, MPKN (Ky.); CWXN, CCW (Colo.); GSPN, NHN (N. H.); CN, CPN (Conn.); MSN, MJN, MSPN Noon, MSPN Evening (Minn.).

<sup>3</sup> TCC functions reported, not counted as net sessions.

Despite the fact that traffic was low in June, the NTS totalled more traffic than any previous June on record. We suppose the line headed "record" in the above tabulation should read "previous record," since in most categories we seem to beat all previous records each month. How long can this keep up?



The late 1RN session has been resumed on an informal (unofficial) basis to help clear some of the traffic more promptly. W2PHX reports continued success on 2RN, but "a little switching around might be in order." W3PZW has returned to 3RN, having completed building his new house and antenna system. W4SHJ reports that K4KNP, a 4RN stalwart and one of our oldest NTSers, had his shack destroyed by lightning and will be off for a while. RN5 certifi-

ates have been awarded to K4s CNY BSS, K5s GXR QWR WIC ABV. W6RSY which was hospitalized, but RN6 rolls right along except for Nevada, which seems to have gone on vacation. W7BDU submits RN7 report for W7QLH, who is vacationing. W0LXC submits his first report on TEN — one of the most complete we have seen. ECN has decided to keep struggling, and a new manager will be appointed to replace VE3AOU. Arizona is showing increasing signs of life on TWN, but Wyoming is slipping. Vacancies on CAN are filled on the spot, with never a miss. K0EDK puts out a fine monthly PAN summary bulletin.

*Transcontinental Corps.* Most of the TCC functions continue to be filled successfully. Some of the boys are using high speed transmission with low speed playback to reduce on-the-air time, and report it's working well. All you need is a tape recorder and a gadget for keying your transmitter from an audio tone. You send your traffic into the tape recorder at lowest recording speed, put it on the air at highest playback speed; your TCC counterpart records it at same speed at which played, plays it back at lower speed. No perforated tapes needed. What do you do about fills? Listen, the operators on TCC don't need fills! (It says here.)

#### June reports:

Area	Functions	% Suc- cessful	Traffic	Out-of-Net Traffic
Eastern.....	99	88.9	1221	438
Central.....	60	100.0	1608	804
Pacific.....	117	94.9	1918	965

Summary..... 276 93.8 4747 2207

The TCC roster: Eastern Area (W1SMU, Dir.) — W1s AW NJM OBR SMU WEF, W2FEB, WA2APY, K2s SIL SSX QBW, W3WG, K4KNP, W9s CXY DO DYG, K9GDF, VE2AZI/W1. Central Area (W0BDR, Dir.) — W0s LCX SCA BDR. Pacific Area (W6EOT, Dir.) — W4DNU/6, W5ZHN, K6s GID LVR, W6s EOT ELQ HC WPF QMO, WA6ATB, W7s ZB GMC DZX, W0s ANA KQD, K0s DTK CLS/6 EDH EDK.

## FREQUENCY MEASURING TEST, SEPTEMBER 16

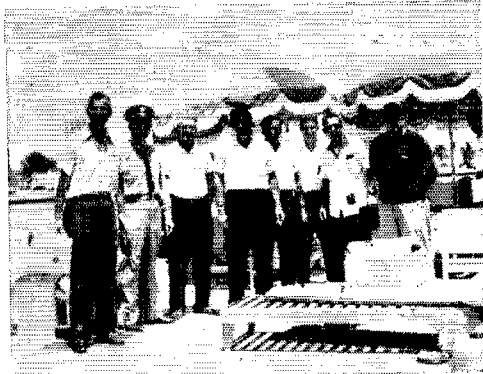
ARRL invites all amateurs to try their hand at frequency measuring. W1AW will transmit signals for this purpose starting at 2130 EDST (0130 GMT, Sept. 17) Friday, September 16. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3506, 7019, and 14,098 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 2136. It is suggested that frequencies be measured in the order listed. Transmissions will be found within 5 or 10 kc. of the suggested frequencies.

At 0030 EDST, September 17 (0430 GMT), W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies used will be 3506, 7019, and 14,098 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointments by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for QST listing of top results. Listing will be based on over-all average accuracy, as compared with readings made by a professional lab.



These amateurs had the enviable job of riding in the same boats with the girls to provide communications for the Miss Universe Aquarade at Miami Beach on July 4. Left to right are W4MKE, K4ONY (Miami Beach police lieutenant, who planned activity), K4YWX, KAUGA, W4DTJ, K4RRB, K4SLR, K4SCS, K4ZXL, W4IYT, E. Fla. SEC, who also took part, was the photographer.

### A.R.R.L. ACTIVITIES CALENDAR

- Sept. 1: CP Qualifying Run — W6OWP
- Sept. 16: Frequency Measuring Test
- Sept. 17-18: V.H.F. QSO Party
- Sept. 21: CP Qualifying Run — WIAW
- Oct. 5: CP Qualifying Run — W6OWP
- Oct. 8-9: Simulated Emergency Test
- Oct. 15-16: CD Party (c.w.)
- Oct. 20: CP Qualifying Run — WIAW
- Oct. 22-23: CD Party (phone)
- Nov. 3: CP Qualifying Run — W6OWP
- Nov. 12-13, 19-20: Sweepstakes Contest
- Nov. 18: CP Qualifying Run — WIAW
- Dec. 7: CP Qualifying Run — W6OWP
- Dec. 19: CP Qualifying Run — WIAW

### OTHER ACTIVITIES

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

- Sept. 3-4: LABRE DX Contest (c.w.), LABRE (p. 71, last month).
- Sept. 9-11: Great Lakes Division Convention QSO Party (p. 114, this issue).
- Sept. 10-11: State of Maine QSO Party, (p. 124, this issue).
- Sept. 10-11: LABRE DX Contest (phone).
- Sept. 10-12: Annual Virginia QSO Party and Contest, Tidewater Mobile Radio Club (p. 136, this issue).
- Sept. 11: WINJM High Speed Code Test, Connecticut Wireless Assn. (p. 89, this issue).
- Sept. 17-18: Scandinavian C.W. Activity Contest, SSA (p. 74, this issue).
- Sept. 24-25: Scandinavian Phone Activity Contest.
- Oct. 1-2: VK/ZL DX Contest (phone), NZART (p. 75, this issue).
- Oct. 8-9: VK/ZL DX Contest (c.w.).
- Dec. 3-4: 21/28 Mc. Telephony Contest, RSGB.

### WIAW OPERATING SCHEDULE

(All times are in Greenwich Mean Time — GMT)\*

#### Operating-Visiting Hours:

Monday thru Friday: 1700-0500 (following day).  
Saturday: 2300-0630 (Sunday); Sunday: 1900-0230 (Mon.).

Exception: WIAW will be closed from 0230 Sept. 7 to 1700 Sept. 8 in observance of Labor Day.

A map showing how to get from main highways (or from Hq. office) to WIAW will be sent to amateurs advising their intention to visit the station.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

#### Frequencies (kc.):

C.w.: 1820, 3555, 14,100, 21,075, 28,080, 50,900, 145,800.  
Phone: 1820, 3945, 7255, 14,280,\*\* 21,330, 29,000, 50,900, 145,800.

Frequencies may vary slightly from round figures given; they are to assist in finding the WIAW signal, not for exact calibration purposes.

#### Times:

Monday thru Saturday: 0000 by c.w.; 0100 by phone.

Tuesday thru Sunday: 0330 by phone; 0400 by c.w.

General Operation: Use the chart on page 101, May 1960 QST, for times and frequencies for WIAW general contact with any amateur. Note that since this chart is organized in EDT, the operation shown between 0000 and 0100 each day will fall in the evening of the previous day in some time zones.

Code Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Tuesday, Thursday and Saturday, and at 5, 7½, 10 and 13 w.p.m. on Monday, Wednesday, Friday and Sunday are made on the above-listed frequencies (except 1820 kc.). Code practice starts at 0130 each day. Approximately 10 minutes of practice is given at each speed. On Sept. 22 and Oct. 21, instead of the regular code practice, WIAW will transmit certificate qualifying runs. On Sept. 17, WIAW will transmit a frequency measuring test in place of code practice.

\* WIAW schedule is shown in GMT per recommendation of ARRL Board of Directors that use of GMT for amateur communications be encouraged. For ADST, subtract three hours; for AST or EDST, subtract four hours; for EST or CDST, subtract five hours; for CST or MDST, subtract six hours; for MST or PDST, subtract seven hours; for PST subtract eight hours; for Alaska time (central part) and Hawaii subtract ten hours. Don't forget to change the day (to previous day) when subtracting takes you through 0000.

\*\* Single sideband.

### BRIEFS

The semi-annual high speed code test of the Connecticut Wireless Assn., Inc., will take place on Sept. 11. Call-up starts at 0100 GMT (Sept. 12), with WINJM transmitting simultaneously on 3637 and 7120 kc, and W3NF on 3520 kc. Plans are not yet complete at this writing for synchronized transmissions by a middle west and west coast station; if this works out, the calls and frequencies of these stations will be indicated during the call-up.

Instructions (at 25 w.p.m.) start at 0130 GMT, and the following is the schedule for the five-minute qualifying transmissions: 40 w.p.m. at 0145 GMT; 45 w.p.m. at 0155 GMT; 50 w.p.m. at 0205 GMT; 55 w.p.m. at 0215 GMT; 60 w.p.m. at 0225 GMT.

If you can handle better than 30 w.p.m., you owe it to yourself to take a crack at this. You can't lose a thing.

The following are contest corrections concerned with in the 1960 V.H.F. Sweepstakes as reported in July QST. For those errors which ARRL is responsible, sincere apologies. W2YHP is the club winner for the Lake Success Radio Club, and that club moves up to 18th place with a score of 24,376. K9MZV was incorrectly listed in Illinois; K9MZV is an Indiana entrant and club winner for the Hoosier Amateur Women's Klub, whose corrected score is 8108; W9RTH score as listed in Indiana is correct at 264 points. K2RIH is the Technician winner in N.J. W3IBH was incorrectly listed as W3IBU as was W3FSY listed as W3FSY.

## REGISTER YOUR NET

It doesn't seem possible, but here it is September again, and time for all nets to sign up with ARRL for a place of honor in the annual net directory. This business of putting out a complete cross-indexed directory is a form of madness that overtakes us each fall, in addition to having supplementary (QST listings in the November, January, March and May issues each year.

In order to facilitate and simplify registrations, we provide net registration forms (CD-85), as shown in the cut. The best way to register your net is to get one or more of these (we'll send on request), fill it out and send it back to us. This is almost sure-fire. If you stick the info in a letter, on a scrap of paper, on a radiogram, on the bottom of a membership renewal or entry, or trust we will pick it up from a net bulletin, your SCAL's column, or just because you think we already know all about your net — well, it may get picked up and it may not. But don't count on it. Register your net deliberately, methodically and accurately.

We have to have a few rules in registering nets, to wit: (1) Only public service nets are registered. If your net renders no public service, don't bother to register it. In any event, the public service rendered (e.g., emergency communications or traffic handling) *must be indicated*. (2) All nets must be registered some time between Aug. 1 and Nov. 1 to make the cross-indexed net directory. Nets registered prior to Aug. 1 which are not re-registered after that date will be dropped from our active card file. (3) We reserve the right to omit nets with ridiculous, obscene or suggestive names, whether they serve the public or not. (4) MARS, citizen's band or other non-amateur nets are not eligible for registration. (5) Generally speaking, if for any of the above or other reasons (like if we can't decipher your hen-scratching) your net cannot be entered, it will not be possible for us to notify you of this fact or engage in correspondence about it; so make sure it's done right the first time.

As we said before, the best way to register is to get a CD-85 card and fill it in. Second-best is to make a facsimile from the above, on a postcard. Lacking either of these, give us the following data (Items 1, 3, 4, 6 and 8 are *absolutely required* for registration):

1. *Name of Net*. Enter this *exactly* as you want it on the net list, because that's how we'll enter it.

2. *Net designation*, if any. Examples: CN for Conn. Net; CPN for Conn. Phone Net; BEN for Badger Emergency Net.

3. *Frequency* or frequencies in kc. If more than one frequency, be sure the time and days of operation on each are clear. Frequency bands or segments are not sufficient.

4. *Days*. Tell us *which* days, not how many a week or "all." "Daily" means *every* day, including Sundays, holidays and paydays.

5. *Call of Net Manager*. Or whatever you call the guy who runs the net, writes correspondence or is otherwise the one to see about it.

6. *Net starting time(s)*. Net ending time(s). All nets are urged to use GMT. Whatever you do, don't confuse us with "daylight saving" time. Indicate either standard time or GMT, and when you change time, change your registration.

### NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

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

The following are the National Calling and Emergency Frequencies for Canada: c.v. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

### NET REGISTRATION

Name of Net.....  
 Net Designation..... Freq..... Days.....  
 Mgr..... Starts..... Ends..... ST  
 Direct coverage.....  
 Purpose of Net..... Starting date.....  
 NCSs..... NTS?.....  
 Liaisons.....  
 This info submitted by.....  
 (Name and/or call)  
 CD-85 (Rev. 9/54)

If your net has no specific ending time, indicate it approximately so we will have an idea how long the net lasts.

7. *Direct coverage*. The coverage afforded by the net stations themselves, or the coverage area assigned the net. Do not include liaison with other nets.

8. *Purpose of net*, if not indicated by its name. Nets not dedicated to a worthy public service such as emergency or traffic are not eligible. Don't say "training" without indicating training in what.

9. *Starting date*. If your net is an old one, the year it started. If less than a year old, the date it started or will start.

10. *Net control stations*. The calls of the stations who regularly control your net on the air.

11. *NTS?* Affirmative if your net is part of the ARRL National Traffic System. If you don't know, it probably isn't.

12. *Liaisons*. We'd like to know the names of nets with which your net regularly conducts traffic exchange. If an NTS section or local net, this must show your NTS liaison.

13. Call letters of amateur submitting this info. Include your name if you want to, but *don't forget your call letters*.

*Important note*: registration of your net with ARRL gives your net no special status as over an unregistered net or any individual station. Net listings are for *information only*.

### DXCC NOTES

Announcement is hereby made of five new and separate additions to the ARRL's Countries List. DXCC credit claims may be made for these five starting November 1, 1960. Claims for any of these five received before November 1, 1960 will be returned without credit. The additions are as follows:

*Marcus Island*: Marcus Island is located in the Pacific Ocean approximately 700 miles due east of Iwo Jima. It is an isolated island neither attached to nor part of any island group. Confirmations for contacts with Marcus Island stations must be dated November 15, 1945 or later.

*Mali Federation*: The Mali Federation is located in West Africa and includes the Senegal and Sudanese Republics. The territories of Senegal and French Sudan have in the past been considered as parts of the French West Africa listing. On June 20, 1960, the Mali Federation became independent and no longer can be considered as part of the French West Africa listing. The Mali Federation separates areas that have been identified with the French West Africa listing. This change places Mauritania, one portion of the French West Africa listing, to the west and several other areas to the east. While it is expected that there will be further changes in the French West Africa listing, at the present time those areas to the east of the Mali Federation will continue to be creditable toward the French Africa listing. Confirmations for contacts with Mali Federation stations must be dated June 20, 1960 or later.

*Mauritania*: Mauritania was previously considered as part of the French West Africa listing. By virtue of the separation by the Mali Federation and in accord with point 3 of our published criteria (see May 1955 QST, page 68, and July 1959 QST, page 84), Mauritania is now a separate listing. Confirmations for contacts with Mauritania stations must be dated June 20, 1960 or later.

*Ruanda-Urundi*: Previously considered for DXCC purposes to be with the Belgian Congo because of its administrative attachment to the Belgian Congo, Ruanda-Urundi

will, as of July 1, 1960, be considered as a separate listing. Ruanda-Urundi is a UN Trust Territory administered by Belgium. Confirmations for contacts with Ruanda-Urundi stations must be dated July 1, 1960 or later.

**Somalia Republic:** The Somalia Republic came into being as of July 1, 1960. It comprises the two former listings of British Somaliland and Italian Somaliland. Confirmations for contacts with Somalia Republic stations must be dated July 1, 1960 or later.

Announcement is hereby made of the deletion of the following five listings from the ARRL's Countries List.

**British Somaliland and Italian Somaliland:** In view of the formation of the Somalia Republic by the combining of these two areas and since such areas no longer exist, these two listings are deleted for crediting purposes. Only confirmations for contacts with these two listings dated June 30, 1960 or earlier will be creditable to the British and Italian Somaliland listings.

**Karelo-Finnish Republic:** Because of an earlier action of the Supreme Soviet incorporating the Karelo-Finnish Republic into the Russian Soviet Federated Socialist Republic, its status is changed. For DXCC crediting purposes, contacts with those stations in the Karelo-Finnish area made July 1, 1960 or later will be considered as creditable to the European Russian Soviet Federated Socialist Republic

listing. Only confirmations for contacts with Karelo-Finnish Republic stations dated June 30, 1960 or earlier will be creditable to the Karelo-Finnish Republic listing.

**Tangier:** Inasmuch as the Tangier area of Morocco is now considered an integral part of Morocco, for DXCC crediting purposes, contacts with those stations in the Tangier area of Morocco made July 1, 1960 or later will be considered as creditable to the Morocco listing i.e. CN8, CN9. Only confirmations for contacts dated June 30, 1960 or earlier will be creditable to the Tangier listing.

**Wrangel Island:** This deletion is made in view of the fact Wrangel Island meets none of the published criteria for separate status. Since no one has ever received DXCC credit for Wrangel Island, its deletion will affect no one's total. This deletion is effective immediately.

We are pleased to announce the return to separate status of the Cayman Island listing. A review of the question of the separate status of the Cayman Islands shows factors not considered at the time of the original decision. This announcement supersedes footnote 5 on the ARRL Operating Aid No. 7 (Rev 8/59) and the DXCC Note in the June 1958 issue of *QST* relative to the Cayman Island listing. Confirmations for contacts with the Cayman Islands for contacts dated November 15, 1945 or later will be creditable as a separate listing.

### DX CENTURY CLUB AWARDS

#### HONOR ROLL

ZL2GX.....300	W6CUQ.....296	W4DQH.....292
W1FPH.....300	W5JNN.....296	W7AMX.....292
W9NDA.....299	W9FTV.....295	ZL1HY.....292
W3GHD.....299	W6EBG.....294	W1GKK.....292
W8HCW.....299	W1MBE.....294	W6ADP.....292
W6AM.....298	W7GUV.....294	CE3AG.....292
PY2CK.....297	W6ENV.....294	W2BXA.....292
W4BFD.....297	W5ASC.....294	W8UAS.....292
W3EJN.....297	W5DND.....294	W5ADZ.....292
W2AGW.....297	W8BKP.....294	W6DZZ.....291
W2HUQ.....297	W3KTT.....293	ZS6BW.....291
KV4AA.....296	W9RBI.....293	W6NNV.....291
W8BRA.....296	G3AAM.....293	W3BES.....291
W6SYG.....296	G2PIL.....293	W6TTT.....291
	W7GBW.....293	

#### Radiotelephone

W3RIS.....289	W6VY.....287
W4ERR.....282	W8KML.....286
ZS6BW.....291	W8PQJ.....285
W8GZ.....291	W5JNN.....288
W8BF.....290	W9RBI.....287
	4X4DK.....285
	W6AM.....284

From June 1, to July 1, 1960 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

#### NEW MEMBERS

W3EFF.....150	W8JAQ.....106	K2POO.....101
I1ZN.....143	DL3TW.....106	K5CAV.....101
W9BVM.....142	ZL2IQ.....106	K7CHT.....101
D16EN.....134	VQ2W.....105	G5GNL.....101
PA9FR.....128	W9LH.....104	W1BB.....100
ZE7JV.....123	K4LGL.....104	W2MFS.....100
K9EJZ.....122	W4UA.....104	W3FTW.....100
FT1AG.....121	YU1OE.....104	K6BXW.....100
G5RP.....114	W2TKG.....103	W8HUE.....100
W7YAM.....111	W6FTQ.....103	G3KAD.....100
PA0CF.....110	W9KEE.....102	YU1DF.....100
	W2CUY.....101	

#### Radiotelephone

HB9FE.....169	W4AGE.....104	W18GA.....100
CX1BY.....140	W9MBF.....104	K5GOE.....100
YV5AFF.....112	HB9BR.....103	W7EUD.....100
K8RTW.....106	K8PRA.....102	W8DJP.....100
I1YI.....105	W4HOL.....101	VE3BK.....100
	W90BJ.....101	

#### ENDORSEMENTS

W4TM.....290	W4FVR.....263	W1TX.....235
W8KLA.....290	W50GS.....260	W0BRK.....230
G4CPC.....290	W6CMF.....260	W3CA.....222
W2TQC.....284	W9GLE.....260	W5WJ.....222
W3LMA.....284	G3DO.....260	W6BRR.....220
W3EUV.....280	W4KWC.....252	W9WYB.....220
W0DAE.....279	W5CE.....251	W2OBX.....216
W3VPE.....276	K4PDV.....250	PY4OD.....213
W6BZE.....274	W2VCD.....241	W1HGT.....212
W3CGS.....271	W2DSB.....240	F4LOU.....212
W5AFX.....271	W6SQS.....240	W2UWD.....211
K2DCA.....270	W9QNO.....240	VE2YU.....211
DL7AA.....270	W1WDD.....237	G3AIZ.....211

W6CG.....210	W7ABO.....170	W3PN.....140
W3MWC.....205	K9CITY.....169	W8BIE.....140
W4EYP.....203	W4UO.....163	W9TKD.....140
W9CPM.....201	W6UNP.....161	4X4BR.....134
W3LPE.....200	K8DYX.....161	DL7BC.....132
W0RBA.....200	K2UKQ.....160	K2TQC.....131
OK1KH.....200	VE25W.....160	K6COP.....131
YV5BZ.....200	DL8PF.....160	W6VPE.....131
ZL4GA.....200	G8PL.....160	SM5DX.....131
W0BTD.....199	W7CWE.....156	ZF3JJ.....131
K48XO.....193	W7BTH.....155	K6HOR.....130
W5VAN.....192	W4IF.....154	W7YAO.....130
W2PDB.....190	W1UD.....152	F8ANL.....130
W6OF.....190	W4JZ.....152	K3AOC.....129
W8PHZ.....188	K8LSG.....152	K9HOL.....125
W4EFX.....187	W0ITB.....152	9G1BQ.....124
K5DGI.....185	W8IGS.....151	W8YAH.....123
K7GIB.....184	W9GGO.....151	K2GUN.....122
W1NT.....183	W1MP.....150	VE3CK.....122
IKKBE.....183	K2FW.....150	K5ESW.....121
W7WDM.....180	K2HY.....150	K2QLL.....120
KS1KB.....180	W4JUL.....150	W7JWE.....120
VE2WA.....180	DL8KP.....150	K4GLA.....119
OK1JX.....176	W3SW.....147	K3DCC.....113
LA2B.....174	W6WV.....147	K5CDB.....113
K1JDN.....173	W6LER.....143	K21JY.....112
W9M2P.....173	W9AZP.....143	W2HDW.....111
W0DSP.....173	K1MLL.....141	W5QIX.....111
W0GBJ.....171	W5LEP.....141	W1FJY.....110
W6BAG.....170	ZS6ASW.....141	K1FFJ.....110
K6SHJ.....170		K3ALD.....110

#### Radiotelephone

W9NDA.....283	W1WDD.....182	W3DJZ.....150
T12RC.....267	W4CIV.....181	W5AKP.....150
W7HIA.....262	W5JCY.....180	VE2YU.....147
W8DMD.....261	DL1WP.....180	W2FXN.....145
W8UAS.....261	DL7AA.....180	W4TDW.....141
G3DO.....242	K6TXR.....175	W8GLK.....141
PY4CB.....241	W9JAV.....173	W1ZSU.....140
ZL1KG.....240	W1AUF.....172	W3SW.....140
W9QLH.....228	K48XO.....172	W5YU.....140
TJ2LA.....222	K5JEA.....172	OA4AO.....135
W4QCW.....217	W6CHY.....170	T12PI.....134
CX3AA.....212	W9UCZ.....161	W46EY.....131
W6CHV.....211	W2TP.....160	W3BNU.....130
I1CTE.....211	DL6PC.....160	W9UIM.....121
W1GOU.....210	VP6SD.....155	W2JYU.....119
W3MAC.....210	W1UOP.....152	K4BEH.....116
W8RGU.....204	W5KFT.....152	K4STY.....114
W9HF.....193	W0JTW.....152	W1DGG.....113
W1YPK.....190	H6GX.....152	FT3MO.....112
W1JYH.....189	K8CFU.....151	W1MGP.....110
W4EFX.....184	W2HMJ.....150	W4ITQ.....110
IKKDB.....183		W7YAM.....110

#### U.S.-Canada Area and Continental Leaders

KH6CD.....261	VO1DX.....230	VE6NX.....256
KL7PI.....231	VE2WW.....271	VE7ZM.....285
W0ELA.....288	VE3DIF.....260	VE8AW.....195
VE1PQ.....249	VE4XO.....180	4X4DK.....288
	VE5JV.....200	

#### Radiotelephone

W2BXA.....274	W0ATW.....270	VE4RP.....102
W4DQH.....273	VE1DE.....143	VE6RU.....178
W5BGP.....260	VO1DX.....141	VE6TF.....160
KH6OR.....254	VE2WW.....213	VE7ZM.....267
W7PHO.....281	VE3KF.....224	G2PL.....266
KL7AFR.....190	VE3QA.....224	ZL1HY.....282



# Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

## ATLANTIC DIVISION

**EASTERN PENNSYLVANIA**—SCM, Allen R. Breiner, W3ZRQ—Active section member K3JSX is now OPS, OBS and EC for Northumberland County. MAV is the new EC for Lebanon County. NOH is now a Class 1 Observer. HNK received the BPL Medallion. AXA advises that the EPA Traffic Net is running normal but the vacation session is taking its usual toll. FKE was a visitor at the Kansas City RC for Field Day. AMC erected a Tribander beam to make West Coast skeds with BNR. K3CUN constructed an r.f. amplifier for 15 and 10 meters. New Generals are K3EPB and BGT. K3EUG, Adams County EC, was QRL with an exhibit at the Fireman's Carnival at Gettysburg. K3CEE, DPQ, DSM, ECP, HKT, IIA, ITH, JGI, JOA and JTU have a baseball team and are looking for other amateur teams to challenge. ELI had to hire a pole-climbing expert to restring his antenna farm. K3DAV has moved to Florida and is succeeded by LRT as president of the Lancaster Radio Transmitting Society. JPS is the new vice-pres. In order to keep K3GSU QRL the OM, IVS, installed an AF-67 in the mobile. New additions to 6 meters are GYP and LUW. New club officers: Delaware Valley ARC—QJJ, pres.; VTE, vice-pres.; DMO, secy.; LQV, treas. 807 Society—K3ANU, pres.; K3BHX, vice-pres.; K3-DFK, secy.; K3HRY, treas. Mt. Airy V.H.F. RC—HKZ, pres.; K3HWZ, vice-pres.; SAO, secy.; MYF, treas. Short Skip RC—W2ILN, pres.; AWD, vice-pres.; K3-ANU, secy.; ZPX, treas.; YLL, act. mgr. The Frankford RC had a transmitter hunt; EAN did the hiding and BBY was found dog number one. The Phil-Mont Mobile RC now holds meetings at the Franklin Institute and is sponsoring the amateur radio station there. New officers of the Bucks County ARC are K3EGP, pres.; K3DDK, vice-pres.; K3GSV, secy.; K3BKP, treas. DUI reports 636 members in the AREC at present and pushing for the 1000 mark. Philadelphia County still is in need of an active EC. Interested operators, contact the SEC for consideration. Summer months and vacation have cut into activity reports but we wish to thank all who contributed over the past year. Traffic: W3CUL 4074, VR 842, IVS 781, HNK 181, AXA 112, K3DCB 105, HLU 95, W3EML 74, KMD 72, K3HEX 63, BHU 58, W3ZRQ 49, K3EXC 46, IPK 40, W3ZLF 34, K3ANS 24, W3JLQ 24, K3AHT 23, W3BUR 23, K3ANU 20, CAH 20, W3TEJ 17, NF 16, NNL 15, K3AOX 12, W3BFF 12, KN3KTC 12, W3DUI 10, FKE 8, NQB 8, W3AMC 6, K3JSX 6, W3OY 6, UUU 5, K3CUN 4, IAZ 4, ALD 2, W3GYP 2, MAV 2, BNR 1.

**MARYLAND-DELAWARE-DISTRICT OF COLOMBIA**—Thomas B. Hedges, W3BKE—SEC: PKC MDD Traffic Net meets on 3650 kc. Mon. through Sat. at 1915 EST; AEPN (phone) on 3820 kc. Mon., Wed. and Fri. at 1800, Sat. and Sun. at 1300 EST; MDDS and MSN (slow speed) Nets on 3650 kc. at 1845 and 2030 PST. New appointments: K2CYA and K3GJD as OOs; K3KPZ and K3GMD as OBS. A Net certificate has been issued K3GJD. AHQ reports the PRVN meets at 9 A.M. on 3935 kc. and the NCVLF Net Tue. at 2030 on 50.4 Mc. BUD says that the St. Marys ARC voted to build a 10-meter transceiver for emergency work. CDQ is in Europe keeping skeds with home on 14 Mc. (CN moved to Virginia and is now 4TE. What a call! He and K4LMB attended the YLRL Convention in Boston. K3DCP reports '60-'61 officers for the BARC are PKC, pres.; K3EFR, vice-pres.; EMZ, treas.; BDY, secy. HIS led the section in accuracy in the May FAIT. K3-EJF reports a new code practice net on 6 meters. Contact him for details. Delaware lost an active traffic man when EKO moved to New York. EOY is looking for WTTY contacts on any band. K3GBV is active on 50, 220 and 432 Mc. He reports 6 meters open every day dur-

ing June. K3GJD reports the new officers of the Johns Hopkins ARC are K3GJD, pres.; K3IIS, vice-pres.; K3IRF, secy.; KN3KYW, treas. KN3GJV passed the General Class exam. K3GKF is finishing a 40-meter quad. K3GMD reports plenty of 50-Mc. activity in the D.C. Area. K3GZK keeps the slow-speed net going. The FSARC at Ft. Meade held an auction to provide Field Day funds. Nice work. OSF is rebuilding the club's TT machine. K3HJD has new rigs for 2 and 6 meters. IWJ says the v.h.f. nets like his OOs. K3IZM reports a good E opening into the South and Southwest. KHA is busy with Official Bulletins in Baltimore. KHU reports that JNKL, 3KRH, K3CPJ, K3GIM and W3Z provided 6-meter communications for the Northeast River Yacht Club. KLA sent in his usual excellent OO report. K3KPPZ is working on an all-band trap. KN3LLR needs an invisible apartment antenna! MAZ led a successful meeting of the Baltimore City AREC. MCH has a new 75A-4. OYX gets out that fine Hagerstown news sheet. K0PIV/3 sends in a good traffic count but may soon go s.s.b. TN is an MDD Net regular and a fine operator. TSG goes after traffic and awards. UE wants more Delaware and Baltimore stations to check into MDD and 3RN. K3WBJ provides message service and code practice at Walter Reed Hospital. YZI has a new antenna. ZAQ reports moving to Edgewater, where he will have an antenna farm. ZNW is busy with MDDS and AREC activities. Don't forget the annual Foundation Hamfest to be held at Gaithersburg Fairgrounds Oct. 2. It will be bigger and better than ever. Traffic: (June) W3UE 229, K3WBV 101, K0PIV/3 88, W3TN 87, ZNW 57, K3EJF 33, W3TSG 30, AHQ 22, BKE 20, IWJ 19, BUD 7, K3GZK 6, DCP 3, W3CDQ 1, K3KPZ 1. (May) K0PIV/3 52.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG—SEC: W2YRW. RMs: W2BZJ, W2HDW and W2ZI. New Jersey Phone and Traffic Net June totals: 30 sessions, attendance 663 and traffic 138. W2ZI is giving 160 meters a whirl. Field Day reports were received from the DVRA., the SJRA., the Medford Wireless Assn., the Apple Pie Hill Radio Club, the Burlington County Radio Club and the Hamilton Twp. Radio Assn. K2-DEI, Maple Shade, made BPL again. The *NYN Bulletin*, issued by Manager W2RXL, shows an active QNI list of 27. W2RG, Merchantville, is top on the attendance list. K2SNK, Trenton, is remodeling the shack. W2BZJ, Pennington, has qualified for WAC. K2JJC, Pitman, has applied for OBS appointment. K200K, Merchantville, expects to return to Cincinnati in B&O RR employ. The Levittown (N.J.) Amateur Radio Club has completed its present theory training. Additional training probably will be available this fall. The Gloucester Co. ARC paper *Crosstalk* is edited by K3AYL/2, assisted by K2HJJ and K2RPA. The club meets in Glassboro the 1st Mon. W2CVV is back after a stay in the hospital. K2JJK has a new receiver and a new Tribander. K2JKA, Woodbury, is station engineer at WBCB. K2HJJ, Gloucester Co., is part-time engineer at WKDN. The SJRA received the gavel from Headquarters as winner of the 1960 ARRL V.H.F. Contest. K2YIB, Riverside, was contest chairman. A 10-meter AREC net is being planned in Burlington County. It will meet Fri. nights with K2ECY, Riverton, as NCS. Atlantic County news was received from K2HBA. He reports plenty of activity is centered around the Southern Counties ARA which meets at Northfield the 2nd Fri. Very fine Form 1 reports and club papers are being received. Keep up the good work. Traffic: K2DEI 298, W2RG 89, W2ZI 46, K2JGU 40, W2TLO 32, W2BZJ 30, K2RXB 21, K2JJC 16, K2SNK 15, K2SOX 6, K200K 4.

**WESTERN NEW YORK**—SCM, Charles T. Hanen, K2HUK—SEC: W2LXE. RMs: W2URF and W2ZRC. PAM: W2PVL. NYS C.W. meets on 3615 kc. at 1900. ESS on 3500 kc. at 1900. NYSPTEN on 3925 kc. at 1800. NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun.. TCPN 2nd call area on 3970 kc. at 1900. IPN on 3980 kc. at 1600. Congratulations to W2ACIG and W2EZB on making the BPL Appointments: W2ABEX and W2-DNC as ORS. K2LMG as OES. Endorsement: W2EMW as ORS. A new club is the Jamestown Area Radio Amateurs with K2TXB, pres.; W2GKH, vice-pres.; W2-JIE, secy.; and W2AEAC, treas. W2ICE spoke at the Penn-York Hamfest, W3YA and K2HUK represented ARRL and a fine time was had by 250-plus registrants. K2RWV is now manager of NYSPTEN. K2DPA is asst. mgr. and W2PGA is secy.-treas. They will serve until

(Continued on page 108)

## UPDATING YOUR OLD RECEIVER

**A**T various times our Service Department is requested to modify or convert older and discontinued models of our products to more up-to-date design. Unfortunately, we, as well as most manufacturers, have found this type of operation to be unsatisfactory to both the customer and the company. We understand and appreciate our customers' desire to be able to have the factory modify or convert a "1940" model to a "1960" model. A similar parallel exists, I am sure, in the automobile industry, as they too must receive requests for factory modification of their products; but, as we all know, from an economic standpoint it is not practicable to accomplish those modifications.

**H**OWEVER, it has always been, and will continue to be, Hallicrafters' policy to advise owners of our products of any modification which we have found practicable to improve an older product. Many individuals can accomplish these suggested modifications themselves or have a local service agency perform them at a relatively nominal cost.

**O**LDER receivers in general suffered from frequency drift. This was primarily due to non-availability of good temperature-compensating capacitors. In almost all older receivers, it would be difficult to add this needed compensation, but other and simple modifications can be installed to reduce drift considerably.

**H**ALLICRAFTERS has a bulletin in course of preparation on these points and it's yours for the asking. Just drop a QSL or note to the undersigned.

73,

FRITZ FRANKE

*Bessel Halligan Jr.*

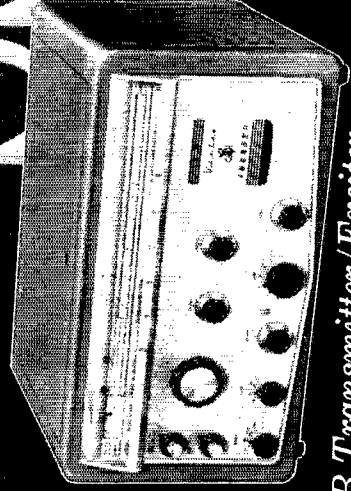
*W. J. Halligan W9AC*

for **hallicrafters**

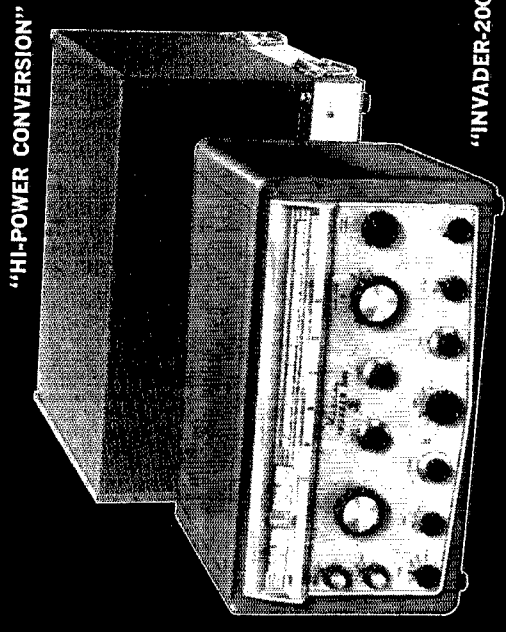
# SSB

A totally new concept in transmitter design—FILTER-TYPE

TRANSMITTER/EXCITER/AMPLIFIER



"INVADER"



"HI-POWER CONVERSION"

"INVADER-2000"

*A superbly engineered SSB Transmitter/Exciter  
... add hi-power conversion for 2000 watts P.E.P.  
(twice average DC) input SSB!*

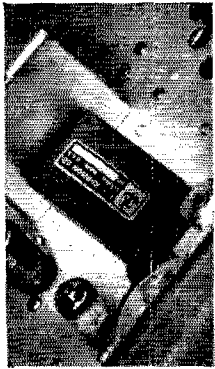
Here is the most versatile ... most advanced SSB Transmitter/Exciter/Amplifier package ever designed for the amateur service! Excitingly different—from exclusive filter-type circuitry to distinctive front panel and cabinet design—the Viking "Invader" and the "Invader-2000" offer flexibility and performance for a lifetime of operating pleasure.



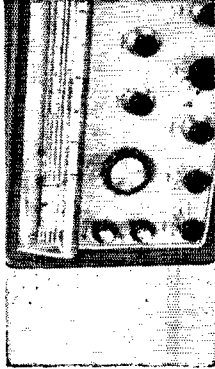
*Viking*

INVADER • INVADER-2000

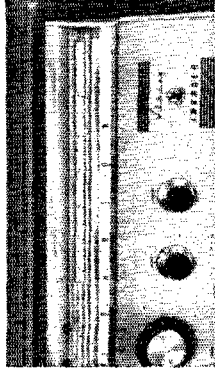




**FILTER-TYPE SIDEBAND**—Exclusive high frequency filter gives you the full 50 db of unwanted sideband and carrier suppression! Select upper or lower sideband instantly with front panel "mode" switch.



**SIMPLIFIED OPERATION**—Unique design and circuitry make the "Invader" and the "Invader-2000" extremely easy to tune and operate! Tune for maximum on the "meter" for maximum signal gain. All front panel controls give complete flexibility!



**FREQUENCY CONTROL**—Instant bandswitching coverage of the full 80, 40, 20, 15 and 10 meter bands... no extra crystals or retuning required. Highly stable, built-in VFO is differentially compensated and factory adjusted for maximum stability. Exclusive "VFO" operating temperature even with equipment turned off... NO WARM-UP DRIFT!



Write today for your free 8-page "Invader" brochure—complete with detailed specifications and photographs!

Here's the transmitter with the sharp, penetrating signal you've been waiting for—plus more exclusive operating and convenience features than any other Transmitter! Exciter on the market today! The "Invader" offers instant bandswitching, full broadcast coverage 80 through 10 meters—no extra crystals to buy—no retuning necessary! Rated a solid 200 watts CW and SSB input; 90 watts input on AM! Final amplifier utilizes a pair of 6146's in parallel, bridge neutralized. Unwanted sideband and carrier suppression is 60 db or better! Exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech power—high gain push-to-talk audio system has plenty of reserve gain for either crystal or dynamic microphones. VOX and anti-trip circuits are extremely smooth in operation—built-in anti-trip matching transformer—adjustable VOX time delay circuit. Mixer-type shaped keying is crisp, sharp—click and chirp free. Single knob wide range pilot network output circuit. Fully TVI suppressed. Blocking and operating bias provide noise-free T-R switch operation. Heavy duty power supply is completely self-contained. The "Invader" may also be used as an exciter for the Viking "Courier", "Thunderbolt", or the Viking "Kilowatt". Dimensions: 11 1/2" high x 21" wide x 17 1/2" deep. Compact, heavy duty power supply with swinging choke circuitry gives excellent voltage regulation—supplies all necessary high and low voltages. Power Requirements: 325 watts, 105-125 V AC 2-wire, 50-60 cycle.

**Cat. No. 240-302-2**... Viking "Invader", wired and tested with tubes, crystals, less key and microphone.

### Amateur Net \$619.50

Available completely factory wired and assembled, the "Invader-2000" offers all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Here's desk-top operating convenience unsurpassed by any other high power transmitter... 2000 watts P.E.P. (twice average DC) input on SSB\*, 1000 watts CW, and 800 watts AM input! Final amplifier employs two rugged, high efficiency, low replacement cost type PL-175A pentode tubes in parallel, bridge neutralized... features a ganged tank assembly that provides exceptionally uniform "Q". RF stages are cut off automatically on stand-by and key-up—wide range output circuit (40 to 600 ohms adjustable) will match virtually any antenna system. Push-pull fan assembly draws air through the chassis, effectively cooling components as well as filament and plate seals for extended tube life. Heavy duty, multi-section power supply uses 866A High Voltage Rectifiers. Screen supply employs a 5U4GA rectifier and uses heavy bleeder and high filter capacity for excellent dynamic screen voltage regulation in Class AB2 operation. An OC2 bias regulator provides regulated bias for the two PL-175A final amplifier tubes. Dimensions: 11 1/2" high x 21" wide x 17 1/2" deep. Power Supply: 11 1/4" high x 19 3/4" wide x 14 1/2" deep. Power Requirements: 1600 watts, 105-125 V AC 2-wire; or 210-250 V AC 3-wire, 50-60 cycle.

**Cat. No. 240-304-2**... Viking "Invader-2000" wired and tested with remote power supply, tubes, crystals, less key and microphone.

### Amateur Net \$1229.00

**VIKING "INVADER" HI-POWER CONVERSION**—Take the features and performance of your Viking "Invader"... add the power and flexibility of the unique Viking "Hi-Power Conversion" system... and you're "on the air" with the "Invader-2000"—a solid 2000 watts P.E.P. (twice average DC) input\* SSB, 1000 watts CW and 800 watts input on AM! Completely wired and tested—includes power supply, new front overlay panel, extra knobs, additional meter, necessary tubes—everything you need to convert your "Invader" into the power-packed "Invader-2000". All you need is a small wrench and a screwdriver—no soldering necessary—complete the entire conversion in just one evening!

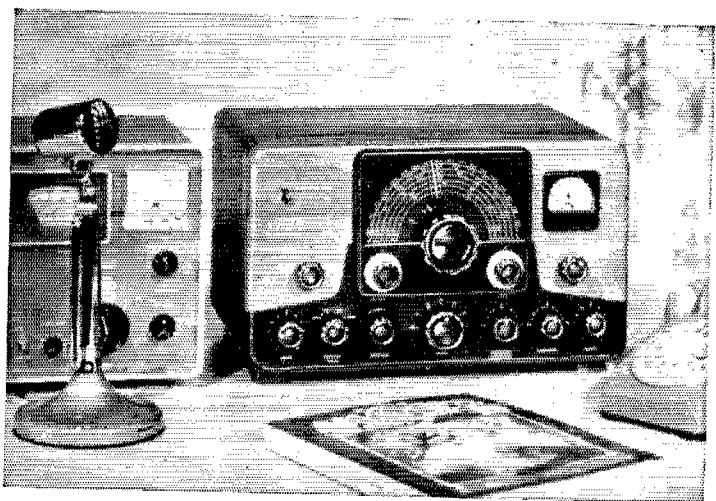
**Cat. No. 240-303-2**... Hi-Power Conversion, complete  
**Amateur Net \$619.50**  
 ANTICIPATED DELIVERY—LATE FALL



# Viking

FIRST CHOICE AMONG  
 THE NATION'S  
 AMATEURS

**E. F. JOHNSON COMPANY • WASECA, MINNESOTA**



### "RANGER" TRANSMITTER/EXCITER

This popular, superbly engineered transmitter also serves as an RF/ audio exciter for high power equipment. 75 watts CW or 65 watts phone input. Built-in VFO or crystal control—instant bandswitching 160 through 10. 6146 final amplifier. Wide range pi-network coupling system will match antenna loads from 50 to 500 ohms—tunes out large amounts of reactance. Timed sequence keying. TVI suppressed. With tubes, less crystals.

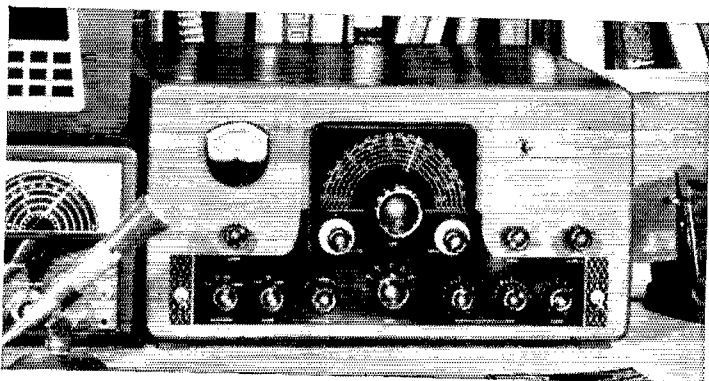
Cat. No. Amateur Net  
 240-161-1...Kit.....\$229.50  
 240-161-2...Wired and tested...\$329.50

## No matter what you expect from a transmitter...

### "VALIANT" TRANSMITTER

Here's effective power, wide flexibility, and many unique operating features combined in a compact desk-top transmitter! 275 watts input CW and SSB (P. E. P. with auxiliary SSB exciter) and 200 watts phone. Bandswitching 160 through 10. Built-in VFO or crystal control. Final amplifier utilizes three 6146 tubes in parallel—wide range pi-network output. With tubes, less crystals.

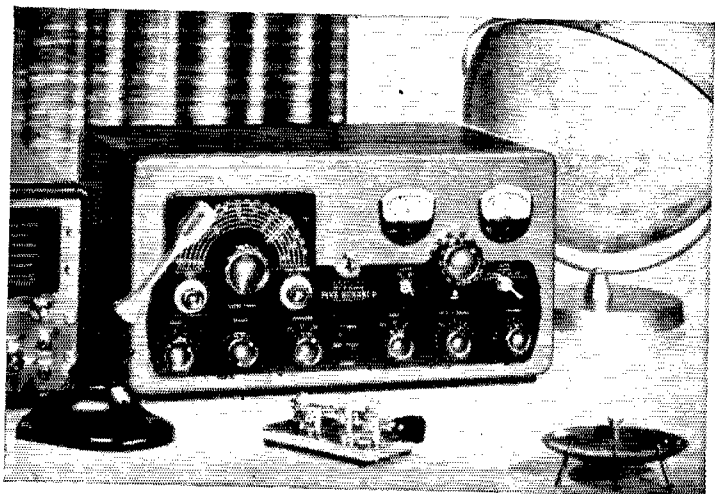
Cat. No. Amateur Net  
 240-104-1...Kit.....\$349.50  
 240-104-2...Wired and tested...\$439.50



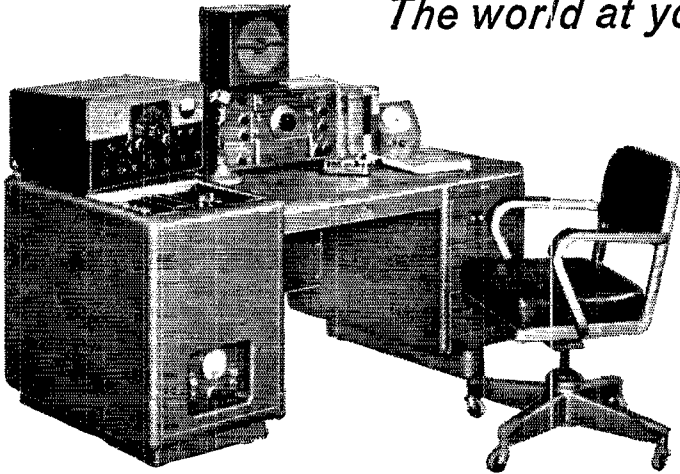
### "FIVE HUNDRED" TRANSMITTER

More than one-half kilowatt of power plus outstanding operating convenience! 600 watts CW input ... 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meters! All exciter stages ganged to VFO tuning. High gain push-to-talk audio system. Built-in VFO or crystal control—VFO is temperature compensated, highly stable. Wide range pi-network output. Low level audio clipping—effectively TVI suppressed. With tubes, less crystals.

Cat. No. Amateur Net  
 240-500-1...Kit.....\$749.50  
 240-500-2...Wired.....\$949.50



*The world at your finger tips!*



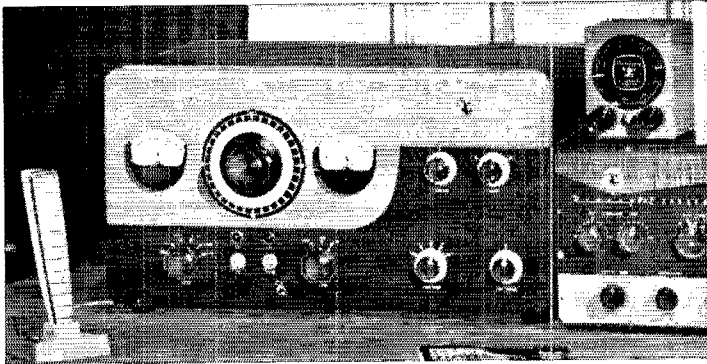
**VIKING "KILOWATT" AMPLIFIER**

This exciting unit is the only power amplifier available which will deliver full 2000 watts SSB\* input, and 1000 watt CW and plate modulated AM! Class C final amplifier operation provides plate circuit efficiencies in excess of 70%. Continuous coverage 3.5 to 30 mcs. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No. **Amateur Net**  
 240-1000... Wired and Tested. \$1595.00  
 251-101-1... Matching desk top, back and 3  
 drawer pedestal, FOB Corry, Pa. . . \$132.00

\*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of two times average or more, depending upon individual voice characteristics.

you'll get more with a **VIKING!**



**"6N2" THUNDERBOLT POWER AMPLIFIER**

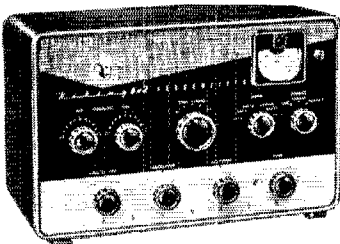
Rated at a solid 1200 watts P.E.P.\* input SSB and DSB, Class AB<sub>1</sub>; 1000 watts CW input, Class C; and 700 watts input AM linear, Class AB<sub>1</sub>—with continuous bandswitched coverage on 6 and 2 meters. Wide range pi network output—effectively TVI suppressed—outstanding efficiency! Drive requirements: 5 watts in Class AB<sub>1</sub> linear, or 6 watts Class C continuous wave. Completely self-contained. With tubes.

Cat. No. **Amateur Net**  
 240-362-1... Kit..... \$524.50  
 240-362-2... Wired..... 589.50

**"6N2" TRANSMITTER**

A compact VHF transmitter with instant bandswitching coverage of both 6 and 2 meters. Power input: 150 watts CW; 100 watts AM phone. Completely shielded and TVI suppressed. External VFO or crystal control—may be used with Viking "Ranger," Viking 1, "Valiant," or similar power supply-modulator combinations. With tubes, less crystals.

Cat. No. **Amateur Net**  
 240-201-1... Kit..... \$129.50  
 240-201-2... Wired..... 169.60



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Your complete guide to amateur radios' most popular equipment. Includes details and schematics on all Johnson transmitters and amplifiers, as well as specifications on the complete line of station accessories, keys and practice sets, and antennas. Write for your free copy today!

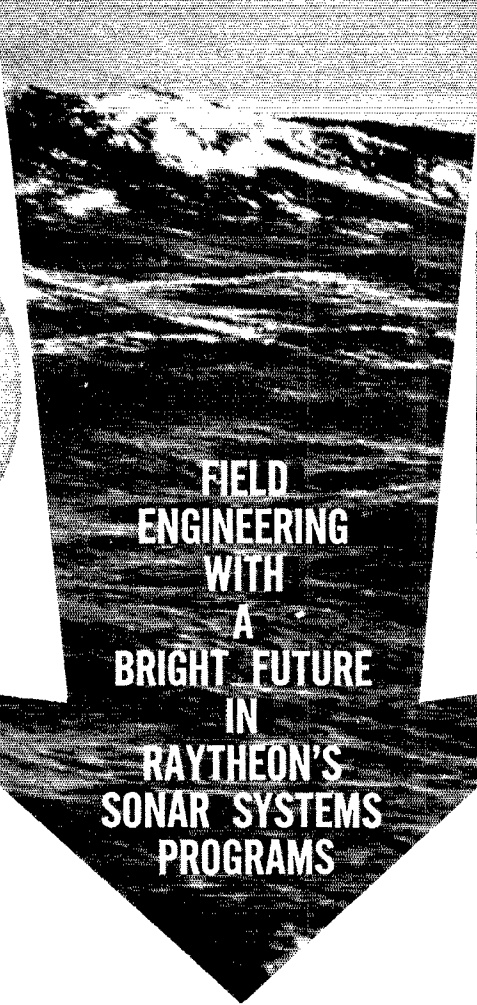
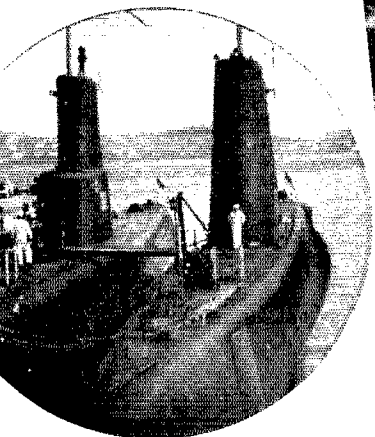


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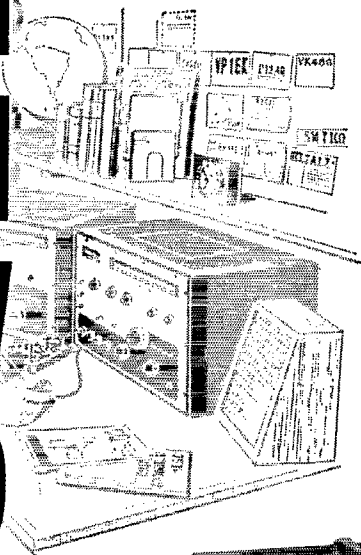
**FIELD  
ENGINEERING  
WITH  
A  
BRIGHT FUTURE  
IN  
RAYTHEON'S  
SONAR SYSTEMS  
PROGRAMS**

■ Some of the newest and most challenging field engineering programs are under way at Raytheon in the sonar field. ■ Just completed was a seven week technical evaluation trip in Bermuda waters where the newest underwater communications system developed by Raytheon was tested. These tests proved very successful. ■ Among the Raytheon field engineering group assisting on this trip aboard the submarines were three "Radio Hams". They were A. C. 'Doc' Aulwurm, K1LXZ; Claude Stogsdill, K1NXS; and Milton Levy, K1KIT, shown in photo above in conference with Ed Dodge, W1CMU. ■ Ham radio electronic experience has helped many engineers advance within the Company. ■ You may qualify as a Raytheon field engineer if you have previous experience plus an E.E. degree or the equivalent in practical experience with guided missiles, fire control, ground and bombing radar or sonar. ■ Benefits include attractive salary, assistance in relocating, insurance, and the opportunity of participating in educational programs. For details, please contact Ronald Guittarr.

**Electronic Services Division  
Raytheon Company  
2nd & South Avenues,  
Northwest Industrial Park  
Burlington, Massachusetts**



# FROM HEATH ... 9 NEW RADIO AMATEUR KITS



GC-1  
**\$10995**  
\$11.00 dn.,  
\$10.00 mo.



## TEN-TRANSISTOR "MOHICAN" GENERAL COVERAGE RECEIVER KIT (GC-1)

An excellent portable or fixed station receiver! Many firsts in receiver design for outstanding performance . . . ten transistor circuit . . . flashlight battery power supply . . . ceramic IF transfilters. The amazing, miniature transfilters used in the GC-1 replace transformer, inductive and capacitive elements used in conventional circuits; offer superior time and temperature stability, never need alignment and provide excellent selectivity. Other features include telescoping 54" whip antenna, flywheel tuning, tuning meter, large slide-rule dial and attractive, rugged steel case in gray and gray-green. Covers 550 kc to 30 mc in five bands. Electrical bandspread on five additional bands cover amateur frequencies from 80 through 10 meters. Operates up to 400 hours on 8 standard size "C" batteries. Sensitivity: is 10 uv, broadcast band; 2 uv, amateur bands for 10 db signal to noise ratio. Selectivity: 3 kc wide at 6 db down. Measures only 6½" x 12" x 10". 20 lbs.

**Heathkit XP-2:** plug-in power supply for 110 VAC operation of GC-1. (optional extra), 2 lbs. **\$9.95**



## 100 KC CRYSTAL CALIBRATOR KIT (HD-20)

Align or check calibration of your communications gear with this versatile ham aid. Provides marker frequencies every 100 kc between 100 kc and 54 mc. Transistor circuit is battery powered for complete portability. Accuracy is assured by .005% crystal furnished. Measures only 2½" x 4½" x 2⅝". 1 lb.

HD-20  
**\$1495**

7 more kits on following pages

# HEATHKIT® . . . WORLD'S FINEST HAM GEAR



KL-1  
\$399<sup>95</sup>

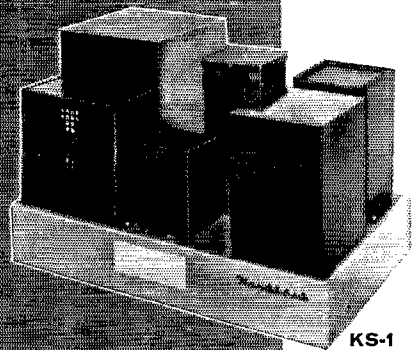
\$40.00 dn.  
(Write for time  
payment details)

## "CHIPPEWA" KILOWATT LINEAR AMPLIFIER KIT (KL-1)

Here is a top-quality kilowatt rig with all the features you've been looking for. Operates at maximum legal power input on all bands between 80 and 10 meters, in SSB, CW or AM linear operation. Premium tubes (4-400A's), forced air cooled with centrifugal blower. Grid neutralized, continuous plate current monitoring, extensive TVI shielding. Features both tuned and swamped grid circuits to accommodate all popular exciters. Operates class AB1 for SSB and AM linear service and high efficiency class C for CW service. Convenient panel controls include power switch, tune-operate switch, HV on/off switch, final bandswitch, meter switch, grid bandswitch, grid tuning, mode switch, plate tuning, plate loading and bias adjust. Accessory connectors are provided on the rear apron of the chassis for complete compatibility with all control circuitry in the Heathkit "Apache" Transmitter. Two meters provided; one monitors final plate current; the other indicates switch selected readings of final grid current, screen current, and plate voltages. Send for complete specifications now. 70 lbs.

## A PERFECT COMPANION FOR THE "CHIPPEWA" KILOWATT POWER SUPPLY KIT (KS-1)

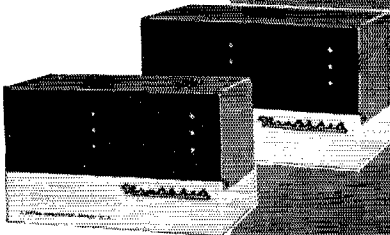
Ruggedly constructed for heavy-duty use in medium to high power installations, the KS-1 fills the requirements of a top-notch power supply with economy and safety. Features an oil-filled hermetically sealed plate transformer, "potted" swinging choke input filter and 60-second time delay relay. Line filters minimize RF radiation. Maximum DC power output is 1500 watts. Nominal voltage output, 3000 or 1500 volts. DC current output, average 500 ma, maximum 1000 ma. Control circuitry is arranged to allow remote installation. The KS-1 employs two 866A half-wave mercury vapor rectifiers in a full-wave, single-phase configuration. Power requirements: 115 V, 50/60 cycles, 20 amperes; 230 V, 50/60 cycles, 10 amperes. 105 lbs.



KS-1  
\$169<sup>95</sup>

\$17.00 dn.,  
\$15.00 mo.

XC-6  
\$26<sup>95</sup>



XC-2  
\$36<sup>95</sup>

## 6-METER CONVERTER KIT (XC-6)

Extends frequency coverage of the Heathkit "Mohawk" and most other general coverage receivers into the 6 meter band. Converts 50-54 mc signals to 22-26 mc. 3-tube circuit provides two RF stages and low-noise triode mixer. Calibration accuracy assured by .005% overtone crystal supplied. Provision for external RF gain control. 6 lbs.

## 2-METER CONVERTER KIT (XC-2)

This top-quality 2-meter converter may be used with receivers tuning any 4 mc segment between the frequencies of 22 and 35 mc when appropriate crystal is used. Converts 144-148 mc signals to 22-26 mc with .005% overtone crystal supplied. High quality parts used throughout. Silver plated chassis and shields. 7 lbs.

# IN KIT FORM TOPS IN TRANSMITTING POWER

## TWO BRAND NEW MODELS HEATHKIT 10 & 6 METER TRANSCEIVER KITS

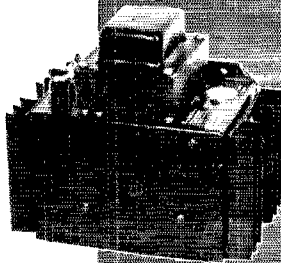
Complete ham facilities at low cost! The new Heathkit transceivers are combination transmitters designed for crystal control and variable tuned receivers operating on the 6 and 10 meter amateur bands (50 to 54 mc HW-29 and 28 to 29.7 mc for HW-19) in either fixed or mobile installations. Highly sensitive superregenerative receivers pull in signals as low as 1 microvolt; low power output is more than adequate for "local" net operation. Other features include: built-in RF trap on 10 meter version to minimize TVI; adjustable link coupling on 6 meter version; built-in amplifier metering jack and "press-to-talk" switch with "transmit" and "hold" positions. Can be used in ham shack or as compact mobile rigs. Not for Citizen's Band use. Microphone and two power cables included. Handsomely styled in mocha and beige. Less crystal. 10 lbs.

**VIBRATOR POWER SUPPLIES:** VP-1-6 (6 volt), VP-1-12 (12 volt), 4 lbs. Kit; \$8.95 each, wired; \$12.95 each.



HW-19 (10 meter)  
HW-29 (6 meter)

**\$39.95** each



HP-10  
**\$44.95**

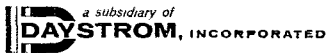
## NEW! IMPROVED DESIGN TRANSISTOR MOBILE POWER SUPPLY (HP-10)

Brand new power supply for mobile gear; features all-transistor circuit, instant starting, high efficiency, rugged construction. Operates from 11 to 15 VDC input; at 12 VDC, provides 600 VDC @ 200 ma, or 600 VDC @ 150 ma & 300 VDC @ 100 ma simultaneously, at 120 watts. Negative 150 volts @ 30 ma also provided. Max. ambient temp., 150 @ 120 watts ICAS. Input current requirements: 2 amps, idling; 13 amps, full output. Includes heavy filtering of input and output leads, remote relay control of primary power, silicon rectifiers, and extruded aluminum heat sinks for efficient cooling of power transistors. Measures 8" x 7 1/4" x 6 1/4". 10 lbs.

## ORDER DIRECT BY MAIL OR SEE YOUR HEATHKIT DEALER\*

\*The convenience of Local Heathkit Sales and Service costs but a few dollars more.

## HEATH COMPANY



Benton Harbor 3, Michigan

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only. Dealer and export prices slightly higher.



## FREE CATALOG!

Describes over 150 easy-to-build electronic kits in HI-FI, Test, Marine, and Ham radio fields. To get yours, fill in this coupon and mail today!

ITEM	MODEL	PRICE

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

## AN APPEAL TO INTELLIGENCE

A product that is consistently advertised in *QST* month after month, year after year, has to be good. Over 10,000 GOTHAM antennas have been purchased by *QST* readers. Even the "price-is-no-object" customers choose GOTHAM antennas on the basis of performance and value. Select your needs from this list of 50 antennas:

**Airmail Order Today—We Ship Tomorrow**

**GOTHAM** Dept. QST  
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

### TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

6-10 TWO BANDER.....	<input type="checkbox"/>	\$29.95
10-15 TWO BANDER.....	<input type="checkbox"/>	34.95
10-20 TWO BANDER.....	<input type="checkbox"/>	36.95
15-20 TWO BANDER.....	<input type="checkbox"/>	38.95

### TRIBANDER

Do not confuse these full-size Tribander beams with so-called midgers. The Tribander has individually fed (52 or 72 ohm coax) elements and is broad banded. It does not have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multiband and get gain is to use a Gotham Tribander Beam.

<input type="checkbox"/> 6-10-15	\$39.95	<input type="checkbox"/> 10-15-20	\$49.95
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### 2 METER BEAMS

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

<input type="checkbox"/> Deluxe 6-Element	9.95	<input type="checkbox"/> 12-El	16.95
---	------	--------------------------------	-------

### 6 METER BEAMS

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

<input type="checkbox"/> Std. 3-El Gamma match	12.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 3-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Std. 4-El Gamma match	16.95	<input type="checkbox"/> T match	19.95
<input type="checkbox"/> Deluxe 4-El Gamma match	25.95	<input type="checkbox"/> T match	28.95

### 10 METER BEAMS

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

<input type="checkbox"/> Std. 2-El Gamma match	11.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 2-El Gamma match	18.95	<input type="checkbox"/> T match	21.95
<input type="checkbox"/> Std. 3-El Gamma match	16.95	<input type="checkbox"/> T match	18.95
<input type="checkbox"/> Deluxe 3-El Gamma match	22.95	<input type="checkbox"/> T match	25.95
<input type="checkbox"/> Std. 4-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Deluxe 4-El Gamma match	27.95	<input type="checkbox"/> T match	30.95

**CITIZENS BAND ANTENNAS** • Any of our ten meter beams or the V40 vertical is perfect for the CB operator.

# FREE GIANT 1960 CATALOG

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

## New! Ruggedized 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- Beam #R6 (6 Meters, 4-El) . . . \$38.95
- Beam #R10 (10 Meters, 4-El) . . . 40.95
- Beam #R15 (15 Meters, 3-El) . . . 49.95



### 15 METER BEAMS

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

- |  |       |                                  |       |
|--|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 2-El Gamma match   | 19.95 | <input type="checkbox"/> T match | 22.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 29.95 | <input type="checkbox"/> T match | 32.95 |
| <input type="checkbox"/> Std. 3-El Gamma match   | 26.95 | <input type="checkbox"/> T match | 29.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 36.95 | <input type="checkbox"/> T match | 39.95 |

### 20 METER BEAMS

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

- |  |       |                                  |       |
|--|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 2-El Gamma match   | 21.95 | <input type="checkbox"/> T match | 24.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 31.95 | <input type="checkbox"/> T match | 34.95 |
| <input type="checkbox"/> Std. 3-El Gamma match   | 34.95 | <input type="checkbox"/> T match | 37.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 46.95 | <input type="checkbox"/> T match | 49.95 |

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

## 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, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antennal

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,  
Thomas G. Gabbert, K6INI (Ex-TI2TG)



# FACTS

## ON THE GOTHAM

### V-80 VERTICAL ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Withstands 75 mph wind-storms.
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and 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.**

73,  
GOTHAM



YOU COULD  
WORK  
WONDERS WITH  
A  
GOTHAM  
VERTICAL  
ANTENNA!

### FILL IN AND SEND TODAY!

*Airmail Order Today — We Ship Tomorrow*

**GOTHAM** Dept. QST  
1805 PURDY AVE., MIAMI BEACH, FLA.  
Enclosed find check or money-order for:

- V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... \$14.95
- V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95
- V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

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

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

A decorative border surrounds the text, consisting of a top row of seven circular icons, a vertical column of ten circular icons on the left side, and a bottom row of seven circular icons. Each icon depicts a small, rectangular, wire-mounted crystal unit.

# WHERE TIME AND DEPENDABILITY COUNT IN COMMUNICATIONS . . .

INTERNATIONAL'S \*ONE DAY CRYSTAL PROCESSING  
SERVICE AVAILABLE WORLD WIDE

**AMATEURS • EXPERIMENTERS • COMMERCIAL**

**AMATEUR CRYSTALS** (FA-5, FA-9 spot frequencies 1000 KC to 137 MC .01% Tolerance.

Wire mounted, plated crystals for use by amateurs and experimenters, where tolerances of .01% are permissible and wide-range temperatures are not encountered.

Designed to operate into a load capacitance of 32 mmf on the fundamental between 1000 KC and 15 MC. Designed to operate anti-resonance on 3rd overtone modes into grid circuit without additional capacitance load. Fifth overtone crystals and seventh overtone crystals are designed to operate at series resonance. (Write for recommended circuits.)

**Custom made COMMERCIAL CRYSTALS 70 KC to 100 MC**

Wire mounted, plated crystals, for use in commercial equipment (Type F-6) where close tolerances must be observed. All units are calibrated for the specific load presented by equipment.

Circuit: As specified by customer. Crystals are available for all major two-way equipment and in most cases the necessary correlation data is on file.

Prices on request.

How To Order: For fastest service, our crystals are sold direct. Terms F.O.B. Oklahoma City.

*\*One Day Processing . . . Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday through Thursday will be shipped the day following. Orders received on Friday will be shipped the following Monday.*

*Now* IN ONLY MINUTES **CONVERT YOUR CAR RADIO**  
FOR SHORT WAVE RECEPTION WITH A **MOBILETTE**



International's **NEW** all transistor, **Crystal Controlled Converter**.

- Easy to Install. • Works on 6 or 12 volts without change.
- Power connector plugs into cigarette lighter socket. (No external power supply needed.)

Designed by International for Amateurs, Citizens Licensees, Short Wave Listeners, Hobbyist.

Available in Seven frequency ranges covering the Amateur bands, 75 through 10 meters, the Citizens band, and WWV National Bureau of Standards Time Broadcasts.

Three simple steps to install (1) Remove antenna lead from car radio and plug into input of Mobilette. (2) Plug jumper wire from Mobilette into antenna connection of car radio. (3) Plug power connector into cigarette lighter socket. Mobilette normally wired for negative ground battery system. When ordering positive ground, add Suffix "P" to catalog number.

International Mobilettes cover these short wave bands.

Catalog No.	Frequency	Catalog No.	Frequency
630 - 105.....	75 meters (Amateur)	630 - 102.....	15 meters (Amateur)
630 - 104.....	40 meters (Amateur)	630 - 101.....	11 meters (Citizens)
630 - 106.....	10 MC (WWV Time)	630 - 100.....	10 meters (Amateur)
630 - 103.....	20 meters (Amateur)		28.5 - 29.5 MC

Available soon for 6 and 2 meters at slightly higher price.

**INTERNATIONAL**  
CRYSTAL MANUFACTURING CO., INC.

18 NORTH LEE • OKLAHOMA CITY, OKLA.



Complete, ready to  
plug in and operate  
... only \$19.95

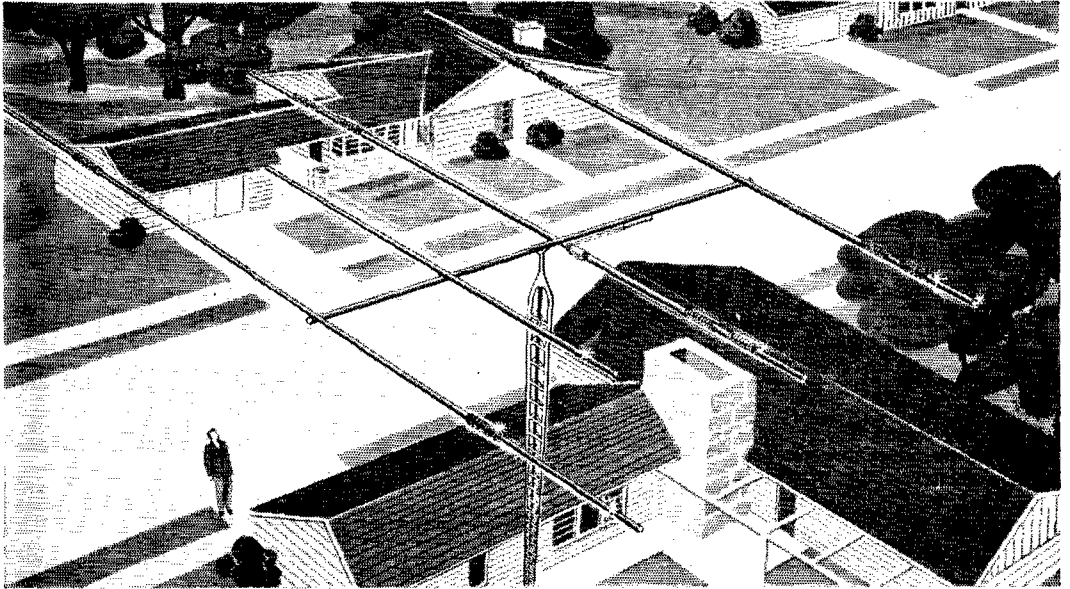
Order direct from International. Terms F. O. B. Okla. City. Include postage. Shipping weight 2 lbs.

Send for **FREE** Catalog covering International's complete line of Crystals and Equipment.

# Have You Seen the THUNDERBIRD Fly?

Have you seen it reaching skyward for those whispered signals from around the world, its graceful arms of bright finished aluminum defying storm and snow and hail and heat? Have you seen its clean and sturdy silhouette graced with the slender slimline traps of sky-blue plastic . . . rugged, lightweight, handsome?

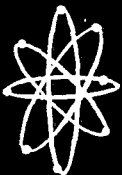
If you have you know that beneath its shadow lives a man who believes in beauty . . . a man who knows that the Thunderbird goes up easily, stately, and stands there always . . . a man who knows what he wants.



*All aluminum construction. Boom: 2" OD, 16 ft. long, 1 1/2" telescoping to 3/4" elements, longest element 32 ft. Cycloc and Propylene plastic cappings and slimline traps. All steel iridite treated to military specifications. Interlaced fourth element. Weight 38 lbs. Model TH-4, \$117.50.*

**LET THE THUNDERBIRD FLY YOUR WAY!**

**WE CARRY IN STOCK THE COMPLETE LINE OF HY-GAIN ANTENNA PRODUCTS**



# E

**ELECTRONIC SUPPLY**

61 N.E. 9th STREET • MIAMI 32, FLA. • Phone Franklin 7-2511

**ELECTRONIC SUPPLY**

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**ELECTRONIC WHOLESALERS, INC.**

2345 SHERMAN AVE. N.W. • WASHINGTON 1, D.C. • Phone HUDSON 3-5200

# Have You Heard the THUNDERBIRD Roar?

Have you heard the bands when they're cluttered with calls, when suddenly one clean, crisp and mighty signal comes through with perfect intelligibility?

If you have you know that behind that signal, there lives a man who flies the Thunderbird . . . a man who believes in important features of careful design, in proper matching and full sized construction . . . a man who wishes his antenna system designed with integrity and honest understanding . . . a man who knows what he wants.

**Dear Sir:**  
 I usually spend a month or two testing an antenna out the results in the last three days have been so conclusive that I thought I'd tell you about them signed with K9KEH a couple more were causing me to give me a report. I went to the enclosed copy of my log what tells the story. On Saturday night when I called QSO and again after signing with him there were stations calling me one after another. I had taken with QSO the night before on 70 testing only this time they were all from Europe. As you can see from the log it was his new tri band used and then he calls me on 15 with the report that I'm blocking his receiver I have that recorded to prove it (I). Invariably the Europeans would report that 70's don't usually come in at this time but I sure was. The reports were for themselves for an antenna only 35 feet off the ground. The reports were for themselves for an antenna only 35 feet off the ground. The reports were for themselves for an antenna only 35 feet off the ground. The reports were for themselves for an antenna only 35 feet off the ground.

**New 4x Gain Thunderbird Tri-Bander**

Freq	Call	Time	Bandwidth	Signal	Remarks
2470	550U	1412	58	59	14203 AM 4015
2480	CA30V	1412	58	59	14203 AM 4015
2490	GB30V	1412	58	59	14203 AM 4015
2500	CO81	1418	58	59	14203 AM 4015
2510	7016	1418	58	59	14203 AM 4015
2525	7016	1418	58	59	14203 AM 4015
4440	OP	2124	59	59	21253 P 700 10 30
4455	X	2124	59	59	21253 P 700 10 30
4465	X	2124	59	59	21253 P 700 10 30
4475	X	2124	59	59	21253 P 700 10 30
4485	X	2124	59	59	21253 P 700 10 30
4495	X	2124	59	59	21253 P 700 10 30
4505	X	2124	59	59	21253 P 700 10 30
4515	X	2124	59	59	21253 P 700 10 30
4525	X	2124	59	59	21253 P 700 10 30
4535	X	2124	59	59	21253 P 700 10 30
4545	X	2124	59	59	21253 P 700 10 30
4555	X	2124	59	59	21253 P 700 10 30
4565	X	2124	59	59	21253 P 700 10 30
4575	X	2124	59	59	21253 P 700 10 30
4585	X	2124	59	59	21253 P 700 10 30
4595	X	2124	59	59	21253 P 700 10 30
4605	X	2124	59	59	21253 P 700 10 30
4615	X	2124	59	59	21253 P 700 10 30
4625	X	2124	59	59	21253 P 700 10 30
4635	X	2124	59	59	21253 P 700 10 30
4645	X	2124	59	59	21253 P 700 10 30
4655	X	2124	59	59	21253 P 700 10 30
4665	X	2124	59	59	21253 P 700 10 30
4675	X	2124	59	59	21253 P 700 10 30
4685	X	2124	59	59	21253 P 700 10 30
4695	X	2124	59	59	21253 P 700 10 30
4705	X	2124	59	59	21253 P 700 10 30
4715	X	2124	59	59	21253 P 700 10 30
4725	X	2124	59	59	21253 P 700 10 30
4735	X	2124	59	59	21253 P 700 10 30
4745	X	2124	59	59	21253 P 700 10 30
4755	X	2124	59	59	21253 P 700 10 30
4765	X	2124	59	59	21253 P 700 10 30
4775	X	2124	59	59	21253 P 700 10 30
4785	X	2124	59	59	21253 P 700 10 30
4795	X	2124	59	59	21253 P 700 10 30
4805	X	2124	59	59	21253 P 700 10 30
4815	X	2124	59	59	21253 P 700 10 30
4825	X	2124	59	59	21253 P 700 10 30
4835	X	2124	59	59	21253 P 700 10 30
4845	X	2124	59	59	21253 P 700 10 30
4855	X	2124	59	59	21253 P 700 10 30
4865	X	2124	59	59	21253 P 700 10 30
4875	X	2124	59	59	21253 P 700 10 30
4885	X	2124	59	59	21253 P 700 10 30
4895	X	2124	59	59	21253 P 700 10 30
4905	X	2124	59	59	21253 P 700 10 30
4915	X	2124	59	59	21253 P 700 10 30
4925	X	2124	59	59	21253 P 700 10 30
4935	X	2124	59	59	21253 P 700 10 30
4945	X	2124	59	59	21253 P 700 10 30
4955	X	2124	59	59	21253 P 700 10 30
4965	X	2124	59	59	21253 P 700 10 30
4975	X	2124	59	59	21253 P 700 10 30
4985	X	2124	59	59	21253 P 700 10 30
4995	X	2124	59	59	21253 P 700 10 30
5005	X	2124	59	59	21253 P 700 10 30
5015	X	2124	59	59	21253 P 700 10 30
5025	X	2124	59	59	21253 P 700 10 30
5035	X	2124	59	59	21253 P 700 10 30
5045	X	2124	59	59	21253 P 700 10 30
5055	X	2124	59	59	21253 P 700 10 30
5065	X	2124	59	59	21253 P 700 10 30
5075	X	2124	59	59	21253 P 700 10 30
5085	X	2124	59	59	21253 P 700 10 30
5095	X	2124	59	59	21253 P 700 10 30
5105	X	2124	59	59	21253 P 700 10 30
5115	X	2124	59	59	21253 P 700 10 30
5125	X	2124	59	59	21253 P 700 10 30
5135	X	2124	59	59	21253 P 700 10 30
5145	X	2124	59	59	21253 P 700 10 30
5155	X	2124	59	59	21253 P 700 10 30
5165	X	2124	59	59	21253 P 700 10 30
5175	X	2124	59	59	21253 P 700 10 30
5185	X	2124	59	59	21253 P 700 10 30
5195	X	2124	59	59	21253 P 700 10 30
5205	X	2124	59	59	21253 P 700 10 30

My Cash Corporate  
 1142 North Third Street  
 Lincoln, Nebraska

Installation of my 4x Gain Thunderbird antenna Model TH-4 at my residence, 1142 North Third Street, Lincoln, Nebraska on May 1960.

The Thunderbird is coupled to a Collins KVM-10B antenna in 28 Ohm impedance. The antenna is mounted in an open area in front of my house.

In one week of operation there have been 25 QSO contacts in 28 Ohm impedance. The antenna is mounted in an open area in front of my house.

My May 1960 the antenna was installed by me in my residence. The antenna was installed by me in my residence. The antenna was installed by me in my residence.

My May 1960 the antenna was installed by me in my residence. The antenna was installed by me in my residence. The antenna was installed by me in my residence.

**SOUTH MIAMI RADIO CLUB INC**

Dear Sirs,

I recently installed one of your new 4x Gain Thunderbird Tri-Bander Model No. TH-4 antenna. Two hours after I took the parts from the box, the Thunderbird was permanently mounted atop my 40 foot tower. The instructions were complete and I experienced no difficulty in assembling it.

The performance of the antenna actually exceeded my specifications with whether the antenna could take the full gallon of my Johnson EW so I loaded it up first just using low power. When I put the full EW on the SWR didn't change and the reports I got were fantastic I operate on 40, 80 and CW on all three bands so I chose the present settings for AM. I was amazed to find that the SWR remained less than 2 to 1 even at the low end of the 2x bands.

The Thunderbird is certainly radiating all the RF my transmitter can to offer union is experienced by the lack of TVI even on 15 meters without using any low pass filter.

Congratulations on the wonderful 38 pound beauty sitting on top of my tower as I sincerely feel I have the ultimate in tri-banders.

John F. Johnson  
 South Miami

Power rating 1000w AM, 2000w SSB (PEP). SWR less than 1.5-1 on all bands with exceptional bandwidth. Forward gain and front-to-back ratio are maximum attainable under conditions of proper matching and full size construction. Guaranteed for one year. Model TH-4, \$117.50

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SEE ELECTRONIC SUPPLY FOR A COPY OF OUR NEW ILLUSTRATED COMMUNICATIONS ANTENNA CATALOG

## Station Activities

(Continued from page 82)

Jan. 1, '81. W2OF and his XYL have retired and are moving to Ogdensburg. K2JXF is joining the Air Force. Good luck. W2EMW has received WAP CP from the NZART. K2QIW is back on the air in Auburn after a 3-year absence. WA2DAC called on the AREC in Lake Champlain in a search for three lost children. Twenty-one stations responded, including six stations running mobile on the lake. This is a fine record and the fellows in the North Country can be proud of their organization. How would the hams in your area respond in a similar situation? Are you organized? K2MHC moved to Alabama. K2RWT was elected manager of the Noontimers. Judging by the number of Field Day messages received here I think we had a record turnout this year. All stations are reminded that monthly reports should be mailed to me not later than the 4th of each month. Form 1 report cards are available from ARRL upon request. Appointees are reminded that monthly reporting is one of the conditions for appointment. Material for this column should be submitted two months prior to publication date. Club secretaries, please note that your club could be represented here. We are only too glad to publicize any events such as hamfests, picnics, club schools, RACES, AREC, elections and other items of interest. The W.N.Y. section consists of 44 counties. Delaware, Schoharie, Montgomery, Saratoga and Washington are in the section and everything north and west of these counties in New York State is included. Traffic: (June) WA2CIG 1600, W2EZB 586, K2SSX 358, W2RUF 185, K2IYP 116, W2OE 97, K2SIL 77, K2IMK 67, W2FEB 55, K2TDG 47, WA2ALO 39, W2PVI 37, W2RQF 34, K2RWV 34, WA2DSC 31, K2OPV 31, K2RYH 31, K2BBJ 29, K2DWR 20, K2RTQ 18, K2JXF 16, WA2CRH 12, WA2BEX 9, K2-HUK 6, W2TPV 6, K2DXV 5, W2EMW 4, K2RTE 2. (May) K2TDG 11. (Apr.) K2TDG 61.

**WESTERN PENNSYLVANIA**—SCM, Anthony J. Mroczka, W3UHN—SEC, OMA. RMs: KUN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. The PEN meets Mon. through Fri. at 1800 EST on 3850 kc. It is with deep regret that we record the death of LBF. At this writing Field Day is over, with participation at a new high, operating at home is at its lowest, and everyone is taking in the summer hamfests. We would like to thank each and everyone for the fine support they have given the section with reports and also the club secretaries who have been so generous in forwarding their club bulletins. Now with the summer months behind us, let's look forward to a very active fall season. Appointees, don't forget to check your appointment certificates for endorsement and mail your monthly reports in. K3IBA now has his General Class license. The Conemaugh Valley ARC received incorporation papers. BWU is ready to go RTTY on 6 or 2 meters. K3HWL is having rig troubles. K3GHH received his CP-30 sticker. The Steel City ARC reports via *Kilovatt Harmonics* that AFN and NKM built "TO" electronic keys; KWH was official relay station for the c.d. drill called "Operation Prep Pitt III"; YDP is going mobile. The Mon Valley ARC reports via *Parasitic Press* that code practice sessions are held at the club house on Tue. evenings; the club net is held every Sun. at 1300 EST on 3980 kc. The Friendly Amateur Radio Trans. Society held Field Day in W2-Land on Lake Chautauqua. OEZ is back home and on 10 meters. ZUX was rig captain for the Cumberland Valley ARC (K3GFW) Field Day. The Horseshoe RC reports via *Hamateur News* that Field Day was very successful; LIV received an Armed Forces certificate; AUD has a Heath Sixer; K3JCZ worked CO2XZ on 6 meters. The Huntingdon County ARC now is incorporated. The Coke Center RC (NAV) reports that DPY moved to Florida; K3JZD has a new Hornet TB3 Triband beam; K3BTF was appointed county radio c.d. officer; the 10-Meter C.D. Net meets every Sun. at 0800 on 28.640 kc. The Allegheny-Kiski Amateur Radio Assn. Civil Defense Net meets each Tue. at 2000 on 29.360 kc. Traffic: W3WRE 168, MFB 149, K3GHH 108, W3KUN 86, K3HWL 40, W3LSS 35, UGV 11, UHN 10, BWU 5, K3COT 4.

### CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME. SEC: PSP. RM: USR. PAM: RYU. RC of Cook County: HPG. Section net: ILN. 3515 kc. Mon. through Sat. at 1900 CST. Now is the time to make your reservations for the Central Division Convention which will be held in Indianapolis Sept. 10 and 11. It is only a few weeks from this issue and from all reports it should be one of the finest held in this division. K9BHD, K9GDQ, K9KIM, ZIV, K9OCU, LGH, GFF, K9JLR and K9AUB participated in the latest ARRL Frequency Measuring Test. The

ILN handled 193 pieces of traffic in 22 sessions and the North Central Phone Net traffic count was 85 messages. K9BWW was elected president of LARK (Chicago) for the new season. This column extends sympathy to RQY, whose wife and 3-year-old daughter recently were fatally injured in a two-car collision. K9HMY was valedictorian of his high school class. GDI and K9OXW are sporting beam antennas. CNT's new QTH is the Cruiser *Oklahoma City*. GME, K9THD and K9LIW were elected officers of the YLRL (Chicago). They also participated in their first Field Day and chalked up an excellent score. USR, net control of the ILN, requests that more of the Downstate gang check into the net. Those desiring more information can contact her direct. The Midwest V.H.F. Club is giving some FB prizes to the winners of its hidden transmitter hunts and K9ALLI invites participants in the contests. K9RHU is working his net traffic with a new Apache. KCM is visiting his XYL's relatives in Finland. K9KPP is the proud owner of a Valiant transmitter. K9BQW has a new Globe Bander. K9GDQ is patiently awaiting delivery of his 100V. The final reports of the annual Field Day activities have been received and the total scores on the whole are better than last year's. GPI, HPG and PRN, League Officials, have been making most of the hamfests and having eyeball QSOs with the gang in the field. RWC won an HQ-180 at the Mississippi Hamfest. The State C.D. Coordinator at Springfield reports that over 70 different films on civil defense are available through the Film Library for local clubs and other cooperating groups and they may be obtained by addressing Room 107, State Office Bldg. K9JXO is mobile with a Heathkit Sixer and a halo antenna. K9HPC is hammering it in Indiana for the summer. A new net, the Tri-State Traffic and Emergency Net, meets daily on 29.1 Mc. at 2000 CDT, according to NCS K9RHU. Traffic is slow this month and with the break in the weather everyone must be getting their lawns in shape. Traffic: W9DO 540, IDA 527, K9UGY 278, W9MAK 258, USR 241, JXV 109, UQT 99, K9QYV 49, RAS 49, W9SXL 48, K9MMS 38, BIV 36, UGY 21, W9PRN 20, K9GDQ 17, BTE 12, LXG 12, RHU 11, OCU 10, MLI 2, QPJ 2.

**INDIANA**—SCM, Clifford M. Singer, W9SWD—Asst. SCM, Arthur G. Evans, 9TQC. SEC: SNQ. PAMs: K9AOM, BKJ, RVM and UKX. RMs: DGA, JOZ, TT and VAY. Net skeds: IFN 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.) 1900 daily on 3920 kc.; QIN 1900 daily and RFN 0700 Sun. on 3656 kc.; QIN (training) 1800 M-W-F on 3745 kc.; CAEN (160 meters) M-F at 1900 on 1805 kc. New appointments: KL7CA/9 as EC for Clark County and OLS AS EC for Montgomery County. OESS are K9UOF, RTH and K9UBK. CDW is OO Class 1 and 11. A V.H.F. Roundup was held at Jasper Pulaski Preserve with 100 present. K9KGT took first place in the transmitter hunt. All activity points to Indianapolis on Sept. 10 and 11. Hope you have set aside these dates and will be present at the Central Division ARRL Convention. MHP worked K8AXU on 220 meters. New officers of the Hancock County ARC are YWE, K9LAV, K9TTL, K9HKV and K9SSI. Trustee is DZC. KN9WJR is on 2 meters. OM K9SWN, XYL K9SNL and YL K9SNM are building a homebrew rig for 6 meters. Thirty-one Field Day messages were received by the SCM. DIR has received a B.S. degree from the U. S. Air Force Academy and was commissioned a second lieutenant. UWU has received a bachelor's degree in electrical science and engineering from the Massachusetts Inst. of Tech. APO has a new V-100. ZSS is the proud owner of a 2-A Drake receiver. When the town of Markle was threatened with complete devastation by fire K9WIA sent the alarm for fire fighting units and was answered by HUF, who phoned long distance for assistance and K9LXD, who alerted the State Police for additional help. This action, emphasizes that *amateur radio exists as a hobby because of the service it renders*. June net reports: IFN, reported by RVM, at 370; ISN total was 147, reports K9AOM; VAY reports QIN total at 298; RFN was 123, reports TT. CAEN and QIN (training) were not reported. Those making BPL are DGA and TT. Traffic: (June) W9PT 533, ZYK 368, DGA 191, GJS 176, FJR 133, HDG 90, SWD 84, RTH 70, NZZ 69, RVM 61, K9UBK 51, AOM 46, W9EQG 45, K9LXD 45, GBB 39, W9MKE 39, BKJ 24, SNQ 33, EJV 36, GFA 31, K9UOF 28, W9CQ 24, CC 23, DOK 23, FWH 23, K9BSU 19, W9YX 18, K9IHG 16, AVO/9 14, W9HUF 14, K9LPH 13, W9RDP 11, K9LZJ 11, W9BQC 10, K9GSV 10, HMC 8, W9IMU 7, VQP 7, AB 6, K9CRS 6, W9NTA 5, TQC 4, DZC 3, YVS 3, K9VHF 1. (May) W9GFA 25, MEK 18, BVE 10, TQC 9, K9PUT 6.

(Continued on page 110)

# On the air tonight



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W2RID

# GET THE MOST OUT OF YOUR HAM STATION

**SHORTWAVE PROPAGATION** by Stanley Letnwoil (Radio Frequency & Propagation Mgr.—Radio Free Europe). Of special interest to those concerned with radio communications. This review in QST (May 1960) sums up the book's vital interest to all amateurs:

"... written at just the right level for the amateur interested in ionospheric propagation..... There is... background material—necessary for an understanding of the subject—on the ionosphere, on radio waves, on sunspots and the sunspot cycle, all treated in language that is easy to follow. The section on ionosphere measurements introduces the ideas that are important to the detailed understanding of ionospheric propagation, leading to the use of ionospheric charts and predictions for the determination of maximum usable frequencies and optimum working frequencies. The calculation procedure for distances shorter than the maximum one-hop, generally neglected in amateur literature, is also included.

Of special interest to QST readers are chapters on amateur contributions to knowledge of wave propagation and a forecast—advanced with admitted caution!—of probable amateur-band conditions during the coming sunspot cycle. Throughout the book the reader is introduced to various interesting aspects of propagation: one-way skip, for example, scatter, meteors, auroral effects—all the things that hams continually encounter in everyday operation. It would be hard to find a question about propagation in the 3-30 Mc. region—at least the type of question that an amateur would ask—that isn't covered somewhere in this book, even if only (of necessity) by the statement that the answer hasn't yet been discovered." #231, \$3.90.

**RIDER GLOBAL TIME CONVERSION SIMPLIFIER** by Lt. Col. John G. Daiger (Ret'd). What time is it in Oslo? In New Delhi? In San Francisco? In Rio de Janeiro? No matter where you are located you can tell at a glance what time it is anywhere in the world with the greatest of ease. It lists small towns and large cities around the world; large cities and small towns in the United States. It is color-keyed to tell you immediately the correct day. Corrects for areas that have Daylight Savings Time. Has conversion tables for those who use 24-hour calculated system. Ideal for communications personnel, airlines, banks and travellers. Colorful chart and map and makes it usable to anyone. #238, \$1.

**HOW TO USE GRID-DIP OSCILLATORS** by Rufus P. Turner K6AI. The first book ever devoted entirely to grid-dip oscillators tells you how to construct and use this very versatile instrument with best possible results. It is applicable to all kinds of radio receivers and transmitters, also to television receivers. The grid-dip oscillator is a troubleshooting device—an adjusting device—a frequency measuring device—applicable to circuits and components in circuits—to antennas; also a signal source of variable frequency. #245, \$2.50.

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**WISCONSIN**—SCM, George Woida, W9KQB—SEC: YQH, PAMs: NRP and GFL, RMs: VIK and VHP. New appointees; K9JQA as ORS, QYW as OO Class IV, APB as ORS, K9DTK as OPS, Attention ECs, only 6 Wisconsin ECs submitted their 1959 annual reports, which gave the section a percentage of 18.2, putting us 36th among the 72 ARRL sections. CCO is on active duty with the U. S. Navy installing stations and is due for a Pacific cruise. K9ELT began employment at the oldest radio station in the States, WHA. The Wausau Hamfest had a record attendance of 520. NLJ, on visiting K9PTL, noted a 40-w.p.m. Army code certificate on his wall. FMT results of three Wisconsin OOs show RKP 5 cycles high on 80 meters and 96 cycles low on 40 meters; TKY 31 cycles high on 80 meters and 76 cycles high on 40 meters; K9GDF 267 cycles low on 80 meters and 313 cycles high on 40 meters. RKP, a life member of the Milwaukee Club, was named top ham of that group for 1959. K9RRS is having QSL return troubles on 6 meters. K9LCA has a new Matchbox to further his antenna experiments. The new Apache and antennas have K9CJL active on all bands. OES K9OXY completed his 6- and 2-meter v.f.o. 2MTA/9 is helping the traffic nets while in Milwaukee. Wisconsin OOs K9RZG, K9GDF and RKP sent out 6900 notices. Total traffic reported by 49 Wisconsin operators for the first half of 1960 amounts to 14,242. Eight BPLs have been issued. Six OOs sent out 598 OO notices. Thirty-four clubs have registered with the SCM. Traffic cleared for the first 6 months by the BEN was 2653; by WIN 1519; by WSSN 178; total 4350. Please send your monthly traffic and news reports. This is your column and is only as good as you make it. Traffic: (June) W9DYG 813, CXY 466, K9DTK 32, PDJ 76, W9KQB 75, K9GDF 68, W9VHP 66, W2MTA/9 62, W9NLE 49, K9JQA 31, W9NRP 31, K9ELT 24, W9VIK 23, K9CJL 22, DOL 18, W8CCO 16, SIZ 9, SZR 4, MWQ 2. (May) W9NLE 8.

## DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Harold Wengel, W8HVA—SEC: K8KBV, PAM: K8KJR, RM: KTZ. Reports received for the 75-Meter Phone Net show a total 395 check-ins: 30 highest number, 5 lowest; 59 pieces of formal traffic handled, 31 informals and 7 r-ays. K8ADI is going mobile with an Elmac A54H. K8PVI is working on an all-band mobile. K8KJR recently got a 2nd-class commercial license. Through an error the traffic list for April in the July issue of QST listed K8ITP 5. This should have read K8ITP 65. Sorry, Bertha. K8TTY was missed that time, too. His count was 40. HVA is now on the air with RTTY and having a lot of fun. Traffic: K8ITP 81, MPH 30, W8VCL 12, K8TTY 11, KJR 8, W8BHF 4, K8AJW 3, PVI 3, GRM 2, W8IHM 2.

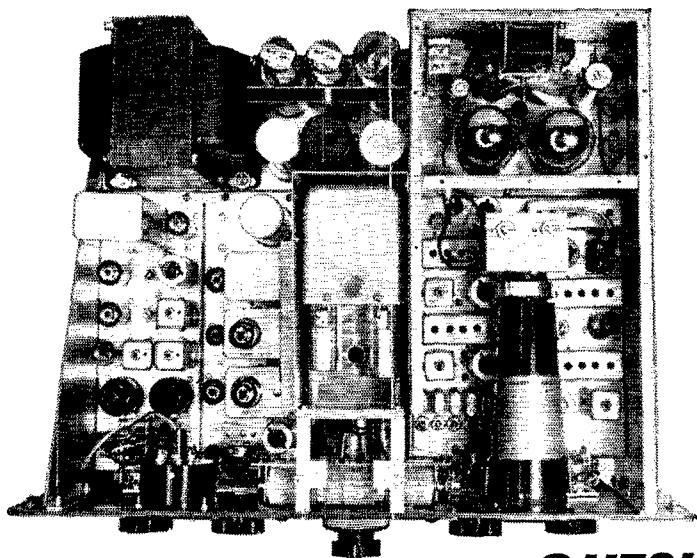
**SOUTH DAKOTA**—SCM, J. W. Sikorski, W8RRN—SEC: SCT, BQH has returned to the air after several years' absence. He's running a Challenger. OJH has moved to Sioux Falls from Minnesota. The Sioux Falls ARC has moved to new quarters in the CAP-C.D. building at the Airbase. The club acquired a new SX-111 in time for Field Day. K8DZG, formerly of Mitchell, has a new jr. operator. KN8WEM passed the General Class exam. New calls (all KNs) are AIT, AJK, AJH, AIQ, BQO, BQS and BQT, all of Redfield; ALT, ALU, BRB, BQX and BQW, of Sioux Falls; and BSW, of Madison. Newly-licensed at Winner is KN8BQQ. He uses a Globe Scout and an NQ-160. BQX is the Rock Island agent in Sioux Falls, and the father of ALT. ADJ is moving to Meade County. Traffic: W8SCT 364, K8BMQ 135, W8DVB 83, ZVL 30, K8DUR 6, W8CTZ 5, OFP 4, K8TVJ 4, AIE 3, W8VVF 3, NNX 2, RWM 2, K8RQY 2, W8SEJ 2, K8VIZ 1.

**MINNESOTA**—SCM, Mrs. Lydia S. Johnson, W8KJZ—Asst. SCM: Rollie O. Hall, LST. SEC: TUS. PAMs: OPX and K8EPT, RMs: RIQ and K8LZD, ZLIQQ and his XYL attended the SPRC with BMX. The MRC (Minneapolis) and MARC (Mankato) Clubs had an "ARRL Night" with Director BUO and SCM KJZ as the speakers. The June issue of the *Minnesota Conservation* carries an interesting article on amateur radio referring to PICON and the KMG net members and with a picture of EC TWG in his shack. The annual MJN-MSN meeting held at RIQ-OPX's farm home was attended by BGY and family, Director BUO, DQL, GBG and XYL, ISJ, KJZ, KLG, K8MGT, OJK, OMC and family, K8ORK, K8SNC, SNG, THY and his XYL and ZOB. RIQ will continue as RM of MSN, and K8LZD of MJN, K8IKL and OM VEIEG are spending the summer at Prince Edward Island, Canada. KN8YQU built a Q-Multiplier for his 20-year-old RCA ACR-175. RM RIQ received the A-1 Operator award. HPS can be heard daily on 50.09 Mc, at 0800 and 2230 until midnight. TUS and VPO are the proud parents of a baby boy, their fifth child. K8TXO is building a 10-meter transceiver. K8UPA can be heard on 40 and

(Continued on page 112)



**INSIDE . . .**



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**H**ave you been wondering whether Adirondack might have that piece of equipment you set your heart on? When in doubt—drop us a line.

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80 meters from Illinois, where he will be for the summer. W8OLJ, Detroit, Mich., who traveled world-wide with MATS, gave an interesting talk at the MRC on his experiences as an amateur radio operator contacting people all over the world from the MATS plane. W4MA and BUO participated in the last PMT with accuracy. K6SXD went to Florida. The last report from SEC TUS shows that we have 576 AREC members. EC BEI resigned because of his business. OGP was appointed in his place as EC of Rice County. Happy vacations to all! See you at the Dakota Division Convention Sept. 16-17-18, Lexington Hotel, Minneapolis! Traffic: TUS 979, K6ORK 299, IUK 120, W6QDL 111, HEN 80, KJZ 76, KYG 66, PET 64, RIQ 60, KLG 55, K6QRI 55, W6OPX 49, K6SNG 49, W6KFX 43, K6PAIL 41, W6LST 35, K6LWK 34, QYV 34, SNG 32, W6WMA 30, YPO 28, DQL 27, K6JYJ25, MGT 23, W6BFO 22, THY 20, ALW 18, K6IKU 18, W6UAX 18, K6RHN 13, VXX 11, MAH 10, KNWVYV 10, SBB 10, W6VXO 8, FGP 6, K6GIW 3, W6WVT 2.

## DELTA DIVISION

**LOUISIANA**—SCM, Thomas J. Morgavi, W5FMO —SEC: MXQ, RM: CEZ, PAM: CEW. Receipt of Field Day messages is acknowledged from the Jefferson ARC, the Lafayette ARC, the Crowley ARC, the Westside ARC, the Ouachita ARC, the Baton Rouge ARC, and the Calcasieu ARC. K5ESW is now operating his new SB-10. UQR participated in the June V.H.F. QSO Party, making 117, contacts in 21 sections. K5AGJ is doing very nicely after a heart attack. MXQ has a new 75-meter antenna but is having trouble with the 40-meter job because of high s.w.r. The New Orleans Hamfest will be held Oct. 9 at Jackson Barracks, New Orleans, La. Tickets are now available. Contact QPS for details. CEZ is back pounding brass after a three-week vacation in California. Between the TV and radio station, EA always manages to handle a few messages. HSM, who has been active in Lake Arthur for many years, has now been transferred to Opelousas. It would be nice if the fellows would give the Delta 75 Net a little bit of elbow room Sundays at 0730 CST. This net has been operating as an ARRL Net for some thirty years and has contributed to the advancement of the amateur in the eyes of many. If you won't join in the net, please do not interfere with its operation. How about checking the date of appointment on your ORS and ORS certificates? Some are overdue and need renewing. Good operators should hold one of these appointments. How about dropping your SCM a line for application blanks? Traffic: W5MXQ 208, CEZ 95, K5ESW 60, W5EA 11, K5OKR 5.

**MISSISSIPPI**—SCM, Floyd C. Teetsen, W5MUG, K5YCN is on the air from Collins with a DX-40 and an SX-110. Field Day activity was better this year than usual. Five reports were received from clubs at Gulfport, Hattiesburg, Meridian and Natchez. Congratulations, gang. DNV is now working out of Jackson. K5RUO will be on RTTY shortly from Massachusetts. Let me have your reports. Traffic: W5JHS 45, K5MDX 10, W5RIM 10, MUG 9, EBF 1, FPI 1, KHB 1, K5MOH 1.

**TENNESSEE**—SCM, R. W. Ingraham, W4UO —SEC: K4EUN, PAMs: PAH and UOT, RM: FX, PL reports that he was host to the DJI Field Day group. Field Day messages were received from DJI, PM, SKH, AM, ZZ and K4RTA. K4BWS got his 25-w.p.m. CP certificate. WBK reports that the MARA amateur radio school is being led by WTI, WBK, YMG, K4s BOM, OZN and ASK. K4RIN has his tower up 35 feet and is working on a modulator and a dual power supply. The Mid-South V.H.F. Assn. reports that UDQ and HHK will mobile with Heath Sixers and that LOJ, in Jackson, is working crossband 6 and 2 meters with the Covington Area. New appointments are K4s AKP and BWS as ORS. Net Report were received from FX, PAH and UOT; OES report from K4KYL; OO reports from K4s RIN and RSU. Traffic: (June) W4PL 1157, K4AKP 547, BWS 141, W4VJ 121, K4OUK 89, W4EIN 78, P4P 62, FX 47, UO 24, PAH 23, K4PFR 22, W4UVP 16, UVL 9, K4LPW 6, W4TYV 4. (May) K4BWS 36, W4TZG 12.

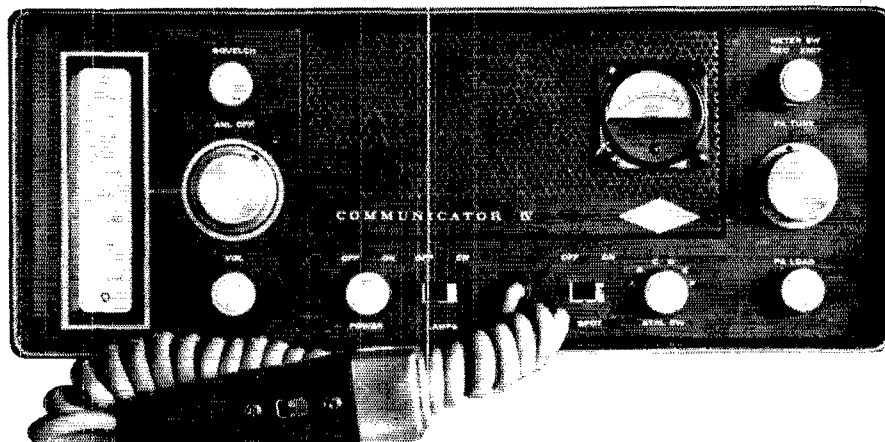
## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, 4CDA, SEC: BAZ, RM: K4C'SH, PAMs: K4HCK and SZB, V.H.F. PAM: K4LOA. KYN reports its June traffic total as 191. New members are K4SFD, Bowling Green, and K4CIA, Nicholasville. Net certificates went to K4KWE. The MKPN reports a traffic total of 43. New members are K4AYF, JBC, and K4PGH. K4QCN will be missed on MKPN as he is leaving the State. JUI is rebuilding the shack. K4IPB has a new pre-selector. OO K4ZRA has received several letters of thanks for his friendly

(Continued on page 114)

# COMMUNICATOR IV

GONSET'S VHF STATION "PACKAGE"...

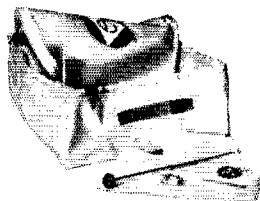
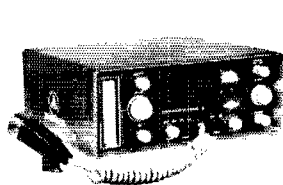


"IV"... newest member of a family of champions... size of a lightweight... wallop of a heavyweight...

Now... "IV" offers you... More carrier power... 20 watts input power • More talk power—10 watts of audio, integral high-level clipping and audio shaping allow high modulation percentages • Simple, non-critical tuning... broadband driver stages—no panel controls. Only PA "Tune" and "Load" adjustments with panel meter to assist. Six crystal channels, (6 or 8 mc crystals) selectable by switch... provisions for external VFO • And a really fine receiver. Continuously tunable 143.7-148.3 megacycles... latest low-noise frame grid VHF tubes (6ER5's) used in RF and Mixer stages. Noise figure of 4-5 is exceptional for equipment of this general type... opens up real possibility for weak signal DX reception • Unit is exceptionally compact... only 5"H, 9½"W, 13"D, weighs only 21.8 pounds. Strap handle on side facilitates carrying • Universal mounting bracket is optionally available... allows simple under-dash mounting.

Contributing further to excellent performance... High stability—crystal controlled 1st conversion • Low image—triple conversion, 455 kc 3rd I-F • Muted standby—adjustable squelch—noise limiter • Panel speaker—earphone provisions... Tuning meter—gives relative signal strength • Universal power supply—12V DC transistorized, (negative ground) and 117V AC. Change from one to the other merely by using proper cord.

## COMMUNICATOR IV FOR CIVIL DEFENSE APPLICATIONS



Communicator IV has been certified to OCDM (FCDA) as meeting applicable specifications under OCDM Item No. U-70 and will qualify for matching funds but only when supplied with #3361 C-D kit. (shown). Kit contains yellow C-D canvas carrying case, telescoping antenna, C-D decals, right angle coax connector and crystal certificate. (In lieu of crystal)

AVAILABLE SOON:

COMMUNICATOR IV MODELS FOR 50 AND 220 MGS

**GONSET**

**GONSET**

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## GREAT LAKES DIVISION CONVENTION QSO PARTY

September 9, 10, and 11

The Committee of the Great Lakes Division Convention will sponsor a QSO Party open to all amateurs residing in Kentucky, Michigan, and Ohio. The Party will be held from 1900 EST Friday, September 9 until 1900 EST Sunday, September 11. Any and all amateur bands may be used and any mode of emission. There are no power restrictions.

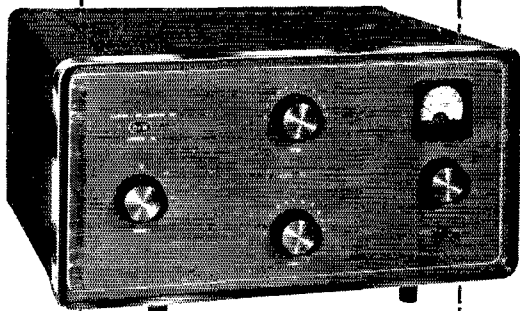
**Scoring:** Multiply the number of stations worked in the three state area by the number of counties contacted (291 counties are represented in the Great Lakes Division). Each station may be worked but once regardless of band or mode of emission used. Logs should include calls of stations worked, band used, signal reports, time, date, and county in which contact stations are located. Operation near the following frequencies is recommended: 3600, 3740, 3870, 7100, 7175, 7250, 14100, and 14250 kc. The call "CQ Great Lakes" should be used on phone and "CQ GL" on c.w. An engraved trophy will be presented to the highest scoring station in the contest. The high scorer in each state will receive complimentary registration and banquet tickets to the Convention. Certificates of performance will be issued to the three highest scoring stations in each state. Certificates also will be awarded to the highest scoring Novice station in each state.

All entries must be postmarked no later than Sept. 20, 1960, and should be sent to Contest Manager, Jack Siringier, W8AJW, 2972 Clague Road, North Olmsted, Ohio.

reports. ZRA has 41 toward DXCC. ADH picked up five new states on 8 meters. K4DMU and K4BJZ are new 6-meter stations in Louisville. Again this year Kentucky had the highest EC annual reports of the 73 sections. K4CC is preparing for a trip to the World Convention in Edinburgh, Scotland. K4ZQR reports the Louisville ABC V.H.F. meets regularly. KN4QDF has started the Tri-State Novice Net (Ky.-Ohio-Ind.) on 7160 kc. at 6 P.M. EST. Field Day reports were filed from Louisville, Henderson and Owensboro. OO reports were sent by K4BUB, EJA, SZL, K4IFB, K4ZRA and K4ZQR. K4LHQ won a trip to Puerto Rico on a high school essay contest. Traffic: K4AVX 106, CSH 43, KWE 37, LHQ 34, VDN 33, DFZ 29, W4SUD 29, SZB 23, K4SBZ 22, W4CD 19, SZL 19, ADH 12, K4VDO 11, W4YYI 10, K4ZQR 6, W4KJP 5, K4YCB 5, W4VJV 5, K4QLZ 4, W4JUI 2, DK 1.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC; YAN, RMS; SCW, OCC, QOO, FWQ, PAMs; AQA, K8CKD, K8JUG, ATB, V.H.F.; NOH, PT, CQU is new Asst. Director. EC appointment went to EMD and QOL; OPS to K8BMU, K8CWI, K8GJD and K8JVM. The best reporting EC record for '59 was that of AIM, who resigned and was succeeded by LAE. New officers of the Holland ARC are QOL, pres.; LAI, Vice-pres.; K8EMV, secy.; K8PVY, treas.; DYL, editor. All are "Generals"! On June 16, Calhoun County had a terrific storm and EC K8CIS called out the AREC. Roads were blocked, trees down and heavy damage was done to homes, barns and utilities. Working with State Police and BC stations WBCK and WELL, the AREC did a splendid job. The following hams took part: K8CIS, K8AEM, YAN, K8BUV, K8CDZ, K8DAL, K8DKT, K8IVG, K8IWF, K8JNG, K8LWD, K8NEY, K8NKP, K8OXD, K8QFO, K8REM, KHY, NZ, PVQ, VZY, WQP and W.XJ. Battle Creek—well done! PEZ, working RTTY, wants information on Michigan RTTY. Not but we have none. SS now is on s.s.b. The Mason Co. RC used a school bus for Field Day. K8LX's dad was in for major surgery. EMD (OO) is building a frequency standard and a frequency meter, completely transistorized. PT hears 5 states on 42 Mc. and is building 50 watts for the band. TIC missed Field Day—he was in Arkansas hunting diamonds! K8KIT, Munising, finally sends in a report. Nice QES reports were received from HFF, K8BGZ and K8LNQ. The Chain O' Lakes ARC officers are K8OTA, pres.; KEO, vice-pres.; NUL, secy.-treas. All reports to the SCM must be in by the 5th of each month. Traffic: WSOC 209, K8CWI 135, W8FWQ 110, JTQ 106, K8OTJ 99, W8FY 72, HAW 61, K8KMQ 55, GJD 52, W8NOH 50, K8JVN 47, W8COU 29, K8LPU 20, ELU 19, K8NAW 19, ENE 18, W8YAN 17, K8LOS 16, W8TBP 14, QON 11, SWE 10.

(Continued on page 116)

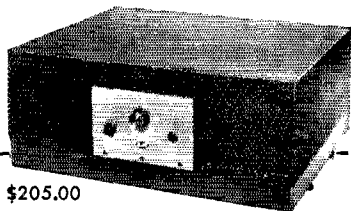


PRICE \$375.00

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Ready for a full kilowatt? Here's the power package for you. The B&W LPA-1 is new, skillfully engineered to give you *everything* you need in an amplifier. Two Type 813 beam power tetrodes, connected as high- $\mu$  triodes in a grounded grid circuit... flexible Pi-network output circuit with precise adjustment of tuning and loading 80 through 10 meters... smart, functional styling.

The LPA-1 takes no more space than a receiver, but what a difference it makes in your signal.



PRICE \$205.00

The LPS-1, a compact high voltage power supply for the LPA-1. Removable switching control panel lets you use it side by side or remotely. Heavy duty components for continuous operation... full wave single phase bridge rectifier using four Type 816 tubes... R.F. filtering.

Compact LPA-MU impedance matching unit for driver-exciter with fixed output impedance or marginal output. Couples to bandswitching Pi-network of LPA-1 for automatic input matching. Similar unit, LPA-MU-2 for B&W amplifiers L-1000-A and L-1001-A.



LPA-MU \$36.00  
LPA-MU-2 \$36.50

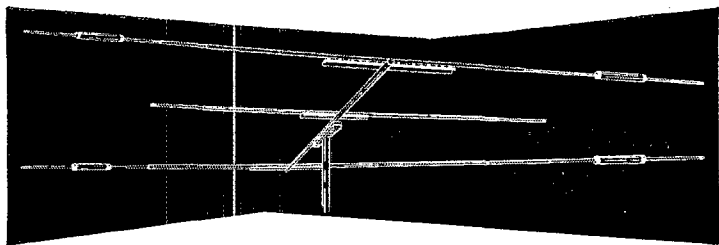
See these new units at your  
B&W dealer soon, or write  
for color brochure.



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THE BIG SIGNAL BEAM FOR 20 & 40 METERS

BUILT FOR OPERATION AT MAXIMUM LEGAL AMATEUR POWER  
EXCLUSIVE DESIGN AND CONSTRUCTION FEATURES

FREQUENCY STABILITY IN ALL WEATHER

FULLY RUST AND CORROSION PROOF—GUARANTEED!

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Model TA-20-40 complete with tilting head and illustrated instruction booklet.

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# TA-20-40

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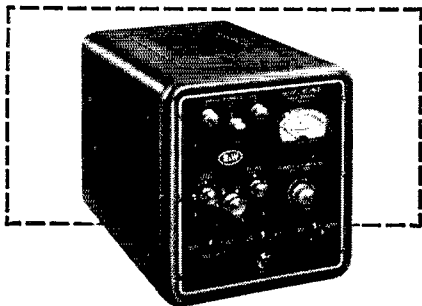
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## THE SPARKLING PERFORMANCE YOU WANT... WITH THE 5100-B

Packed with features that count, the B&W 5100-B is unbeatable on AM-CW or SSB. Input power 180 watts CW-SSB, 140 watts AM phone...80 through 10 meters...bandswitched throughout with integral VFO or crystal control... Pi-network final and integral low pass filter.

Get on the air with this great transmitter and enjoy the pleasure of trouble-free operation, ease of control and tuning, top signal quality.

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In half an hour you can add the 51SB-B sideband generator to your 5100-B. You'll have outstanding SSB with voice operated control, push to talk, speaker deactivating circuit. (Also available—51SB with integral power supply for converting other transmitters. Price \$279.50. Send for data.)

Write today for the new B&W catalog.



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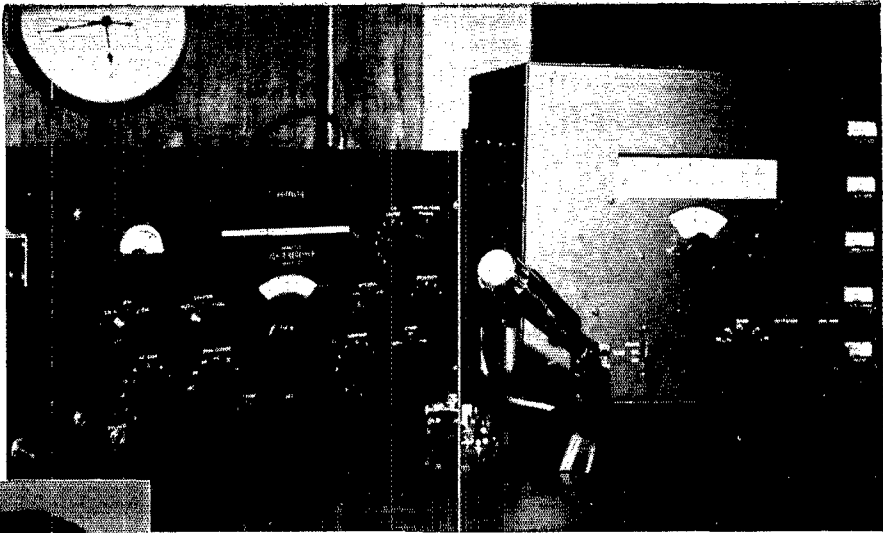
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Bristol, Pa.

K8CKD 9, W8HKT 8, K8IXA 8, JED 8, W8SCW 7, UOQ 7, K8LZF 6, W8DSE 5, ZZ 5, WXO 4, ALG 3, EGI 2, K9UBK/8 2, W8EMD 1, JXK 1, K8KCO 1, W8NUL 1. (May) W8AIO 41, K8CWI 28, W8AII 16, K8KIT 12, W8UOQ 8, K8NFU 5, W8TIN 4, K8EFY 2.

**OHIO**—SCM, Wilson F. Weckel, W8AL—Asst. SCM; J. C. Erickson, 8DAE, SEC; HNP, RMs; DAE and VTP, PAMs; HZJ and WYS, Officers for 1960 of the Tire Town RC of Akron are K8MUG, pres.; QJZ, vice-pres.; K8LDU, secy.; K8DBU, treas.; IQT, SAC and K8KXW, directors. K8BXT reports that K8OBQ and K8PAU received their General Class licenses; K8QBK is in Navy boat training; K8OZK has a new Heath v.f.o.; RZK and UUI have new IIT37s; PKC and K8QDQ have new 100Vs; PBE has a new Drake 1A receiver and beam; K8QDQ vacated in Florida and K8AZY has a new Triband beam, PVC and K8JSQ have new HW-29 Sixers for mobile, KN8UCZ is a new amateur, K8PKY has a new DX-100B, K8TOY is in the hospital, KN8UKH is a new amateur, K8s SJS and TCI are new Technicians, Officers of the Buckeye Short Wave Assn. are KJZ, pres.; EXL, vice-pres.; K8KEG, secy.; and K8DPW, treas. K8s NQT and NYM have their General Class licenses, TEEJ vacated in Florida. DSX is now working for FCC in California. The Cuyahoga County AREC took part in the Cleveland Flag Day Parade with AGU, BAH, LBX, NZI, QXG, K8s BWH, GJW, IJZ, IPI, JHJ, KKO, MBW and MME participating. The Seneca RC heard a taped talk by IH1Q, V.H.F. Editor of QST, and held a hidden transmitter hunt. Springfield ARC's Q-5 reports that KJP is back home after four years in the Armed Forces. Toledo's *Ham Shack Gossip* names as its "Ham of the Month" TSI, who has activated the 160-meter band with s.s.b., followed by ESN, FCY, NBD, BXK and K8KAS; MIQ moved to N.Y.C.; KN8PMI graduated from Trinity Lutheran School; K8JDS is on sick leave; Cancer Drive collections were made by HDY, RZM, RZQ, K8s GIJ, KAS and LVR on the 10-meter mobiles, with ADI, JVS, VKR, K8s CWS, JPC, HNL, LCW and WBQ on the 6-meter mobiles; K8ENY received his General Class license; K8BPH is attending Navy Technical School at Treasure Island, Calif. Columbus ARA's *Choruscope* tells us that UAQ has 58 Ohio counties confirmed on 6 meters; BAX has 29 states on 2 meters; TIP is on Navy duty. Your SCM attended two large hamfests. First was the Lancaster and Fairfield County ARC's first hamfest held in Lancaster, where about 1500 attended with 368 amateurs registering. An SX-111 was won by Mrs. Milland, whose husband is KN8TFS and son is KN8TPT. The club's 1961 hamfest will be held June 17 and 18. The second hamfest was the Fifth Annual Northeastern Ohio 50-Mc. Group Picnic held at Sunset Park near Alliance, where approximately 900 attended with 219 registering. The HQ-170 was won by HRV and a 6N2 v.f.o. was won by K8TOY. EVJ joined Silent Keys. AL received the Colonial America Award. Field Day is now past history. Hope all the Ohio clubs had a very successful Field Day, ran up large scores, had as ideal weather as we had with good band conditions and no breakdowns. The members of the Buckeye Net are as proud as a peacock as the *Buckeye Net News Bulletin* has been started again, being edited by K8ONQ and ably aided by his wife Elaine. All of us thank you from the bottom of our hearts and your SCM begs you to send them news for they will need it like I do. Traffic: (June) W8UPH 597, 194E 394, BZX 123, K8ONQ 52, W8CXM 22, K8DHJ 23, W8YGR 26, K8QIH 17, GWK 13, MTT 12, W8AL 11, QCU 10, IJZ 8, OIU 8, BEW 7, GQD 6, K8MMO 6, W8IBX 5, WYS 5, CL 4, K8PMV 3, W8AQ 2, K8BNL 2, W8LMB 2, K8MYG/8 2, W8VVL 2. (May) W8PMJ 51, K8GWK 39, W8LZE 16, K8MMO 8, EKG 4.

### HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EPL—SEC; W2KGC, RM; W2PHX, PAMs; W2JG and W2NOC, Section nets; NYS on 3615 kc. at 1900; NYSPTEN on 3925 kc. at 1800; SRPN on 3980 kc. at 1600; ESS on 3590 kc. at 1800; ENY (emerg.) on 29,490 (Thurs.) and 145,35 Mc. (Fri.) at 2100; MHT (Novice) on 3716 kc. Sat. at 1300. Congrats to our two consistent BPL winners, K2UTV and K2YZL. Nice to hear from these Field Day groups: K2AE (Schenectady), W2HLQ (Ossuing), W2YQJ (New Rochelle), K2HLL (Peekskill), K2MBU (North Salem) and K2DZ (Greenwich, Conn. Endorsements: K2EHI and W2HZZ as EC, W2RUF, mgr. of NYS reports that 3048 messages were handled from Jan. through May. There are four hams in one family: K2MBF, W2NCP, W2NCP, and W2MCZ. Joe wonders if this is tops in ENY. New stations in Peekskill are WA2ATC and W2KSC. The June speaker at the Yonkers Club was W1VLE. K2CON and K2IQM walked away with the prizes. K2UTC did well in the May FMT. June 25-26 was named "Amateur (Continued on page 118)"



Fred J. Pichitino  
Phone DXCC No. 28

## "surpasses its claims"

...writes Fred J. Pichitino, W8KML, of his  
Electro-Voice Model 664 Cardioid Microphone



W8KML, a consistent top-rated DXer, was a ham with a problem. In his words, *"It should be emphasized that my equipment installation requires a highly directional microphone . . . to provide smooth operation of the vox circuit for sideband transmission."* For his operation, W8KML claims of the Electro-Voice Model 664 *"... the cardioid pattern permits greater usable audio loop gain, providing better microphone technique."*

If you — like W8KML — have acoustic feedback problems . . . if you could use up to 12 db more audio (without splatter or hash) . . . or if you simply want to add more intelligibility to your carrier to smash through QRM, we suggest that you give the 664 a good, solid try. We're convinced that — like W8KML — you'll find this

highly directional microphone is *"... highly desirable for communication work and surpasses its claims in difficult operational environments."* Your distributor guarantees satisfaction — or your purchase price is refunded.

**TECHNICALLY SPEAKING:** Model 664 Variable D Dynamic design principle provides multiple sound paths to the diaphragm. Spaced sound entrances are phased to provide maximum pick-up of all frequencies and complete cancellation of rear sounds. Variable D principle insures a response that is free from dips and peaks. Eliminates effects of blasting and boominess due to close talking. Unaffected by mechanical shock. Exclusive E-V Acoustalloy diaphragm, unaffected by moisture, humidity, and temperature. Convenient ON-OFF switch.

Model 664 (without stand) List Price: \$85.00

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419 desk stand) List Price: \$95.00

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Highly reliable, exemplary electronic, mechanical, industrial design. Powerful 5-watt (as defined by FCC) crystal-controlled transmitter & extremely sensitive, selective superhet receiver with RF stage & noise limiter. Built-in speaker, detachable ceramic mike. Pre-set & sealed crystal oscillator circuit elements. To change channels, just change crystals—no adjustments needed. Built-in variable "pi" network matches most popular antennas. Portable whip, & roof antennas available. No exam or special skills needed—any citizen 18 years or older may obtain station license by submitting FCC form, supplied free by EICO.



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"Top quality"—ELECTRONIC KITS  
GUIDE. Ideal for veteran or novice.  
90W CW, 65W external plate modulation,  
80 through 10 meters.



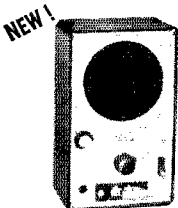
**HIGH LEVEL UNIVERSAL  
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Kit \$49.95  
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Delivers 50W undistorted audio.  
Modulates transmitters having RF inputs up  
to 100W. Unique over-modulation indicator.



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coverage. Continuous  
coverage 400 kc to 250 mc. 500 ua meter.



**Code Practice Oscillator #706**  
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Rugged battery-operated transistor oscillator circuit with built-in 3" speaker. Front panel (deep-chested satin aluminum) has flashing light, phone jack, pitch control (500-2000 cps), external key terminals, "temporary" key. Panel switch selects Tone, Light, or both Tone & Light. 6 1/2" h, 3 1/4" w, 2 3/4" d.

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Add 5% in the West ©1960

Radio Days" by the Mayor of New Rochelle for public service by CCNR. The club courses added 30 hams in the New Rochelle Area in the past year and a half. K2SJM is Dean of Faculty for the courses. W2KRW was guest speaker at the Albany Club. We welcome the Dutchess County V.H.F. Society as an affiliated club; also the Western Westchester Radio Club of Ossining. WA2BMB reports Putnam Co. RACES handled 300 messages during Operation Alert. A new 6-meter station in Poughkeepsie is WA2HRE. W2VGI has a new 44-element beam on 2 meters, according to K2BGU. Among those headed for college this fall are K2UTV, K2YZI and WA2ALO, all good traffic men. Is your appointment due for endorsement? Traffic: K2UTV 471, K2YZI 660, K2MBU 166, W2EFU 73, K2OZT 61, K2RKY 59, WA2ALO 39, W2TFS 14, W2PKY 6, K2BGU 4, WA2EKE 3, K2CVG 2.

**NEW YORK CITY AND LONG ISLAND—SCM.** Harry J. Dannals, W2TUK—SEC: W2ADO, RM: W2VDT, PAM: W2UGP, V.H.F. PAM: W2EW. Section Nets: NLI, 3630 kc, nightly at 1930 EDT and Sat. and Sun. at 1915 EDT. NYC-LIPN, 3908 kc, Mon. through Sat. from 1730 to 1830 EDT, NYC-LI AREC, 3908 kc, Sun. at 1730 EDT, V.H.F. Traffic Net, 145.8 Mc, Tue., Wed. and Thurs. at 2000 EDT. Our K-call boys earned the BPL cards this month with K2UBG leading the parade and K2RBW, K2UFT and K2MIQW/2 earning BPL via originations plus deliveries. The Five Towns RC, under the call, K2MIQW/2, originated all its traffic at the Five Towns Community Fair. W2EW reports a V.H.F. Traffic Net total of 294 messages handled in 14 sessions with a total attendance of 180. This indicates the ever-increasing popularity of this fine net. Excellent weather conditions plus good band conditions prevailed for this year's Field Day and judging by the number of FD messages your SCM received, our NYC-LI section was well-represented. A few post-mortem reports indicate the usual run of FD difficulties and the "wait 'til next year" cry has already been heard. W2OKU, Kings County 10-meter EC, reports that the Kings County AREC/RACES Net now meets every Mon. at 2100 local time on 29.640 Mc. WA2CSE has a new 8-over-8 beam on 144 Mc. K2IBJ is using a new Heath 6-er. K2IDB has his Viking and Super-Pro primed for the coming fall Sweepstakes. The L.I. 6-Meter Emergency Net has changed its frequency to 50.45 Mc. K2CTR has retired as Kings County EC and has been replaced by K2OVN. Ira did a fine job during his years as EC. Officers of the Stuyvesant HSRC are WA2GLK, pres.; WA2LZE, vice-pres.; and WA2BWQ, secy. WV2LJY is on the air with a Globe Chief, an HQ-110 and a TA-33JR. WA2CXO, WA2IZV and WV2JYR journeyed Up-State to the Ten Mile River Scout Camps where they operated WA2MMQ, the station of the Crystal Lake ARC. After earning the W-Conn Award on e.w., W2RTU, operating portable at East Marion, turned the trick on 144 Mc. K2MYN earned the W-Conn Award on phone. WA2DEL is now General Class. K2VBJ and his XYL, WA2BEI, are working wonders with their new homebrew triband quad. K2DKR is reactivating on 144 Mc. WA2AZE is working QRP on 40 meters. K2AXS and K2QOV are mobilizing with Heath Tenners. W2CKZ, ex-WVILZ, is now active after ten years. His rig is the Heath Apache and Mohawk with an all-band vertical. K2VUI is building a d.s.b. adapter for his Ranger. Joe will be off to Brown U. in Providence, R. I. where, time permitting, he will operate K2VUI/1. W2ONQ has a new Mosley Tri-bander. K2TPU is enjoying operation on 144 Mc. WA2GPT managed the 2-Meter Phone Net during the latter part of June and did a commendable job. WA2CSE, home from college for the summer, returned to the traffic circles. W2EW won a club certificate for his participation in the V.H.F. QSO Party. K2QQH left the city for the summer months and operated on 75 meters from East Marion. WV2KWZ is on the air with a Communicator III and twin 11-element beams on 144 Mc. K2AVB/9 reports from Chicago, where he is operating on 6 and 2 meters. With the fall season around the corner it would be my pleasure to visit your club. Let's arrange a date. Remember the HARC Convention to be held Oct. 15. Traffic: K2UBG 614, K2RBW 265, K2UPT 233, K2MIQW/2 180, W2EIV 147, WA2GPT 144, W2DUS 112, W2OKU 55, W2IZY 51, K2QBW 30, K2YQK 28, WA2BST 27, W2IVN 25, K2PIF 24, K2IHY 21, WA2CSE 20, W2TUK 17, K2DEM 16, W2PF 15, K2CMJ 8, K2DNY 8, W2EC 8, W2HNG 7, WV2KWZ 4, K2RHG 4, W9PVD/2 3, K2CFZ 1, W2JIS 1, W2LDC 1, K2LHA 1, K2MEM 1, K2QQH 1, W2SEU 1, W2ZRA 1.

**NORTHERN NEW JERSEY—SCM.** Edward Hart, jr., W2ZVW—SEC: WA2APY, RM: W2RXL. PAMs: K2SLG and K2KVR. K2THC made the BPL and is vacationing in Maine. K2UCY also make BPL with OCDM traffic. WA2COO can take code fast but can't get it down on paper, so is now taking typing lessons. WA2EBR checks in with his first BPL on originations  
(Continued on page 120)



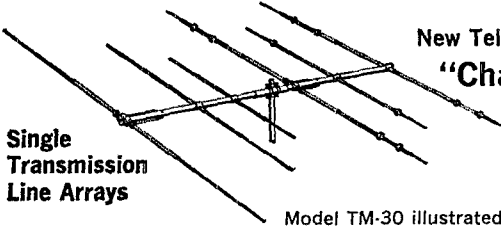
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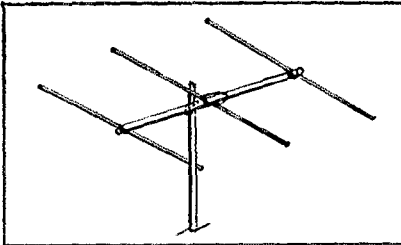
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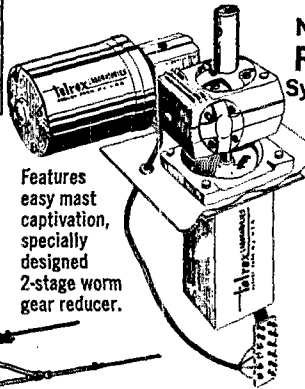


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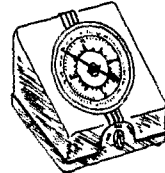
- Model TC-99 \$159.50
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- Model DP-4 \$175.00  
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System Model 175-RIS \$198.50

Features easy mast captivation, specially designed 2-stage worm gear reducer.

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money  
can buy!

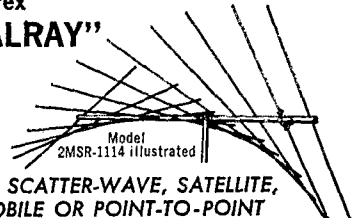
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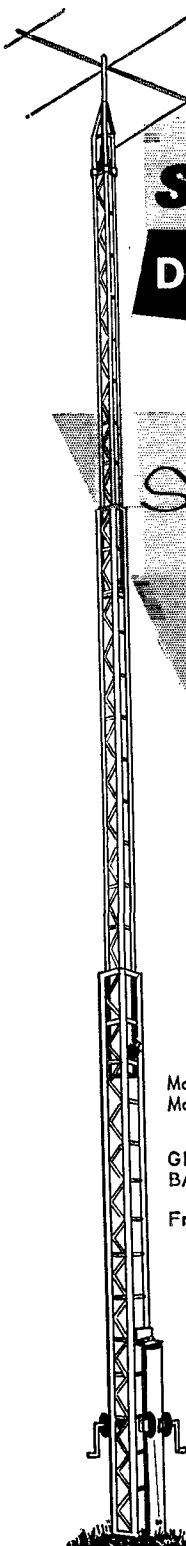
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design decreases wind load  
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**CRANK UP TO 60 FEET,  
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Way design and strength are  
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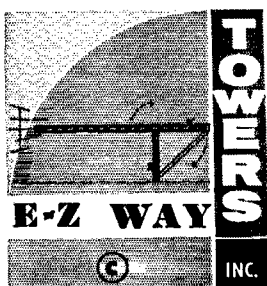
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INC.**

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**120**

and deliveries. WA2CCF also made BPL on origina-  
tions, and is now putting up an 80-meter antenna to  
get into the 80-meter nets. K2TWZ is operating on  
6 meters from Millington. K2UFM, with the help of  
W4AEZV, K2TWK and K2ZSL, put up a multi-band  
antenna. NJN reports 30 sessions, 589 stations report-  
ing and 233 messages handled. WA2GZR is building a  
grid-dip meter so he can build a 20-meter beam.  
K2LWQ sends his last report to N.N.J., as he is leav-  
ing for Lexington, Ky. Kentucky's gain is our loss.  
K2JTU is converting a 522 to 2 meters. W2NKD is back  
on 80 and 75 meters with a new doublet. K2MFX  
joined the MARS V.H.F. Net. K2AGJ had two visitors  
from Westfield, K2IMB, N. J., and W1VBG, Mass.  
W2REH has rig trouble, but still is working DX. W2NIY  
worked K2GIBB and met an old shipmate, W5OJ.  
W2AZZ gets out better since he moved his antenna off  
the ground. W2CVW is home week ends from K3WAG.  
K2PTI reports his 40-meter doublet doesn't load very  
well on 2 meters. K2LXL will be in Maine for the  
summer. W2ZL, mgr. of NJPN, reports 30 sessions, 663  
attendance and 138 messages. K2CEP is now in MARS.  
NJ6 reports 9 sessions, 100 attendance and 12 messages.  
K2RHN moved to Stanhope from L. I. That's in Sussex  
county, fellows. Traffic: (June) K2THC 1532, K2UCY 520,  
WA2COO 235, WA2EBR 162, WA2CCF 138, WA2APY  
129, WA2GUI 122, K2VNL 75, W2RXL 70, WA2GQZ 54,  
W2EBG 52, WA2GZR 52, K2LWQ 38, K2MFF 38, K2EPQ  
36, W2ZVW 36, K2VVL 31, W5FKL/2 23, WA2EDG 20,  
K2JTU 18, W2DRV 16, WA2GQI 16, K2MFX 16, K2SLG  
13, WA2AKM 11, W2RON 11, K2AGJ 10, W2NIY 10,  
W2REH 10, W2AZZ 7, W2CVW 5, K2PQR 2, K2UWN 2,  
K2PTI 1. (May) WA2EBR 54, W2CVW 7.

**MIDWEST DIVISION**

**IOWA**—SCM, Russell B. Marquis, W8BDR—Re-  
ports were received from 16 Field Day stations. The An-  
nual Picnic of the 160-Meter Net was held at Newton.  
K8MMZ has moved to Pittsburgh, Pa. K8ULN is the  
new editor of *Mismatch*, a publication of the Upper  
Iowa Radio Amateur Association. RTF reports that 6  
meters was exceptionally good throughout June. New  
appointments: K8BSZ as PAM, DUA as ORS and III  
as EC. Renewals: QVA as RM and ORS. Ex-K8IGU  
is visiting her mother, SLY, in Sioux City for the  
summer. ERP is spending the summer at Arnolds Park.  
Ex-K8LKE is visiting friends in Iowa. FDM is active  
again on TLNC. This report is rather short because  
your SCM spent most of the month in Colorado visiting  
K8KQD, K8EDH and EDK, WME and K8GAS, and  
FVD. Traffic: W8LCX 2015, LGG 1618, SCA 1528, BDR  
558, DUA 226, K8HBD 97, W8NTB 95, PZO 90, WVF 38,  
K8GXP 30, KAQ 23, SFW 16, W8SLC 16, K8TZC 15,  
W8YDV 14, QVA 11, K8OFK 7, W8FDM 6, K8KZC 6,  
W8HWU 5, MEL 5, PTL 5, QVZ 4, K8BRE 3, GOT 3,  
IHC 3.

**KANSAS**—SCM, Raymond E. Baker, W8FNS—SEC:  
VZM, Asst. SEC: LOW, RM: OGG, PAM: UTO.  
V.H.F. PAM: HAJ. Field Day participants: Kaw Blue  
Radio Club, Warner Park, Manhattan, 2 stations, emer-  
gency power, 20 operators, K8NRM/8; Johnson County  
Radio Amateur Club, ERH/8, Kansas City, 3 stations,  
emergency power, 3 AREC operators; Atchison Radio  
Club, Atchison, 3 stations, emergency power, 6 op-  
erators, K8QVQ; Kansas State Amateur Radio Club,  
Manhattan, 2 stations, emergency power, 7 AREC op-  
erators, QQQ; Hutchinson, DEP/8, Hutchinson, 3 op-  
erators; Flint Hills Amateur Radio Club, El Dorado,  
K8BXD/O, 4 stations, emergency power, 15 operators;  
McPherson Club, TWU, 2 stations, emergency power, 4  
operators; Hutchinson AFB, TFW/8, 4 operators emer-  
gency power; Kansas Nebraska Radio Club, FDJ/8,  
emergency power, 3 stations, 25 operators, Palmer; Nim-  
nescah Amateur Radio Club, Lake Nimescah, EBL/8,  
2 stations, emergency power, 8 operators; Southern  
Kansas Amateur Radio Club, Ark City-Winfield, 6 sta-  
tions, emergency power, 16 operators. K8NRX/O; Boot  
Hill Radio Club, Dodge City, QMV/8, emergency power,  
2 stations, 10 operators; Wichita Amateur Radio Club,  
RC/8, Mt. Hope, 18 operators, Class A3 station; Cen-  
tral Kansas Radio Club (two locations), K8EDL, Cor-  
onado Heights, AET/8, Indian Rock Park, 3 stations,  
emergency power, 14 operators. It is hoped you all  
have mailed in your reports to Headquarters; also all  
ECs should report. All report a large crop of "chiggers"  
this year. Traffic: (June) W8TOL 222, FNS 177, ABJ  
113, SZV 95, UTO 85, OGG 57, K8ZM 53, HVG 48,  
BHC 30, W8AMJ 25, K8QKS 23, UAX 17, W8AXZ 11,  
K8EFL 9, JID 8, GIG 3, W8FDJ 2, K8QOB 2, W8WFD 2,  
K8WUD 1. (May) K8QWN 6, JID 5, W8BBO 3.

**MISSOURI**—SCM, C. O. Gosch, W8BUL—SEC:  
K8LTP, RMs: OUD, QXO and K8ONK, PAMs: BYL,  
OMM and K8KLQ. Net reports: MEN (3885 kc., 1800  
CST M-W-F) 13 sessions; QNI 344, QTC 108; NCSs,  
(Continued on page 122)

# 3 ADDITIONS

standard line 33

new additions 3

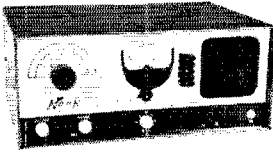
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**TRANSMITTER FEATURES:** • Hi-impedance mike input with built-in relay for press-to-talk operation • 20 watts input to final R.F. amplifier with pi-L output for antenna matching • Complete metering for all transmitter stages • 5 position xtal switch • C.W. provision.

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Tecraft's fully metered "SIDEWINDER" features voice operated control, upper and lower sideband selection and A.M. carrier insertion. With a 500 volt supply, the "SIDEWINDER" delivers 50 watts P.E.P. and 18 watts A.M. Voltage regulation and distribution circuits built in to permit use with a variety of power supplies. Tecraft's advanced design uses 14 tubes. The "SIDEWINDER" also features the "E-Z Open", baked grey cabinet.

## NEW!

Tecraft  
POWER  
SUPPLY  
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INPUT 115VAC  
OUTPUT 12.6V @ 5 amps  
250VDC @ 200ma  
500/600/750VDC @ 150ma

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The new "PTR-3 POWER SUPPLY" is the companion to the "SIDEWINDER" or may be used wherever high voltage applications are required. This new unit features an accessory power socket on the rear panel and provision for remote control. It is fused and protected for safe operation. The "PTR-3" is housed in an "E-Z Open" cabinet to stack and match with the "SIDEWINDER".

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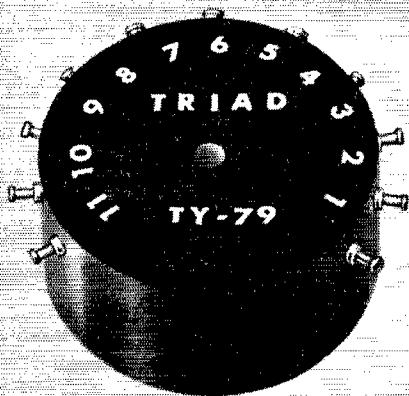
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TY-78	12.6	250/125	100
TY-79	12.6	300/150	200
TY-80	12.6	325/162.5	150
TY-81	12.6	375/187.5	200
TY-82	12.6	450/225	150
TY-83	12.6	500/250	200
TY-84	12.6	600/300	200
TY-99	6.3	300/150	100
TY-100	6.3	325/162.5	150
TY-101	6.3	375/187.5	200
TY-102	6.3	450/225	150

OHC 3, KØOLW 5, OVV 3, OMM 2, MSN (7115 kc, 1615 CST M-F) 15 sessions; QNI 40, QTC 23, NCS KØONK 15, HBN (7290 kc, 1205 CST M-F) 20 sessions, QNI 462, QTC 254; NCSs, K5JXD, KØHGI 4, KØONK 3, KØLTI, KØQGU, KØMAIR 2, KØJTW, KØJME, WØWAL 1. Evidence of the continued "black-out" of the low-frequency bands at net-time is shown in the number and variety of NCSs for the HBN given in the report immediately above. This situation is becoming the rule rather than the exception. Thanks are extended to those stations participating in Field Day who sent their messages to the SCM (who monitored 3.5-4.0 Mc, and 7.0-7.3 Mc, during the activities). Those whose traffic was reported were RIP/MI, FKM (Joplin), ZLN (Columbia), KØSGI (Independence), KØHEB (St. Joe), KØINN (Dixon), KØYAX (Eldorado Springs), KØIGO (Bay), KØOKI (Grandview), RFU (O'Fallen), KØOYM, (Jeff City). This represented 73 operators, 37 of whom were members of the AREC. KØHEA reports that the Hayes-see Net, again, is in operation. This net meets at 0630 CST Tue. through Sat., on 3717 kc. Your participation is invited. KIK has at long last received a BPL medalion, KØRAL reports having made DXCC. KØCCQ turns in a nice traffic total but didn't quite make BPL. He uses a 2E26 driving p.p., 813s on 3.5 and 7.0 A-1. The HARC (Kansas City) reports visit from ZLIQ and his XYL, who showed a very interesting set of color slides of points of interest in their country "down under." While traffic was off during the month the SCM wishes to apologize for possibly missing some mail because of a vacation schedule. Traffic: (June) KØONK 882, QØQ 404, LTJ 388, WØOMI 133, KIK 118, OVV 59, PXE 47, BUL 35, VPQ 22, KØVBU 21, WØBVL 10, KØPCK 10, LGZ 6, WØEPI 5, KØOEP 4, VXU 4, (May) KVBU 1.

**NEBRASKA**—SCM, Charles E. McNeel, WØEXP—The Western Nebraska Net, on 3850 kc, with NIK as NC, reports ONI 649, QTC 95 and the following reported 100 per cent for June: KØAIE, KØBAMQ, DYB, NIK, KØTUH and SWG. The Nebraska 75-Meter Morning Phone Net on 3980 kc., KØDGW reporting had QNI 794, QTC 206. The Nebraska C.W. Net, NYU reporting had QNI 91, QTC 45. The Western Nebraska Hamfest was held at the Chadron State Park on June 5 with an attendance of about 50 hams. The North East Nebraska Hamfest was held at Stanton on June 12 with a very good attendance. I was able to make both Chadron and Stanton this year. Field Day reports are as follows: The Crete Amateur Radio Club operated at the Air Port; the Tri-City Amateur Radio Club operated near Scottsbluffs; the Sand Hills Amateur Radio Club operated at the Alliance Air Port; the Hastings Amateur Radio Club operated at Crystal Lake; the Beatrice Amateur Radio Club operated near Beatrice; the Pioneer Radio Club operated near Fremont; the Dawes County Amateur Radio Club operated near Chadron. Traffic: (June) WØNYU 155, ZIF 119, KØLJV 118, DGW 111, BRI 60, WØKIK 57, KØVJA 47, KØKJP 27, ØFK 27, MZY 21, WØKTZ 19, KØQON 19, WFK 18, VEA 17, ØØQ 15, DDT 13, VZJ 13, HTA 12, KØROP 12, WØEGQ 10, ØCU 10, KØBRQ 8, WØKDW 5, GGP 6, KØLB 6, KØSLB 6, WØRJA 5, KØSEC 5, DVW 4, WØLFJ 4, YFR 4, KØLUL 2, SCM 1, TUH 1. (May) WØRDN 93, KØMZV 32.

## NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Victor L. Crawford, WITYQ—FVY is returning to Fletchers Ice Island. CJN has a new Viking transmitter and a Moseley vertical. KICCB has a new S-38 and intends to go mobile. APA and his XYL recently celebrated their 31st wedding anniversary. He is on the air with p.p. 810s and NC-300. AW has a new Model 15 printer. KIKJ put up a new 80-meter half-wave antenna. KIGPT has a new GSB-100. CHR has a "fix" for preventing 100-meter output from a Heath V.F.O., DX-35 combination. KIGHK had a visit from K5GUA. OBR has a new three-element 20-meter beam. YBH reports CPN handled 245 messages during 29 sessions with a daily attendance of 26 stations. High QNI goes to VOH, YBH, 29; FHP, 28; KIAQE, 25; IHG, 21; KIBSB, KICBV, DAV, 23. DHP is with the *Williamian Daily Chronicle*. KICAK operated portable from Vernon, N. Y., during the summer. KIHAN and KIMJC gave a talk on transmission lines and antenna tuners to the Waterbury ARC. MDB is recovering from a ruptured appendix. BDI attended the W. Va. Hamfest. KIGGG vacationed in VE-Land. The Connecticut Wireless Assn. made 1200 contacts in the four transmitter class during Field Day. KYQ advises that CN handled 254 messages during 30 sessions. Daily attendance was 9.2 stations. High QNI goes to KIGGG, AW and RFJ. The second session of CN is now at 2030. The CQ RC made 841 contacts in the five-transmitter class during Field Day. P5F worked 15TUF, HZLAB, ST2AR and VQ4RF on 15-meter s.s.b. BFS built the Heath sixer.

(Continued on page 124)

# THIS BEAM THINKS IT'S A PIPELINE

## THE NEW MODEL TB 1000-4 10-15-20 Meter Antenna

- Famous Hornet Quality
- Rated at Maximum Legal Power
- Four Elements On Each Band

Model TB 1000-4 Cash Price, Only \$119.50

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The four triband elements, in operation on each band make the difference —

**A Powerful four element punch!**

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World famous Hornet antennas are now available from dealers. See your dealer today for the model of your choice, or order direct from Hornet.

## THE NEW MODEL TB 750

This husky antenna replaces Hornet's famous Model TB 600, and is now rated at 750 watts AM or SSB.

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**THE NEW MODEL TB 1000** offers top performance in three element design.

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- Rated at maximum legal power

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## ALL MODELS . . .

- Are Pre-tuned and Easy to Install
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- Use a Single 52 ohm Coaxial Transmission Line
- Have completely weather-sealed Frequency-Dividers\*
- Have Elements of 6061-T6 Aluminum

All Prices F.O.B. Dealers Store or Factory

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Cash Price  
Only \$59.75

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Antenna Products Co.

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**HORNET ANTENNA PRODUCTS CO.**  
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- Please ship one Model \_\_\_\_\_ Hornet tribander. Cash price in full is inclosed.
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NAME \_\_\_\_\_ My Call Letters Are \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

**ABSOLUTELY NO RISK ON YOUR PART**

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Art Brown, W9IHZ

We are able to offer full market value for trade-in ham equipment in almost every instance. You are thus able to equip your shack with the most modern ham equipment without penalty. The dollars allowed in trade are just as big as the dollars paid in cash. In the case of contract sales your trade-in allowance provides a substantial equity at once while serving as the down payment. In the few rare cases where the amount of goods offered in trade is too great or where we are loaded on a specific item, the only loss is the postage.

A second way to save is by buying top flight used gear. We have been both surprised and pleased by the fine care evidenced by the more expensive trade-in receivers and transmitters. In many cases the performance, upon receipt, is as good as the day the equipment left the factory. Here too, we can trade at very realistic figures. The new owner's cost, however, is markedly reduced by reason of the previous owner's use. We don't have every item available used but now that we have all the top ham lines the variety is improving daily. Simply ask for our used list.

Coupled with the best possible trades and time payment terms with low down payments and reasonable carrying charges we offer our convenient Request for Quote form below. If you will complete it and drop it in the mail, our reply will be prompt and our trade-in offer fair. DO IT TODAY.

## REQUEST FOR QUOTATION

(Please Print)

I have the following used gear to trade: (Please use this code to describe it.) 3. Like new, little use; 4. Minor signs of use, no major blemishes; 5. Good condition, with minor modifications; 6. Has major modifications, or requires major repairs

\_\_\_\_\_

I am interested in purchasing the following equipment:

New  \_\_\_\_\_

Used  \_\_\_\_\_

No obligation to buy is implied.

Name: \_\_\_\_\_

Street No. or R.F.D.: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

**BROWN ELECTRONICS Inc.**  
1092 Broadway      Fort Wayne, Indiana  
PHONE Anthony 3381

BQQ, K1MJM and VXJ answered WHR's AREC tornado alert June 24. Six members of K1CHN's radio class in Mystic recently passed the amateur examination. LGE worked CQ2XZ on 6 meters during the V.H.F. Contest. FVV made 39 QSOs in 8 sections during 6 hours in the V.H.F. Contest. IGG is building a Seneca. ECH has moved to an apartment and is off the air. The TRI-City Amateur Radio Council recently elected GVV, pres.; WJF, vice-pres.; WAZ, treas.; DCM and K1HOY, secys.; FAIL, act. mgr.; K1HNO, K1GZJ, and K1HOX stewards. KN1LAV has dropped the "N." He has a new HQ-180 and is building a new rig. Appointments renewed: BIH, OBR and TUW, as ORSs; TXI and WX as ECs; FVV as OES; DHP as OPS. Reports received: OES from LGE and FVV, OO from K11FJ, K11VR and K1LFS. Traffic: (June) W1AW 302, OBR 244, K1YQ 225, YBH 170, K1GGG 71, AQE 52, IVR 51, W1FHP 30, K1JAD 29, W1CHR 25, TYQ 25, BDI 23, K1IHP 20, HAN 17, W1ETF 15, FVY 14, K1CBV 12, W1VTV 11, K1CAK 10, W1APA 5, BNB 5, WAZ 1. (May) K1HAN 38.

**MAINE**—SCM, Jeffrey I. Weinstein, W1JMN—The advent of winter does not necessarily indicate that amateur radio in Maine will not contain all the color and excitement of the preceding warm weather months. Included in my agenda for the 1960-1961 season are contests, group and club meetings, AREC promotion, and other special activities which will permit participation by all classes of licensees, including Novices. Traffic-

## STATE OF MAINE QSO PARTY

September 10 and 11

Maine's SCM announces the State of Maine QSO Party, in which all amateurs are invited to participate.

Rules: 1) Time of contest 6 P.M. EDT Sept. 10 to 11:59 P.M. EDT Sept. 11. 2) Suggested congregating frequencies are 3600, 3726, 3940, 7025, 7166, 7250, 14,050, 21,075, 21,220, and 28,100 kc., and 50 and 144 Mc. 3) The same station may be worked for additional credit on more than one band. Phone and c.w. are separate contests, requiring separate log entries. 4) General calls "CQ ME" on c.w. and "CQ Maine QSO Party" on phone. Maine stations identify themselves by signing "DE (call) ME K." Phone stations by "this is (call) in the Maine QSO Party." 5) Contact procedure: Maine stations send QSO number, RS or RST report, QTH, and county. Outside stations send QSO number, RS or RST report, and QTH (state, province, or country). Maine to Maine contacts will not count for score. 6) Scoring: Each completed contact counts 10 points. Outside stations multiply contact points by number of Maine counties worked. Maine stations multiply contact points by the number of states, provinces, and countries worked. Multiply QSO/multiplier points by two (2) if input power remains under 150 watts during the entire Party. 7) Logs must contain date, time, emission, and power input, as well as the prescribed contact information. Logs will not be returned unless requested with return postage enclosed. 8) Congratulatory letters will be sent by the SCM to the highest scoring station in each state, province, country, and Maine county. 9) Contest logs postmarked no later than Oct. 1, 1960 should be addressed to: QSO Party, c/o Jeffrey I. Weinstein, W1JMN, SCM of Maine, 79 Caleb Street, Portland 4, Maine.

handling in Maine should reach an all-time high. Of course, for all official appointees winter brings the CD and LO Parties. Here's wishing all of you the best of luck for 1960-1961! Under the new Maine State AREC organization, the State has been divided into three areas, namely Northern, Central and Southern Maine. Each area is under the coordination of an EC. Northern Maine (KFY-EC) includes Aroostook, Piscataquis, and Washington Counties; Southern Maine (AEM-EC) consists of York, Cumberland and Androscoggin Counties; Central Maine (GRG-EC) is made up of all the remaining counties. Under this system, I believe that efficiency will be increased at reduced operating expenses on the part of ARL. I suggest that after each individual has determined his area, he register immediately with his EC to render his support to this vital organization. All stations are reminded to tune in JMN on 3950 kc. at 1800 week ends for Official Bulletins and other pertinent information of general interest. Traffic:

(Continued on page 126)



# CRYSTALS

## AMATEUR TYPES

**H-43 or H73 low drift fundamental oscillator crystals.** Will withstand high drive conditions.

1800 to 3000 kc $\pm 2$ kc	\$2.95
3000 to 9000 kc $\pm 5$ kc	2.95
9000 to 15000 kc $\pm 10$ kc	3.95

**Type H173 plated, high stability oscillator crystals.**

1800 to 3000 kc $\pm 2$ kc	\$4.95
3000 to 9000 kc $\pm 5$ kc	4.95
9000 to 21 mc $\pm 10$ kc	4.95
21 mc to 40 mc $\pm 15$ kc	4.95
40 mc to 54 mc $\pm 25$ kc	5.95
54 mc to 75 mc $\pm 100$ kc	7.95

**Special close tolerance crystals for the amateur.**

H43 or H73 1800 kc to 18 mc	\$4.80
H173 1800 kc to 75 mc	7.95

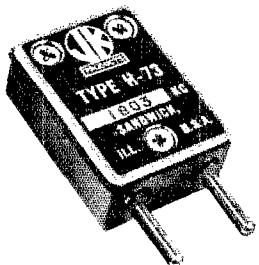
## MARINE CRYSTALS

**Type H-4 or H-7 marine tolerance high drive crystals.**

Frequency range 2 mc to 7 mc \$4.95

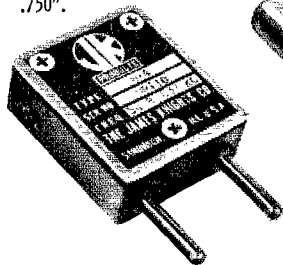
## AIRCRAFT CRYSTALS

**All types available.** State holder size, pin dimensions, and spacing, equipment model and manufacturer, crystal frequency and channel frequency. If receiver, specify IF frequency.

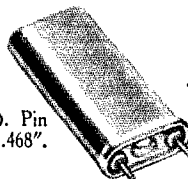


H-73 or H-7 (FT-243).  
Pin Dia. .090". Pin Spacing .500".

H-43 or H-4 (HC-1/U).  
Pin Dia. .125". Pin Spacing .750".



H-173 or H-17 (HC-6/U). Pin Dia. .050". Pin Spacing .486". H-17W (HC-6/U) With Wire Leads.



H-17TL (HC-13/U). Pin Dia. .090". Pin Spacing .468".



H-3 (HC-18/U). Pin Dia. .039". Pin Spacing .192".

## CITIZENS BAND

**Standard Transmitter Crystals.** Type H-17 (HC-6/U) 20 mmfd load, .005% tolerance. Crystal on any FCC channel frequency. . . . . \$2.00

**Standard Receiver Crystals.** Type H-17 (HC-6/U), 20 mmfd load. Crystal 455 KC lower than FCC channel frequency.  $\pm .005\%$  tolerance. . . . . \$2.00

**Special Transmitter Crystals.** Type H-17 (HC-6/U), H-3 with pins, or H3W (HC-18/U) with wire leads. Any practical load, crystal on  $\frac{1}{2}$  or  $\frac{1}{3}$  FCC channel frequency. Give holder, load, frequency, and make of equipment. Also includes control frequencies of 26.995, 27.045, 27.095, 27.145, 27.195, and 27.255 MC.  $\pm .005\%$  tolerance. . . . . \$2.95

**Special Receiver Crystals.** Same holders and loads options as special transmitters crystals but crystal frequency for IF other than 455 KC lower than channel frequency. Give holder, crystal frequency, load, IF frequency, and make of equipment.  $\pm .005\%$  tolerance. . . . . \$2.95

## MARS AND CAP

**Type H-7 available on assigned frequencies.** Calibrated to  $\pm .005\%$ .

Frequency Range 2 mc to 10 mc \$4.80

## TV & MARKER CRYSTALS

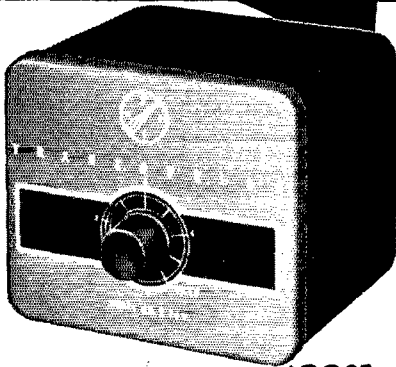
Calibrated $\pm .005\%$	
Type H7, 3 mc to 18 mc	\$4.80
Type H17, 4 mc to 30 mc	7.95
Type H17, 3579.545 kc	4.80
Type H173, 1000 kc	7.95
Type H17TL, 100 kc	6.95

All prices postage paid. Send cash, check, or M.O. No COD's. Distributor inquiries invited.

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You haven't really known  
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# TRANSQUELCH



Size 3" x 3" x 3/4" \$23<sup>95</sup>

Incorporates "The only completely transistorized noise clipper squelch device produced to work with the new hybrid tubes—a natural complement to your mobile converter." Only two connections to the pot of your broadcast receiver. No cutting of any broadcast receiver circuitry.

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**NORTHEAST TELECOMMUNICATIONS, INC.**

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KIBDQ 52, DUG 50, W1GRG 34, K1JMB 24, KSG 22, MPM 9, W1JAIN 6, EFR 5, SWX 5.

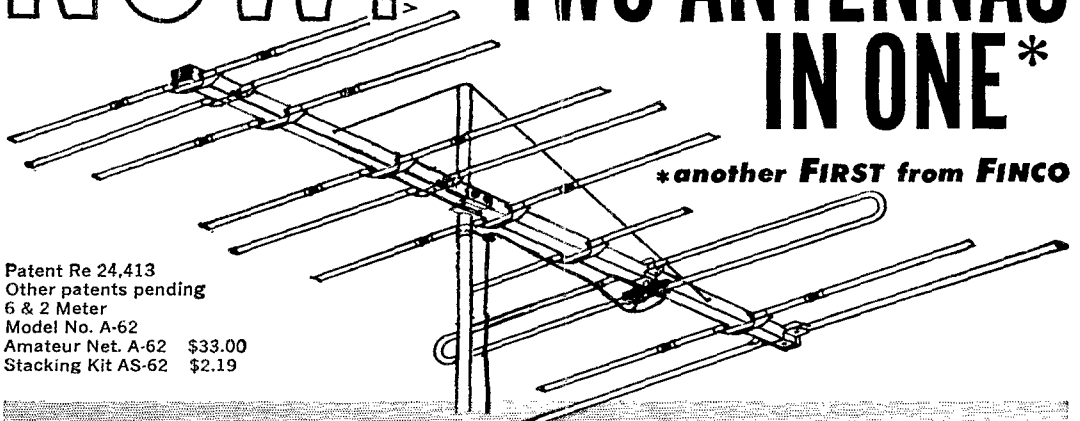
**EASTERN MASSACHUSETTS**—SCM, Frank L. Baker, jr., W1ALP—SEC: AOG. New appointments. QXX Arlington as EC, K1ODL ex-K3BYJ as ORS, K1CHY as QES. Sorry to announce that 1JW is a Silent Key. KN10SN Newton is on 2 meters. Heard on 75 meters: ZEJ K1s IQA and JLN. JLN is now living in Alton, N. H., and was awarded a plaque by his fellow hams for the work he did on the Convention at Swampscott; also one from the North Shore Amateur Radio Assn. and a Life Membership. Tentative plans call for a convention to be held at Swampscott Apr. 23-24, 1961. JZY has a mobile rig for 10 meters. I wish to acknowledge receipt of many Field Day messages from clubs and groups. BGW, BW, AYG, OGU and K1MMQ took part in the May FMT. KN10VZ is the call of N1CCE. Heard on 2 meters: K1s MSA, MPF, KZP and KN10GQ. QFO was up on Mt. Wachusett for the V.H.F. Contest. OFK visited MUD. TWG had a 4-day fishing trip in Maine. The T-9 Club is going up to TJP's camp in New Hampshire. MINK has a rig for 6 meters in his car and is going to Wisconsin and back through VE-Land. YHY, our Fall River EC, says things are coming along fine down there. K4HOU/K1MAO has gone back to Atlanta, Ga. MPB has a General Class license. VIS got married. The 51.30 Club has a new club call, K1OOM. Heard on 6 meters: K1s ARD, CPY, EUJ, GYJ, HIC, HSI, GZZ, ICH, JAF, JML, W1's E7A, JS, SM, KYX, TTY, UFX, VYQ, WJZ and ZBE. The Mass. Phone Net, had 30 sessions with 531 stations and 181 messages handled. NVV, LNK, K1s NKQ, DSW and KN1NOA were up in Blue Hills for Field Day. ENS has a new job out West with Sylvania. K1LLV is on 40 meters. K1BUR received the W-CONN Award from the Jaycees of Willimantic. The QRA had its Annual Bean Supper and a talk by KH6LJ. MXG writes from the Panama Canal that he is on the *Erna Elizabeth* running from the West Coast to New York. GYZ, who went to California is now sales manager for Hallicrafters eastern division military electronics. K1BYV has a 2-element beam for 15 meters and is going to N.U. in the fall. K1JAW was in Field Day down in New Jersey and now is NCS for EMN. K1JLU has a new antenna for 40 meters. K1BGK is an NC for the 6-Meter Crossband Net. K1CMS has a 75-ft. tower with beams for 2 and 6 meters. K1AII has a Navigator and started a 4E27 amplifier for all bands. FVD is moving to Phoenix, Ariz. I want to thank the gang for the cards and phone calls received while I was not feeling well recently. KXN is Silent Key. K1KBC is on 6 meters. NKA is on 6 meters with 50 watts and has the rig in his car. K1KUY, on 6 meters, reports hearing Cuba and lots of VE calls. K2POW/1 is in Lynn. K1JML is on 6 meters working out into the Midwest. K1AII worked a lot of call areas on 6 meters because of openings. DAID received the c.w. W-CONN Award from the Willimantic Jaycees. K1KUG is a new EC for Rehoboth. Appointments endorsed: H1Q Stow, YHY Fall River as ECs. The EM2M Net had 30 sessions, 433 stations, 260 traffic. SSU has an HQ-129-X and a Central Electronics 20-A exciter. Traffic: (June) K1MMQ 550, W1PFX 377, K1GNR 263, W1ZSS 139, EMG 126, EAE 123, OFK 107, K1JAW 76, JIU 65, BYL 54, W1DOM 51, K1BGK 49, D1O 41, W1SIV 33, SSU 24, K1BYV 21, BBH 20, MEM 20, MHC 19, W1TWG 17, K1CMS 11, GYM 10, W1RQL 10, AAR 8, K1AII 8, GTX 4, W1BCW 2. (May) W1EAE 179, K1BYL 101, DNG 31, BYV 22, IWP 4.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—SEC: BYH, RM: DVW, PAM: DNS. Assistant to the RM for the Novice Net: K1JVV. W1MNN meets on 3580 kc. at 7 p.m. Mon. through Sat. MPN meets on 3744 kc. at 6:30 p.m. Mon. Wed. and Fri. W1MNN attendance has been very spotty this summer. MPN averaged 6.03 messages per session with an average of 17.70 stations per session. KN1MGK is the crack operator on W1MNN. K1GCV and K1LNC turned in excellent OO reports. A new club, the Worcester Area Mobileers, has been formed with over 15 members. K1JLH is president. Operation will be on 51.50 Mc. AGM has a new Central Electronics 100 V rig on s.s.b. After his retirement July 31, part of each year will be spent in Florida. Good luck to you, Doc. STR and QWJ are using converted APX-6s. EC SPF reports his area was on standby during the tornado weather alert on June 24. LKQ is working on a home-brew s.s.b. receiver. KN1OFM has a new Eico rig. EHH finished his new Apache. QXX is enjoying a new SX-101. A new G-50 graces Leominster c. d. headquarters. K1KBS has a new 6 and 2 v.f.o. and an SX-101. JTL has a new HT-37 and a 75A-4. K1DER is mobile with a Communicator III and a halo on 6 meters. OAZ and BYH have new Heath i.m. transmitters on 104.7 Mc. DNS is operating portable from Spencer during the summer.

(Continued on page 128)



# NOW! TWO ANTENNAS TWO ANTENNAS IN ONE\*



\*another **FIRST** from **FINCO**

Patent Re 24,413  
Other patents pending  
6 & 2 Meter  
Model No. A-62  
Amateur Net. A-62 \$33.00  
Stacking Kit AS-62 \$2.19

*Introducing.....* THE ONLY SINGLE FEED LINE  
**6 & 2 METER COMBINATION ANTENNA**  
from **FINCO**®

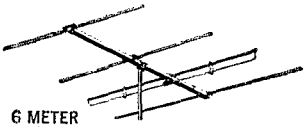
- Heavy Duty Square Aluminum Boom, 10 Ft. Long
  - All Elements Are Sleeve Reinforced And Completely Pre-assembled With "Snap-out" Lock-Tite Brackets
  - Boom Suspension Rods Are Supplied Completely Pre-assembled, Ready To Be Snapped Into Upper End Of Mast
- ON 2 METERS**

  - 18 Elements
  - 1 - Folded Dipole Plus Special Phasing Stub
  - 1 - 3 Element Collinear Reflector
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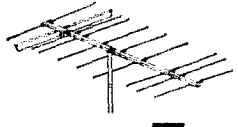
**ON 6 METERS**

  - Full 4 Elements
  - 1 - Folded Dipole
  - 1 - Reflector
  - 2 - Directors

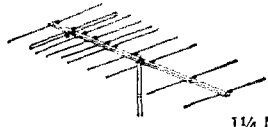
**OTHER ANTENNAS for the DISCERNING AMATEUR**



6 METER  
4 ELEMENT  
AMATEUR NET  
A6-4 \$17.16  
STACKING KIT  
AS-6 \$2.19



2 METER  
10 ELEMENT  
AMATEUR NET  
A2-10 \$11.88  
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1 1/4 METER  
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## CITIZEN BAND-CLASS "D" CRYSTALS

All 22 Frequencies in Stock

3rd overtone. .005% tolerance—to meet all FCC requirements. Hermetically sealed HC6/U holders. 1/2" pin spacing—.050 pins (.093 pins available, add 15¢ per crystal). **\$2.95 EACH**

The following Class "D" Citizen Band frequencies in stock (frequencies listed in megacycles): 26,965, 26,975, 26,985, 27,005, 27,015, 27,025, 27,035, 27,045, 27,055, 27,065, 27,075, 27,085, 27,105, 27,115, 27,125, 27,135, 27,155, 27,165, 27,175, 27,185, 27,205, 27,215, 27,225.

Matched crystal sets for Globe, Gonset, Citi-Fone and Hallcrafters Units . . . \$5.90 per set. Specify equipment make.

### RADIO CONTROL CRYSTALS IN HC6/U HOLDERS

In stock for immediate delivery (frequencies listed in megacycles) sealed crystals 26,995, 27,045, 27,095, 27,145, 27,195, 27,255, tolerance .005%, 1/2" pin spacing . . . pin diameter .05 1.093 pin diameter, add 15¢. . . . . **\$2.95 ea.**

### FUNDAMENTAL FREQ. SEALED CRYSTALS

in HC6/U holders  
From 1400 KC to 4000 KC. .005% Tolerance. . . . . **\$4.95 ea.**  
From 4000 KC to 15,000 KC any frequency  
.005% Tolerance. . . . . **\$3.50 ea.**

### SEALED OVERTONE CRYSTALS

Supplied in metal HC6/U holders  
Pin spacing .486, diameter .05C  
15 to 30 MC. .005 Tolerance. . . . . **\$3.85 ea.**  
30 to 45 MC. .005 Tolerance. . . . . **\$4.10 ea.**  
45 to 60 MC. .005 Tolerance. . . . . **\$4.50 ea.**



## QUARTZ CRYSTALS FOR EVERY SERVICE

All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

<b>FT-243 holders</b>	<b>MC-7 holders</b>	<b>DC-34 holders</b>	<b>FT-171 holders</b>
Pin spacing 1/2"	Pin spacing 3/4"	Pin spacing 3/4"	Pin spacing 3/4"
Pin diameter .093	Pin diameter .125	Pin diameter .156	Banana pins

### MADE TO ORDER CRYSTALS • Specify holder wanted

<b>1001 KC to 2600 KC:</b>	
.01% Tolerance. . . . .	<b>\$2.00 ea.</b>
.005% Tolerance. . . . .	<b>\$2.75 ea.</b>
<b>2601 KC to 9000 KC:</b>	
.005% Tolerance. . . . .	<b>\$2.50 ea.</b>
<b>9001 KC to 11,000 KC:</b>	
.005% Tolerance. . . . .	<b>\$3.00 ea.</b>

### Amateur, Novice, Technician Band Crystals

.01% Tolerance. . . **\$1.50 ea.**—80 meters (3701-3749 KC), 40 meters (7152-7198 KC), 15 meters (7034-7082 KC), 6 meters (8335-8650 KC) within 1 KC

FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC) . . . . . **50¢ ea.**  
Pin spacing 1/2" Pin diameter .093

Matched pairs = 15 cycles **\$2.50** per pair  
200 KC Crystals, **\$2.00 ea.**; 455 KC Crystals, **\$1.50 ea.**; 500 KC Crystals, **\$1.50 ea.**; 100 KC Frequency Standard Crystals in HC6/U holders **\$4.50 ea.**; Socket for FT-243 crystal **15¢ ea.**; Dual socket for FT-243 crystals, **15¢ ea.**; Sockets for MC-7 and FT-171 crystals **25¢ ea.**; Ceramic socket for HC6/U crystals **20¢ ea.**

Write for new free catalog #860 complete with oscillator circuits

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TERMS: All items subject to prior sale and change of price without notice. All crystal orders must be accompanied by check, cash or M.C. with **PAYMENT IN FULL**. NO COD'S. Q-90

Traffic: W1WEF 130, LDE 124, K1LBB 110, W1BVR 108, K1IJV 61, W1DWW 37, AGM 31.

**NEW HAMPSHIRE**—SCM, Robert H. Wright, W1RAH—RM: K1IKK, PAM: 1IQ. The GSPN held its annual picnic at the QTH of KVG on June 19. TTU is the new EC for Merrimack County. There are openings for ECs for the following counties: Stratford, Belknap, Sullivan, Rockingham, Cheshire and Grafton. I desire very much to have these positions filled. A new 6-meter c.w. net has been started in the Concord Area. Anyone interested should check 50,058 Mc. during the evening hours. K1HXC is moving to W6-Land. The Manchester 6-Meter Emergency Net had 12 stations alerted and operating during the tornado alert on June 24. Chuck, the operator at K1FDP, has been transferred to the AF Academy in Colorado. JLN has moved to Alton from Lynn, Mass. The following stations have been endorsed as appointees: K1IKK as OO, ORS and OPS; PU as ORS; QGU as ORS. I wish more of the v.h.f. operators would apply for appointment as OES. This is a very interesting and worthwhile activity for the steady v.h.f. man. If you are interested write the SCM, Traffic: K1FDP 1036, C1F 149, 1JK 101, W1TA 83, QGU 79, K1ITS 59, W1JNC 12, ZUS 8, K1CFX 3.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV —SEC PAZ, RM: SAMU, PAM: TXL. New appointments: K1MLI as OO, Net reports: RIN 13 sessions, 62 traffic; R1SPN 16 sessions, 7 traffic, R1S6MPN 30 sessions, 143 traffic. As of June 30 the R1SPN (3,916 Mc.) was disbanded and all traffic is handled on the R1S6MPN (50.6 Mc.), which meets daily at 1830 EDST. The RIS Rag Chatter Net meets every Wed. at 2000 EDST on 29.2 Mc. Officers of the CRA Club are ZPG, pres.; VAY, vice-pres.; POP, treas.; K1EGD, secy. The LARA Club officers are: K1DWW, pres.; Ed Bruley, vice-pres.; K1GOC, treas.; K1DWH, secy. K1JOL, K1CRN, K1DPR and VZP, directors. K1JYO has just received his Tech. Class license and is now mobile on 6 meters. ZGH also is mobile. K1EGH is now s.s.b. with an HT-37 and a SX-101. K1IFE also has gone s.s.b. K1ABR has just purchased a Valiant and an HQ-145. K1KCA has his General Class license now. K1BBK won the Delaware QSO Party certificate for high score in the Rhode Island section. WED is working to get a set of code records in the local library. HDW/5 would like to hear from Rhode Island stations on a.m. or c.w., 10, 15 or 20 meters. K1JNJ and K1HZN report progress on 2 meters. Traffic: W1XKD 634, SMU 550, TXL 345, K1BBK 29, AAV 14, W1CMH II, WED 8.

**VERMONT**—Acting SCM, Harriet Proctor, W1EIB —PAM: HRG. Vermont frequencies: C.W. 3520, phone 3855, R1TY 3620 kc. Nets: C.W. M-W-F at 1830; VEPN Sun. at 1730; V1PN Sun. at 0900; G1NN Mon.-Sat. at 1730. At least six Vermont groups tested their equipment and competence on Field Day. The Wind Hams Radio Club of Bellows Falls moved to Auxiliary Post and operated 5 bands with 8 operators. The Tri County Club of Brattleboro went to Hogback Mt. and concentrated on 6 meters, making over 100 contacts. The Twin State Club of Wilder went to Meriden, N. H. to work 5 bands with 6 operators and had a family picnic at the same time with about 30 present. The Central Vermont ARC had an expedition to Hurricane Hill in Orange on the property of MMN and OAK and operated as K1MPN. The Burlington ARC conducted a joint affair with the Champlain Valley ARC of New York. They were right on the southern tip of Grand Isle and had a 216 kw. generator and two 350-watt outfits. The Middlebury Mike and Key Club was on Ripton Mountain with two stations operating simultaneously. Operators were divided into two teams, each team manning both rigs for two-hour shifts. Traffic: (June) VE2AZI/W1 739. (May) VE2AZI/W1 1760. KN1-NKS 172. (Apr.) VE2AZI/W1 1430. KN1NKS 25. (Mar.) KN1NKS 5.

### NORTHWESTERN DIVISION

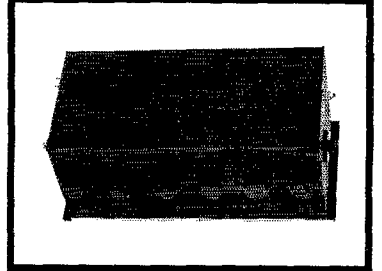
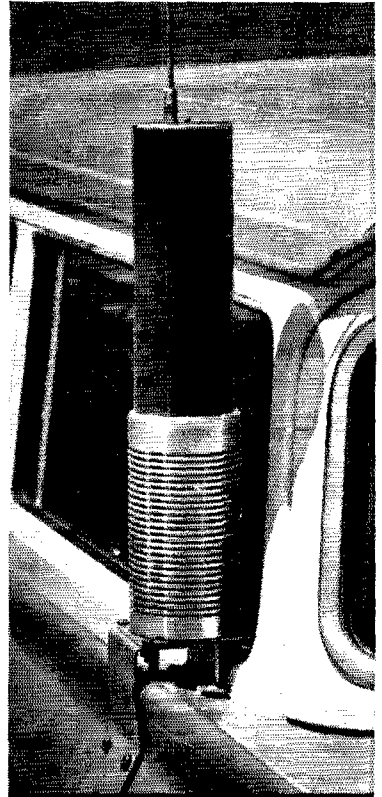
**IDAHO**—SCM, Mrs. Helen M. Maillet, W7GGV—Five stations reported activity in the Field Day tests. Those using portable power were AOT Pocatello, K7AXM Boise, K7GIG Twin Falls, K7GTK Payette, YAD Boise. Two sent messages to the SCM and gained 25 points. Twin Falls led with 272 contacts. VQC and K7BWV are cooperating to promote c.d. communications in their areas. K7KBN/7 is promoting a morning traffic net to affiliate Idaho with the NTS. Plans are to follow the Intermountain Weather Net, 3970 kc. 0725 M-S. W7s BDL, BNJ, YBA and K7s CXP and EWE assisted the Division Tennis Tournament with 2-meter communications. The Twin Falls Radio Club now is affiliated with ARRL. BDL and K7CXP attended the meeting of Idaho radio amateurs in Boise. New Novices are KN7MNZ Aberdeen and KN7MALL Payette. Thirteen-year-old Barry in Weiser is now K7KTO. GOX has gone QRT (Continued on page 130)

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The DMP1012A is a highly efficient solid state inverter that operates from a 12 volt DC source and supplies the plate, screen and bias voltages for the DM1000A. It is capable of 1000 watts output ICAS and has many applications. Test points are provided as part of the inverter for monitoring plate voltage, plate current, screen voltage and bias.



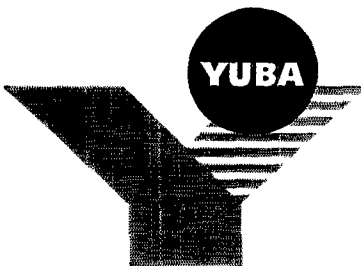
## TECHNICAL INFORMATION

<b>DM1000A</b> Linear Amplifier	<b>DMP1012A</b> Inverter
Plate: 2500V.	Output: 2500V. at 400MA
Screen: 350V.	350V. at 100MA
Bias: -60V.	-40 to -80V. adjustable
RF Bandwidth: Flat for 100KC at 7MC.	Input: 11 to 13V. DC
Frequency Range: 6-60MC with plug in units.	Efficiency: 85% at 1 KW
Excitation: Any good exciter providing a peak signal of 80 volts.	
High power exciters should be terminated in characteristic loads.	

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 Additional plug-in units DM1000A . . . . . \$ 27.50 each

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while serving Uncle Sam. K7GTK earned WAS. FARM Net traffic: 11. Traffic: W7GMC 116, VQC 26, K7KBX/7, 21, W7GGV 17, ZRQ 15, K7GHX 13, BWV 9, DWE 6, W7LIQ 4, DHL 2.

**MONTANA**—SCM, Vernon L. Phillips, W7NPV/WX1 —SEC: KUH, PAM; YHS, RAI: K7AEZ. MPN meets Mon.-Wed.-Fri. at 1800 on 3910 kc. TSN meets Mon. through Fri. at 1200 on 7225 kc. MSN meets Tue.-Thurs.-Sat. at 1830 on 3530 kc. Ten clubs and 98 amateurs are known to have participated in Field Day. The Wolf Point Ham Picnic on Father's Day was well attended. YHB and YHC have a new baby girl. K7BKH earned her 12th consecutive BPL. K7BKH and IDK earned MTHCs. K7BYC became net manager of MSN. K7BVO is travelling to Europe. IBG travelled on the East Coast. K7AEU returned to Billings from Fort Monmouth. LBK returned to Laurel from Fort Knox. K7AET is going to dental school. UGM is at West Glacier. New calls: K7KHY at Medicine Lake, KN7LZJ at Great Falls and KN7s LUK, MGG and MOQ in Billings. Portable operation: TGR at Winnifred, K6PKG at Browning, 0FCN at Billings, BNU at East Boulder, PEM at Wibaux and AYG, K7EKG. K7DGG and K7ICM at West Yellowstone. KN7LPF moved from Lewistown to Nevada. JZW has a new 100V and AYG has a new KWAI-2. Traffic: K7DCI 217, BKH 209, DCH 36, BYC 30, GWA 9, W7NPV 6, IDK 5, K7IIA 5.

**OREGON**—SCM, Hubert R. McNally, W7JDX.—Field Day is over and most of the gang must have had a wonderful time if we can believe all of the nice reports. Hope everyone remembered to send in their reports direct to West Hartford, as indicated in QST. Reports so far have been received from EAY, JHC, DSW, YYE, QNS, SAA, SGD, OTV, K7AIX, K7DON and K7GHV. Old man summer seems to have hit almost all activity in the State, with the exception of the OEN and AREC Nets. ONS is doing without some of its best right now but is struggling along. YG and the Multnomah College in Portland are moving to a new location. MW is doing the colonel's work now? ONS has a monitor on 3585 kc. on Sat. in case there is any traffic for Portland. BDU is back in the BPL gang again but is the only one from Oregon. YG and GUH are doing well in the ARRL Frequency Measuring Tests. EZP and K7DVK are busy on 6 meters. CPV says there will be a new 20-meter beam around soon. ARRL tells us the Oregon section is now rated 11th among the 72 active sections, which is really swell. But we could have been first if all the ECs had sent in their annual reports. Only 11 were sent in. How about a better showing next time, gang? The 3rd Annual Picnic of the Portland Council of Clubs will be held in August and the Annual OEN Picnic in July. Hope to see all of you at these fine affairs. Traffic: W7-BDU 532, K7AXF 179, W7ZFH 94, MW 88, MTW 37, LT 32, CPV 21, DEM 19, AJN 17, DTT 15, GUH 8, JDX 5, K7JWY 5, EZP 4, DVK 2.

**WASHINGTON**—SCM, Robert B. Thurston, W7PGY —Washington nets: CBN, 3960 kc, 2000 PST, ESN, 3920 kc, 1700 PST, Mon. through Sat. NSN, 3700 kc, 2100 PST, Mon. through Sat. WQRTS, 3970 kc, 1800 PST Mon. through Sat. WSN, 3535 kc, 1900 PST Mon. through Fri. The SCM received more than twenty Field Day messages, which denotes a fair turnout for Field Day activities. The BEARS holds a scheduled get-together on 28.350 kc. every Thurs. at 7:30 p.m. K7ELH has installed a Hornet Tribander. TSQ is going 2-meter f.m. mobile. K7EHZ joined the ranks of Silent Keys on May 20. The AREC and RACES Net schedules for the Puyallup and Sumner area have been stopped for the summer and will resume again in the fall. The VARC V.H.F. Party was held at the Ohop Lookout near Eatonville with operation on 6, 2, 220, 440 and 10,000 Mc. MCU returned from the Philippines and has installed a 50-ft. tower and a new Tribander. K7DYL also is erecting a new tower. PUA is attending college through the summer months. TWC, of Concrete, was killed on June 14 in Mt. Vernon when a girder gave way. New directors of the WARTS are W7s ORK northwest, ZHZ southwest, DZX central, YFO southeast and OWJ northeast. K7DDQ reports Island County soon will have a new room for emergency radio coordination in the new telephone building. K7CHH is using a new 4-400A kw., 80 through 10 meters. K7GZB is building a new 100-watt amplifier for 6 meters. IST now has a receiver and a transmitter on 220 Mc. AMC is building a new ham shack with wall-to-wall carpeting and a sound-proof ceiling and is waiting for a new RME-6900. The following renewed their ORS appointments: APS, GIP, PGY and AMC. A certificate of renewal was issued to HMQ as EC. New EC appointees: K7COD, VNC and GUJ. A new OES in the Montansano Area is KN7LQA. VPW received a WSN Section Net certificate. K7APJ renewed his OO appointment. AIB picked up three new countries, thanks to the "DXpeditions." K7KFT is the new EC for Lincoln County. Traffic: W7DZX 830, PGY 652, BA 543, K7HNS 150.

*(Continued on page 132)*

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PACIFIC DIVISION

**NEVADA**—SCM, Charles A. Rhines, W7VIU—IWT is moving to Reno, leaving Churchill Co. without an EC. JU received a Certificate of Merit for copying the Armed Forces Day message. VIU has his kw. going again. NRU has a new tower and beam. VJR is getting KWA1-1. CZZ has moved to Oakland. JDI was home on two weeks leave. TGG and WA6ATY received Nevada Achievement Awards No. 70 and No. 71. The NARA held Field Day at Washoe Lake. The club installed new officers at its annual dinner June 4. They are K7AGZ, pres.; K7DEF, vice-pres.; K7BJB, secy.-treas.; CX trustee; PC, MAH, AZF, K7AGZ and K7BJB board of directors. K7JHC, ex-W8NTE has joined Silent Keys. VJR, NRU, K6UGQ 7, K7COQ and K7BJB, roughed it (?) Field Day at Harrahs Motel at Lake Tahoe. Ex-VR is getting the bug again. Your SCM would like news of your activities.

**SANTA CLARA VALLEY**—SCM, W. Conley Smith, K6DYX—Your SCM was very happy to receive all the Field Day messages from the Santa Clara Valley groups. The way the s.s.b. boys were knocking off the contacts the c.w. gangs are losing their prominence as point-makers. Also it seems many groups were hurting for good c.w. operators. Several groups emphasized the public relations aspect and first reports indicate excellent results. New officers of the Foothills ARS are W6JKI, pres.; K6TCH, vice-pres.; K6JKG, secy.; K6JTC, treas.; and W6ZWE, RO. New officers of the Monterey Bay RC are W6OEF, pres.; WA6CBQ, vice-pres.; and K6VQK, secy.-treas. W6OH is secy.-treas. of the American Legion Net with W6PFF, pres.; K6EDO, vicepres.; and W6KMJ, CNC. K6VQK is temporarily QRT with transmitter trouble and W6HC is realigning his transmitter. Harry pulled a leg muscle recently in a fall but can hobble around. W6REF has moved to a new QTH in Los Altos. W6RSY has finished his GG linear. K6HCQ is building a new 432-Mc. transmitter. K6ZCR has a new HA-1 TO keyer. K6TEH is working 6 meters with a Gonset while the gear for lower frequencies gathers dust. Traffic: W6RSY 467, K6ZCR 384, K6DYX 199, W6AIT 156, W6DEF 94, W6FON 64, K6GZ 64, K6GID 60, K6VQK 39, W6YBY 38, W6HC 32, W6OH 27, W6ZLO 24, W6ASH 15, W6ZRJ 4.

**EAST BAY**—SCM, B. W. Southwell, W6OJW—W6ZF is on RN6 and has bought a new antenna farm location. KGGK is a main-tay on UTL. WA6IRK is a new Tech. Class licensee. WA6EWI is in NCN and is building a new 250TH G.G. final. W6AKB attended the MTN Roundup. W6OT handled traffic for the Red Cross and c.d. during the ET Test. The EBRC held a Dutch Auction on June 8. W6LGW has a new HO-70 W6HOF is building a new s.s.b. mobile rig. The MDARC had a good turnout at the Coffee Cup Net Picnic. WA6GCS is now a General Class licensee and seeks her OM, who is WY6FKU/AMM. That's all for this month, gang. Guess everybody is vacationing. CU next month and keep those reports coming. Traffic: K6GK 180, W6NBX 85, W6OT 38, W6ZF 36, WA6EWI 6, W6OJW 4.

**SAN FRANCISCO**—SCM, Leonard R. Geraldi, K6ANP—Asst. SCM: Jeri Rey, W6QMO, RAI; W6QY, PAM; W6PZE, ECs; K6EKC, W6OPL, W6JWF, OOs; W6GQA Class 1, K6OHJ, W6OKR, W6PHS, OBSs; W6GCG, W6MXJ, ORSs; W6GGC, W6QMO, W6OPL, W6BIP, W6QY, OPSs; W6GGC, W6PZE, W6FEA. There was lots of activity over Field Day by the various clubs in the section. Groups reporting were the Humboldt RC, Tamalpais RC, San Francisco RC, the Bands-panners, the Hams and the BAYLARC. If any groups or clubs in this section have not been mentioned please drop your SCM a card and I will be glad to include your report in the next issue. The new club call of the BAYLARC is WA6MAO. The speaker at the June meeting of the San Francisco RC was George White-ide, who spoke on single sideband. K6QJB is checking into NCN again after a long absence. W6QMO has rejoined army MARS. A Section Net Certificate has been issued to K6NCG, the radio training school at Treasure Island. There was not much new this month but lots of vacations and the let-down from Field Day. Traffic: W6QMO 176, W6GGC 40.

**SACRAMENTO VALLEY**—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William van de Kamp, W6CKV, SEC; K6IKV. Summer me again and judging from the lack of reports, everyone has gone away on vacation. The Camellia Capital Chirps joined the BAYLARCs in Castro Valley on June 11 for a picnic. Recently, while on a fishing trip, W6SYX came across two girls stranded miles from a phone when their car broke down. Tom

(Continued on page 134)

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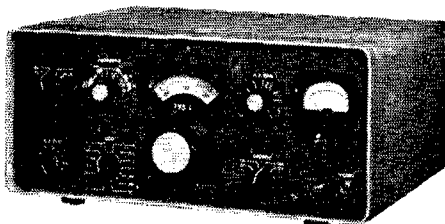


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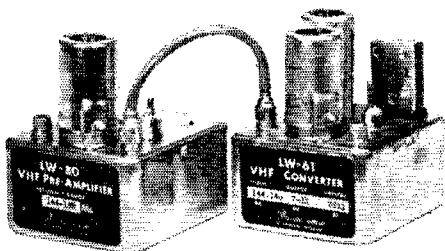


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broke into QSO on 1980, got W6HNL to arrange a rescue and then went on with his fishing trip. It is 73 to K6SXX for three years. Jim, who is going into the Army, has been the most consistent reporter that we have had so we will miss him. Jim's younger brother is WV6MDD so the equipment won't have to be put into storage, that's for sure. W6HSB and W6HTS have completed their "Chippewa" linear amplifier and are having a wonderful time running high power on 20 meters. K6BNB and K6ENK have a new station wagon and wasted no time getting the mobile rig in. The latest MARS net organized at McClellan requires that members have one qualification before joining—a minimum code speed of 30 w.p.m.! Several Sacramento 2-meter men have been working into Reno through the repeater at Slide Mountain. Traffic: (June) K6SXX 513. (May) K6SXX 656.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPU—New officers of the KARC are K6RGZ, pres.; K6OZL, vice-pres.; K6DOC, secy.; and W6NKJ, act. mgr. K6OLN had his DX-100 overhauled. K6OZL is checking into the Mission Trail Net for Kings County. The Tulare County Net on 3895 kc. is having weekly drills and needs an outlet for Exeter and Lindsay. K6ZCD had his HT-32 realigned and it works fine. W6TO/6 operated at Meadow Lakes during Field Day in the two-transmitter class with ten operators. W6ZFN/6 operated at Shaver Lake with three operators. W6PXP has 866 problems with his ART-13 mobile. W6LOS is back on 75-meter s.s.b. K6ZDE is on 75-meter s.s.b. with a 10-A. K6JPL is using a pair of 811 GG, on s.s.b. K6OGX has TVT problems on 6 meters. W6DUU is on 20-meter s.s.b. with a GSB-100 and a Thunderbolt. K6AHQ built up a Q5-er with a product detector for s.s.b. reception. K6OZL made WAC. WN6HSP is now W36-HSP. K6HWY is on 20-meter c.w. W6HQY is on 40-meter c.w. W6FRII is on s.s.b. with an SB-10. K6BP has 500 watts on 6 meters. K6RTS has a TCS. W6WBZ is heard on 80-meter s.s.b. K6YIM is heard on 75-meter s.s.b. The Stockton Radio Club held its Field Day at Columbia Airport. K6ROU operated Field Day at Mineral King. K6AUA passed the General Class exam. If anyone has any news, please drop me a postcard by the first of the month. Traffic: W6ARE 19, K6ROU 13, W6FXV 2.

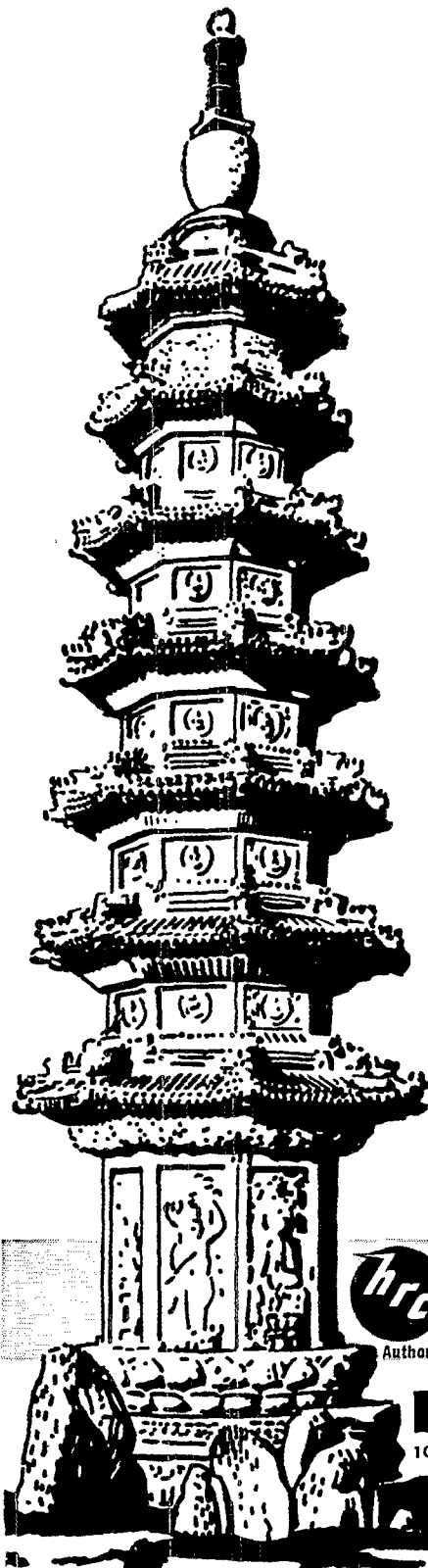
## ROANOKE DIVISION

**NORTH CAROLINA**—SCM, B. Riley Fowler, W4RRH—PAM: W4DRC, V.H.F. PAM: W4ACY. A very nice report was received from PNM on the N.C. C.W. Net. Kenneth has done a good job with this net and is to be congratulated. He also gets out a bulletin each month with reference to the net. The June report shows 35 members. 34WN/4 has moved into Burlington and is helping with the NCN. Welcome, Pete. Every operator who works c.w. should work with this growing c.w. net. OOG informs me that an amateur radio club has been formed at Belmont with OOG, pres.; Carroll Webb, vice-pres.; Thomas A. Oliver, secy.; and Dr. Joseph A. Mathews, treas. Congratulations to this group of amateurs. The Mecklenburg Radio Club has received a number of link mobile units from the county and is putting them on 6 meters. This will strengthen the AREC and RACES program. Fellows, I am sure we are missing out on some good obsolete equipment to strengthen our local communications. (See July QST on converting some 2-meter mobile gear). Here in this area we have 14 stations on 6 meters and it works fine. Change the 807 to a 6146 and you will get better results. Check the assigned frequency for f.m. operation and be sure you get above the minimum. WID has been most successful with converting these units. BBZ is moving to Jacksonville. We are sorry to lose Ellis. Traffic: K4CPX 166.

**SOUTH CAROLINA**—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE, PAM: K4ITE, RA: K4AVU. NOZ/4 of Barnwell, AKC/4 of Rock Hill, JJR/4 of Cheraw, K4JLA/4 of Spartanburg and YJT of Greenville were all active club stations on Field Day and reported much interest and activity. In May K4HJK made BPL for the third time and is eligible for the Medallion. K4ZHV and GCB made BPL in June. K4LDX has received his well-deserved net certificate. The Greenville Mike and Key Club reports KN4TJP as a new member. VIV reports 16 "flying hams" in the State. Rumor has it that K4JPT became so engrossed in building her Apache that she soldered her earrings to the rig by mistake while wearing them. HAQ has a new de luxe hamshack. The S. C. S.S.B. Net has been considering changing its name but we all hope it retains its identity as a state net. The Rock Hill ARC is actively working and planning to make the October Hamfest at Joslin Park the biggest and best yet. DX is busy working on 2-meter gear and an amateur television transmitter. Traffic: (June) K4ZHV 527, W4GCB 128, K4AVU 117, HDX 71, W4VIV 16, GQV 12. (May) K4HJK 169.

(Continued on page 138)





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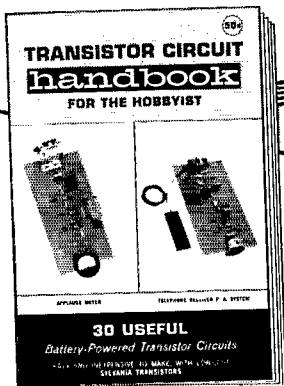
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**VIRGINIA**—SCM, Robert L. Follmar, W4QDY—SEC; K4MJZ, RMs: K4JKK, K4KNP, K4QER, SHJ, K4EZZL and QDY, PAM; W4BGP. Bad news "PN," K4KNP, lost everything in a fire early in June. PN is our senior trafleker and his presence is sorely missed. Reporting holds up with 44 received. FD messages were received from EEU, CHK, RKC, THM, K4HFT, K4-HEX, K4UYT and K4IKF. Your SCM now is out of the Navy. K4MJZ's big generator burnt up. K4AET is building an entire station and antennas. K4DWT has a new electronic keyer. K4TUF is working RATT, OWY and K4AVW are giving code and theory instruction in the Harrisonburg Area for anyone interested in getting tickets. ZM says "After 50 years in amateur radio I have applied for my first WAC and hopefully look forward to DXCC." Who's in a hurry? WBC, from PVRC, reports

**ANNUAL VIRGINIA QSO PARTY  
 AND CONTEST**

September 10, 11, and 12

The Tidewater Mobile Radio Club is sponsoring the annual Virginia section QSO party. All licensed amateurs in the Virginia section are invited to participate and rekindle the spirit of organized communication activity which may have waned during the summer months.

**Rules:** (1) *Contest period:* Participants may work any 24 hours of the 30-hour period from 2300 GMT Sept. 10, to 0500 GMT Sept. 12, 1960. (2) *Contacts:* A valid contact will consist of a two-way exchange of signal report (RS or RST) and the name of the Virginia county of the sending station. For contest purposes, independent cities will be considered as being in adjacent county. Fixed stations must continue to use the same county location throughout the contest. Fixed stations may be worked only once for credit regardless of band or mode used; mobile and/or portable stations may be worked once for each separate county within which they operate. Only two way exchanges count. Example of c.w. contact: "W4QDY de W4JUJ 589 Henrico K." "W4JUJ de W4QDY R 589 Norfolk AR." Example of phone contact: "K4AET from W4BGP Five Nine Norfolk Over." "W4BGP From K4AET Roger Five Nine Mathews Over." (3) *Bands and Modes:* Any legal amateur band or mode may be used. Cross band contacts will not be counted, but different modes may be used within the same band (e.g. 40 s.s.b. to 40 c.w.). Suggested calling frequencies: 3680, 3835, 7050, 7230, and Novice band edges. On phone call "CQ Virginia" and on c.w. "CW Va." (4) *Scoring:* Score two points for each two-way exchange with non-Novice stations and five points for each two-way exchange with Novice stations. Novice participants score five points for each valid contact with any class station. Technicians are considered to be in the Novice classification for this contest. The total score is the total contact points multiplied by the number of different Va. counties worked. (5) *Logs:* Logs should be mailed to the SCM, W4QDY, postmarked no later than midnight Sept. 30. Logs should include, date/time, band/mode, exchanges, and call of station worked. It is suggested that log times be kept in GMT, and contacts numbered with each new county worked indicated. (6) *Awards:* Two first place awards will be given—one to the highest scoring Novice and non-Novice. One second and third place award will be made to the next highest scorers without regard to license class. The decision of the contest committee will be final.

KH6LJ attended a recent club meeting. BGP was top phone station in Virginia and 6th in the national standing in the Apr. CD Party. UGH finished his first year of dental school. IF is glad to be back on the air again. PK, our top OO, reports 42 violations. Through his reporting the SCM found someone bootlegging ML's call. ML has since received several QSLs from unknowns he hasn't worked. Thanks to all our Observers for their important work—CVO, FJ, BGP, BRP, K4LPR, K4ARO, K4QER and K4KMQ. K4ARO, CVO, K4DWT, WBC, K4BUL, K4ZHA, K4GLC, K4AJL and K4LPR sent reports. OES reports were received from K4EUS and W4KDH; OO reports from PK, K4ARO, BGP, and K4LPR. Traffic: (June) W4ZMH 350, Q1Y 322, SHJ 271, DVT 220, K4MXF 157, Q1X 147, W4OOL 76, K4SGQ 69,

(Continued on page 138)

# RADIO SHACK'S



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26; MBL had receiver trouble and scored only 3. The Sky Wy Radio Club held a Ham Picnic in City Park, Cheyenne, Aug. 14. Traffic: K7IOH 20, W7AMU 12, K7-GMD 7, W7BHH 2, CQX 2, EDX 1.

## SOUTHEASTERN DIVISION

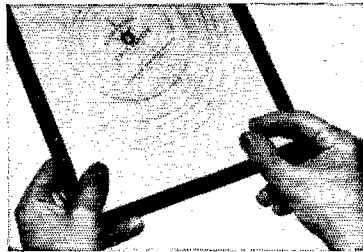
**ALABAMA**—SCM, William D. Dotherow, K4AOZ—SEC: JDA, RMs: RLG and OCV, PAMs: PHH, BTO and JXJ. New appointments: K4AAU as OPS; K4LNA as OBS; K4IWI and K4SSB as OO class I; K4MMO as OO class II; K4LNA as OO class IV. WHW mgr. of AENG. Mobile, reports 24 active members. K4IWI holds RCC, WAS and WAC. Congrats to K4IKR, new net mgr. of AENS. RQS, PTR and K4SSB qualified as class I OO in the May FMT. K4MMO qualified as class II OO. The following reported fine Field Day trips: ACQ/4, Selma ARC; K4DTV/4, Huntsville ARC; EOH/4, Jefferson County AREC; K4IVN/4, South-Port Amateur RC; K4 OBG/4, Shades Valley High School Club; PKA/4, Decatur AREC. Welcome to Mobile, 7CU/4. We welcome to AENB K4GOW Birmingham, K4BQU Childersburg, K4-UFL, Piedmont, K4AKP Memphis. Welcome to RN5, K4AKP. Highest QNT on AENB in June was K4SAV 28 and K4RJM 27. Congrats to KIX on becoming a grandpa. Alabama was 100 percent on RN5 during May. Our State c.w. net, AENB, meets nightly at 7 p.m. on 3575 kc. RLG, mgr., invites you to join. PTR scored 42.3 p.p.m. in the May FMT. Ten Decatur hams operated PKA/4 for 3 days during OPAL '60, using K4JSL's Gonset on 6 meters and K4JSO's DX-100 on 75 and/or 40 meters. PKA recently was sworn in as c.d., Radio Officer and Deputy Sheriff in Morgan County. ZSH has new 80-40-20 doublets. K4PHEI has a new Valiant transmitter. Lightning entered DGH's shack. Congrats to K4OKY, a new General Class licensee. KN4WRR is a new ham in Evergreen. K4CZK reports there are 7 teenage hams in Evergreen. KN4TRH has a new R-100 receiver. K4HAL received his Extra Class license. New hams in Tusculum are KN4WIF and KN4WNM. Congrats to Limestone County AREC and 5RYG/4 for the splendid newspaper write-up regarding their AREC and c.d. activities. *Six Meter News*: Congrats to FUD, new mgr. of AENR. AENX reports 65 per cent of its members attended Field Day on Oak Mountain. KFF built a mobile transceiver for 6 meters. K4UMD operated 6 meters exclusively in a recent AREC Red Cross simulated drill. DGH has a modified Viking for 6 meters. Traffic: (June) W4RLG 114, K4SAV 86, W4PTR 62, K4PHH 59, JDA 48, AOZ 46, W4KIX 28, K4BTO 20, CZK 20, W4CFU 17, K4GOW 15, AAU 12, HJM 12, W4MI 11, K4SSB 11, W4TQ 10, K4-TDJ 10, RIL 9, AAQ 8, BFT 8, HFX 8, JWB 8, W4WHW 8, K4DSM 7, ZNI 7, BOU 5, JSP 4, ZBX 4, W4DGH 2, K4RIX 2, W4EFF 1, EOH 1. (May) W4KIX 34, JNB 12, AYU 7.

**EASTERN FLORIDA**—SCM, John F. Porter, W4KGG—SEC: IYT, RM: K4SJH, PAM: SDR, V.H.P., PAM: RMU. The Hillsboro RACES/AREC drill held at the Britton Plaza Shopping Center was a big success with more than 27 operators participating. K4DRO received his DXCC certificate. K4BOO now has Gonset Twins. K4PEZ now has emergency power. K4RNS has over 30 certificates and awards. K4ONY is to be congratulated on the fine job of organizing amateur communications for the Miss Universe Parade at Miami Beach. See *Florida Skip* for details. The Key West ARC now offers a "Conch-Net Certificate." Only 10 contacts are needed. The Daytona Beach ARB will hold its Gabfest Sept. 4 at Ormond Beach. Hope to CU all there. K4DZP worked RMU in Jacksonville with only 3 watts on 2 meters. You don't get it? Well, DZP is in Hialeah! Guess that 40-element beam helped. The Winter Haven get-together was a big success for Polk County amateurs. Lakeland, Lake Wales, Plant City and Auburndale were represented. It is with deep regret we report the passing of WS and QDZ. Both were very active in amateur doings in this section. BAV attended the YLRL Convention. Officers of the newly-formed Florida Sidebanders are K4QNX, pres.; CNZ, vice-pres.; JQ, treas.; OVE, secy. The Florida DX Club now has 31 members. U. S. Fleet Sonar School ARC (NDJ) now puts out a 3-page *News Letter*. Would like to hear from other clubs that are putting out news letters or papers of which we don't have record. The Novice Hurricane Net meets at 0730 Sun. on 3725 kc. under the capable management of UHF in Tampa. What about you new Novices signing in with Roy? Traffic: (June) K4SJH 621, QJG 534, KDN 411, W4SDR 249, K4EBT 208, W4FPC 191, K4LCD 179, YOQ 164, BY 155, W4AKB 90, K4FMA 87, ODS 66, W4GJI 62, K4ILB 58, PHL 55, A1TP 55, BLAI 48, DAX 47, W4LDF 45, K4LCF 42, HOO 39, W4EAT 33, K4RNS 30, TDT 28, W4TRS 28, K4DBT 28, W4EHW 25, CNZ 24, IYT 22, K4COO 21, W4HRC 21, FE 20, NDJ 16, K4RZQ 12, DRO 10, W4SMK 8, K4DAD 5, IWT 5, OSQ 4. (May) K4EBT 100, W4EHW 35, K4GBS 34.

**WESTERN FLORIDA**—SCM, Frank M. Butler, jr.,  
(Continued on page 142)

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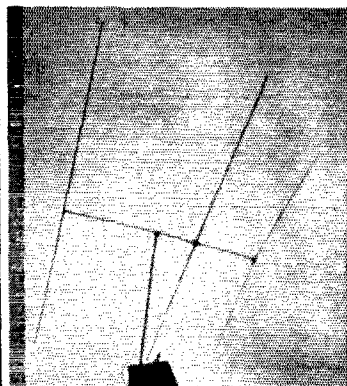
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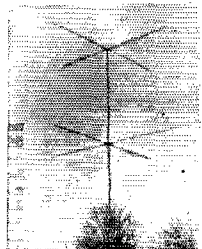
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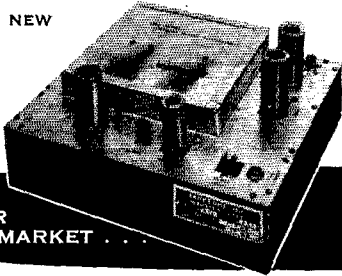
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**Moon Bounce**

(Continued from page 64)

veloping background noise and bits and pieces of Sam's slow-speed c.w. could be read. The first east-west 1296-Mc. moon-bounce transmission was an accomplished fact!

**Acknowledgments**

The success of the first 1296 Mc. amateur "Project Moon Bounce" could never have been achieved without the unselfish, generous help of a number of amateurs. This was truly a group undertaking, supported and encouraged by many amateurs, scattered across the United States. Highest tribute should be given to the following in the Eimac Gang Radio Club: Bill Eitel, W6UF; Hank Brown, W6HB; Willy Sayer, W6BAN; George Badger, W6RXW; Bill Orr, W6SAI; Ray Rinaudo, W6KEV; Al Clark, W6MUC; Bob Sutherland, W6UOV; Carl Whitlow, W6WBC; Bob Morwood, K6GJF; Allan Beer, K6GSO; Charlie Anderson, W6IVZ; Hugh MacDonald, W6CDT; Mac Parks, W6NBD; Lee Perry, W6VW; Dick Kramer, W6FBR; and Hal Jones, W6ZVV.

Other amateurs who contributed to the moon-bounce project are: Mike Krivohlavek, K6AXN; Maj. O. Ray Hill, K6MLZ (ARDC); Capt. Wm. Bettis, W5RLU (SAC); Jo Jennings, W6EI; Bob Melvin, W6VSV; Cmdr. R. Campbell, W4CCN/6 (USN).

**QST**

**Happenings**

(Continued from page 67)

experimental stations are involved in complaints of interference. In the 1959/1960 fiscal year the Department investigated 25,188 complaints of interference of all types and in all services. Of these, only 92 were found attributable to amateur faults — off-frequency operation, harmonics, parasitics, key clicks, overmodulation or other spurious radiation. The breakdown is as follows:

Interference to standard broadcast stations	10
Interference to television reception	59
Interference to both TV and BC	19
Interference to other services	4

As VE3CJ says, "Apparently we are not so bad!"

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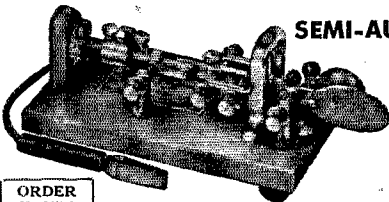
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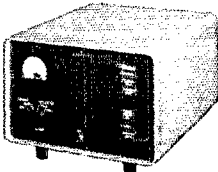
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KØYEC

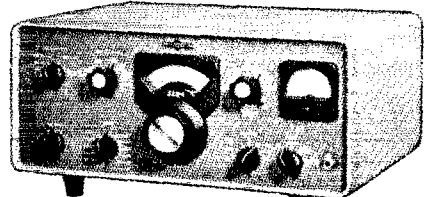


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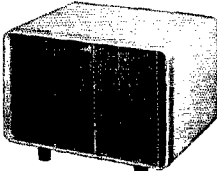


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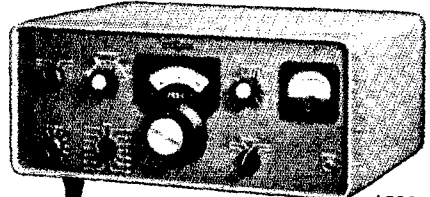
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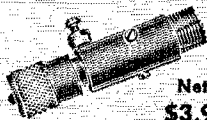
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WARKH—SEC: HEK, PAM; KARZF, RMA; AXP and UBR. Perry; KQP visited New York and Chicago radio stores while on vacation. Tallahassee: TARC members participated in the highly successful coverage of local election returns for WTAL radio through the efforts of W4MLE. Those active were GAA, UEU, K4GXV, K4IYJ, K4JMN, K4MZT and K4OHR. Both 10 and 2 meters were used. Portions of the 2-meter traffic were rebroadcast over the BC station by special authority of the FCC. Panama City: The PC Hamfest held June 19 was well attended. K4OHR won the big prize. K4CNY says kin-folks visiting him for Florida vacations accounted for the low traffic total of 405! Ft. Walton/Eglin AFB: The Eglin ARS and Whipsnappers mobiles provided communications for the parades during the Billy Bowlegs Festival. In addition, they provided a decorated amateur radio float bearing the 10-meter NCS. Communications also was provided along the route of a boat cruise from Panama City to Pensacola. K4UBR was on vacation in New York. RKH vacationed in Alabama, Georgia, Tennessee and took in the Atlanta Hamfest. Gulf Breeze: K4RIV and K4ZMV are the only active hams at present. Pensacola: The PARC installation dinner held June 24 was a gala affair. Your SCM had the pleasure of installing the new officers, who are K4SWQ, pres.; OGW, vice-pres.; K4SNB, secy.; K4RSE, treas. Traffic: (June) K4CNY 405, UBR 49, VND 8. (May) K4CNY/4 356, UBR 315, BSS/4 180.

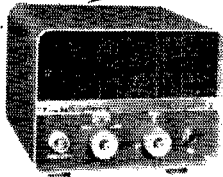
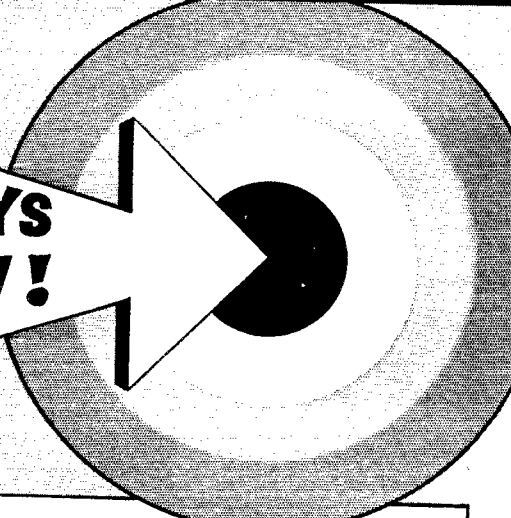
**GEORGIA**—SCM, William F. Kennedy, W4CFJ—SEC: PMJ, PAMs: LXE and ACH. RM: DDD, G4EN meets on 3995 kc. at 1830 EST Tue. and Thurs. 0800 Sun.; GSN Mon. and Sun. at 1900 EST on 3595 kc., LDY as NC; GTAN Sat. at 1000 EST on 7200 kc.; the 75-Meter Mobile Phone Net each Sun. at 1530 EST on 3995 kc., K4JTC as NC; the Atl. Ten-Meter Phone Net each Sun. at 2200 EST on 29.6 Mc., BGE as NC; the GPYL Net each Thurs. at 0900 EST on 7260 kc., K4DNL as NC; the Georgia S.S.B. Net Mon. through Fri. at 2000 EST on 3970 kc., K4AUM as NC and net mgr. The following stations sent messages to the SCM during Field Day: VTA/4, MAI/4, HBB/4, IOF/4, MQN/4, VO/4, K4-KLN/4, K4SZF/4, DNI/4 and MJJ/4. K4TBN and K4ZYI operated from K4TBN/4. The Albany Amateur Radio Club made 368 contacts for a total of 2346 points. June 19 through 25 was proclaimed Amateur Radio Week in Albany by Mayor Asa D. Kelleys, jr. Many activities took place there during that week end. Some of the South Georgia boys will not forget their experiences on Dog Island. The hams who participated in Field Day in Georgia didn't have to be rocked to sleep Sunday night. DDD, NC for GSN, has a new Valiant which works fine. K4VHC has a new linear amplifier. K4PHA has a new Apache. DOC has replaced the beam that the wind storm took down. K4BAI, K4CDF, K4EJH and K4BYD operated the Columbus High School ARC station on Field Day. K4TEA has joined the GSN, and worked HKOAA for DXCC No. 138. YE worked Field Day single operator using a 25-watt rig and made 212 contacts in 13 hours. K4KZP is home during the summer months but will return to school in September. K4ART operated Field on Top Black Mt. in North Georgia. Traffic: K4EJH 220, W4DDY 123, K4VHC 60, PEA 56, BAI 47, BVD 44, TEA 36, W4JWO 30, K4UJS 28, KZP 10, W4YE 10, K4YSB 3.

**WEST INDIES**—SCM, William Werner, KP4DJ—SEC: AAA. AOV has joined the AREC and has applied for an OPS appointment. AOV has worked 100 countries but lacks 46 QSLs for DXCC. On phone he has WAC and the Cuban Diploma Libertad. The Ramey AFB Radio Club, PAC, had ten operators on during Field Day. AKH, Hatillo, says the spring broke in the rusty bug and has to get a hand key before he can take the 15-w.p.m. code test for ORS. Dia Maria Luisa, WT, leaves the receiver on 7245 kc. day and night because of no activity on 3925 kc. AOO moved to the Los Angeles Development near the International Airport where he is on with a Viking Ranger, an HQ-110 receiver and a Hy-Gain vertical 40-10-meter antenna and a loading coil for 80 meters. MT has a new QTH at Central Ejemplo in Humacao and is on with a new Valiant and an HQ-170 receiver. AOV was transferred to W2-Land, AED, in Humacao, is NCS of the Antilles Weather Net on 7245 kc. VP2DJ, at Dominica, says the Weather Net now has 26 member stations reaching from Trinidad to Haiti. VP2DJ helped in the search and final rescue of a fishing boat by providing communications between authorities at Dominica and HMS Trubridge MDSQ from 1 p.m. to 7 p.m. until the boat was located. AOD intercepts weather reports as received by NCS AED and phones them in to the USWB in San Juan. CK has a new Central Electronics 100V and soon AMG inherited a 20A and a BC-459 v.f.o. PJ is back on from Hato Rey with a Viking II and an all-band Windom antenna. RM is almost ready to move into a new home in Rio Piedras with a separate shack for the Apache, Mohawk, SB-10 and TA-33. AAA

(Continued on page 144)



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## MODEL HA-1 T.O. KEYS by HALLCRAFTERS

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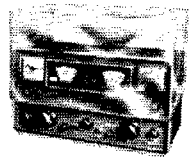
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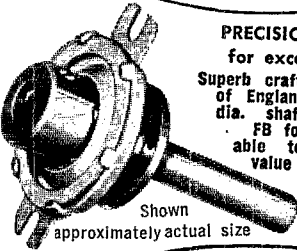
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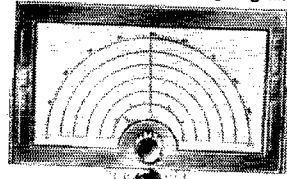
Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x 3/4" w. x 9/4" d. New and fully shielded.

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Another super buy from Jackson Bros. of England. Mechanical "Band Spread", 2 pointers giving Main and Band Spread drive. Ratios: Main 6:1, Band Spread 48:1. Supplied with black escutcheon and glass; fitted degree scale allows for dial calibration.



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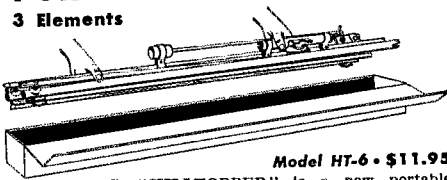
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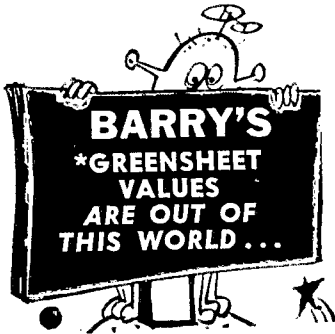
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reinstalled the 20-meter beam and cut teeth in the prop pitch motor to increase speed with less voltage on the motor. AAB replaced the old Millen 50-watt 50-Mc. final with a Gonset G-50. DJJ ordered a Heath 6-meter "lunch-box" like SV and AVB are using so successfully for DX contacts. KD applied for phone DXCC. All Africa Award, NAA-2, W-21-M, AC-15Z and R6K certificates and worked a few rare ones like KM6, LX8, 9M2, 457 and ISI. He worked HK8AA at Bajo Nuevo. HS6S, left home station HH2S in care of his son and operates HH6S in a mining town 2000 feet above sea level on the southwest coast of Haiti. HH4VB is on the Antilles Weather Net at 7 a.m. QV is back on with an Elmac 67. CX, BZ, ABN and AMG operate Collins 8/Line gear from the main office of the Radio Corp. of P.R. with Telrex beams for 20-15-10 and a dipole on 40. AET is at a new QTH in Camuy with a TBS-50 and long-wire antenna. AKH does OK on 15-meter sideband with a DSB-100. ACF took down the beam to strengthen the tower so is on 40 meters only now with a dipole. AOO has 163 worked with 143 confirmed on DXCC. The PRARC picnic at El Yunque was well attended. AVB had his Heath 6M "lunchbox" operating mobile there. Traffic: KP4WT 60, K1KEU/KP4 2, KP4FAC 1.

**CANAL ZONE**—SCM, Ralph E. Harvey, KZ5RV—The Canal Zone Amateur Radio Assn. was host to its members and their wives at a dinner June 5 at the Hotel Tivoli in Ancon. C. Z. Because of the absence of SW, its president, KQ, vice-pres.; presided. A total of 44 members and their wives attended, including BC and his XYL from Gatun, C.Z. The Crossroads Amateur Radio Club held Field Day activities at a portable location, using portable generators and tents to house the equipment. The weather was fine with no rain and a good breeze to keep the bugs moving. The location was on the sea wall at Coco Solo overlooking Limon Bay. The Air Force set up its Field Day location behind Albrook Field using the call AF/KZ5. LO, BS and AO have left the Canal Zone and returned to the States for reassignment. RF is in the States on vacation. OB and his XYL have returned from an enjoyable vacation visiting the Eastern Seaboard. Traffic: KZ5JW 84, VR 54, RV 2.

### SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, Albert F. Hill, jr., W6JQB —SEC: W6LIP. RMs: W6BHG and K6HLR PAMs: W6BUK and W6ORS. The following stations earned BPL in June: W6WPF, W6ZJB, W6GYH, K6MCA and K6WAH. Congrats, fellows! Vacations are cutting into operations all around the section including that of the SCM. Hope all have been enjoyed! K6PZM received a very fine letter from the Coast Guard on tidal wave work. W6ORS is travelling around the East Coast! W6BES has the KWS-1 running again! WA6AYF has a new tower and a G4ZU beam. K6SLX has a new 6-meter beam up. K6GKX reports excellent work on the California Intra-state Net. WA6HOL helped an injured man from a traffic accident while operating mobile. WA6UO has a new Challenger on the air. K6LJY is going to night school. W6FB now has 49 states worked for WAS. He needs Tennessee! K6CLS/6 put up a new 45-ft. tower. K6HLR is working some nice DX on 40 meters. WA6DWP is a new NCS on CN Sun. mornings. W6SRE has gone down to Alamitos Bay for the summer! K6KJY now is in the Air Force in Texas. K6COP received an Armed Forces Day certificate, as did W6FB and many others. W6INH received a CWA 40-w.p.u. certificate. Congrats! All clubs report excellent Field Day outings. K6EA is back pounding brass at sea. Support your section nets: On c.w., the Southern California Net on 3600 kc., meeting at 1900 PDST daily; on phone the SoCal Six Net meeting at 1900 PDST on 50.4 Mc. Traffic: (June) W6WPF 1101, W6ZJB 1082, W6GYH 910, K6MCA 883, K6WAH 670, W6SYQ 376, K6CLS/6 373, K6OZJ 296, W6BHG 277, K6HLR 213, W6CKR 167, K6LJY 121, W6USY 54, W6SRE 51, WA6DWP 45, W6KMJ 44, WA6AYF 41, WA6JOC 30, K6SIX 23, K6PZM 22, W6BUK 16, W6CK 15, K6COP 4, W6ORG 3, W6FB 2, W6NAA 1, W6NKR 1. (May) W6SYQ 180, WA6DJB 178, WA6JOX 126, K6TPL 64, W6KMJ 60, K6PZM 36.

**ARIZONA**—SCM, Kenneth P. Cole, W7QZH—SEC: CAF. The Arizona Hamfest, held July 2, 3, and 4 at White Horse Lake and sponsored by Northern Arizona amateurs, was attended by over 30 hams and their families. A new radio club has been formed by the Salt River Water Project and boasts of 22 members. K7ERE is operating the amateur radio station for the Boy Scout summer camp, Camp Geronimo. This camp is located in the Arizona mountains and radio is their only method of outside communication. Field Day: The Arizona Amateur Radio Club operated 3 rigs around the clock with 14 operators. MWD is the proud possessor of a Viking KW. LVR, a "dyed-in-the-wool" a.m. operator, has deserted the ranks. Listen for him on 20-meters s.s.b. KOY, an ardent amateur, was in an automobile accident Apr. 18,

(Continued on page 146)

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## HAMMARLUND HX-500

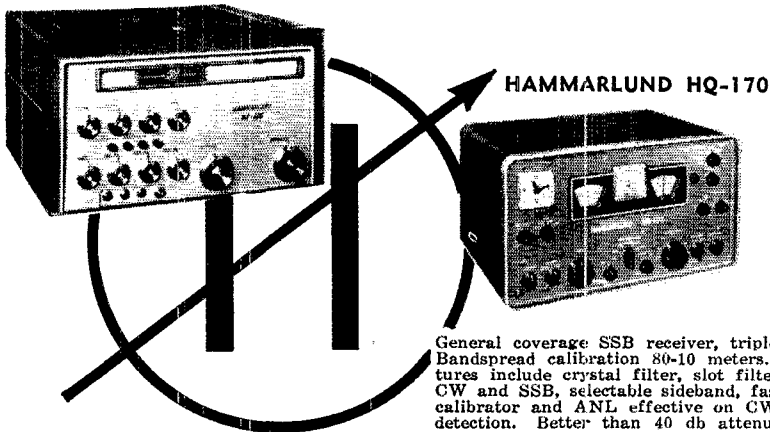
This superb new SSB transmitter for amateur and commercial uses offers 100 watts of undistorted performance. The HX-500 covers 80, 40, 20, 15 and 10 meter bands. Main slide rule dial is calibrated every 10 KCS. Vernier tuning knob calibrated every 200 cps. Carrier suppression and unwanted sideband suppression 50 db or better. Built-in antenna changeover relay. All crystals included — nothing extra to buy TVI-suppressed, 100w PEP, 100w CW, 25w AM, FM and FSK. VFO stability better than 100 cycles after warmup. 19 1/4" x 16 1/8" x 11 1/2"  
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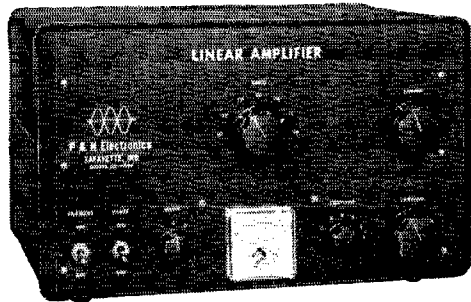
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1960. This means crutches for Gert for another 3 months. Your SCM wishes to apologize for the lack of a Station Activity report last month. Illness, plus hospitalization, made it impossible. Back on the job now—better than ever. Traffic: W7CAF 43.

**SAN DIEGO**—SCM, Don Stansifer, W6LRU—New appointments include K6TXS in Santa Ana as OPS. He is president of the Orange County Radio Club and ex-K6BYT and 51NP. K6LKD, in Escondido, is now ORS. He also is very active at W6LAC, the Escondido High School Club. The new president of the North Island Amateur Radio Club is W4DNU/6, who reports W7ZWN as vice-pres. W9ZAU/6, at El Toro, went QRT in August to return home to enroll at the University of Wisconsin. K6TFT, of National City, is now an OBS as well as a Class IV OO. K6RSL, of Santa Ana, was married in late June. Your SCM received six Field Day messages from clubs. The Newport Club, W6MRO/6, worked Las Vegas, Nev., with 7 watts on 144 Mc. during Field Day. New in Santa Ana is W6MCO. The South Bay Amateur Radio Society held Field Day on Pt. Loma and used a 100-ft. tower for v.h.f. antennas. The August meeting of the San Diego DX Club was held at the home of W6RCD. W6VMDK is now active in San Diego on 7-Mc. c.w. W6LRU had a vacation in the High Sierras after teaching summer school. K6PGO was at home in San Diego for the summer from his college classes in Kentucky. Ex-K6DNO was married in June and is now on active duty in Long Beach as an ensign with the Coast Guard. Traffic: K6BPI 806, W6EOT 706, W4DNU/6 398, K6LKD 229, W6CDD 227, W9ZAU/6 204, WA6ATB 143, K6TFT 23.

**SANTA BARBARA**—SCM, Robert A. Hemke, K6-CVR—Field Day brought plenty of response from this section. K6CST, Ventura Co. RC; WA6BMH, Poinsettis RC; K6BFE, Santa Barbara RC; W6HDO, Raysan RC and K6MIQX, Arroyo Grande RC, were heard but no scores are available at this writing. W6OUL, K6SCD, WA6DYD, WA6ADP, WA6KMG and K6MIQX went all out Field Day for the Arroyo Grande RC with a score of 1536. W6VHRV and W6HRX took the Conditional Class exams. W6IHD is working Paso Robles again on 2 meters—150 miles over mountains! WA6LLL received his General Class ticket. W6UWL won the Santa Barbara Section Sweepstakes for phone with his Ranger and Triband vertical and W6YK won the c.w. portion, giving Oxnard a clean sweep for the ARRL Sweepstakes in the Santa Barbara section. Traffic: W6YCF 9, W6FYW 5, K6CVR 3, W6OUL 2.

## WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG—I am always happy to make a report at this time of the year as I have just attended the 30th West Gulf Convention, this time in Dallas. Our hat is off to the hard-working members of the Greater Dallas Amateur Radio Council and I know the 550 who attended will join me in the vote of appreciation. More than 250 attended the pre-convention party at Louann's Club where we enjoyed a barbecue dinner and good music for dancing. The greatest disappointment of the convention was the lack of anyone bidding for the convention for 1961. Outside the war years when most ham activity ceased, the West Gulf Division has had a convention every year and I sure hate to see that record broken. GY gave a fine talk on traffic nets starting with their origination and bringing us up to the present with their progress. Field Day activity was somewhat hampered because of rain in various parts of the section. Many Field Day stations thought that they should report their locations as maritime mobile. Field Day messages were received from HPI, VFM, K5LAC and K5RAV. AAO is a new ham in Tyler and is really going great, having received his 1st-class commercial along with his General Class license, and now reports receiving the Code Proficiency award for 15 w.p.m. Congratulations, Emzy. LR reports having trouble getting traffic into the Southern Texas Area. Traffic: W5BKH 110, ACK 104, LGI 95, BOO 77, LR 40.

**OKLAHOMA**—SCM, Adrian V. Rea, W5DRZ—SEC: UYQ, K5HFV and K5LZF are new ECS, K5IBZ is a new ORS and K5OOV is a new OPS. Hats off to CZA and K5HYA, originators of the Oklahoma Six Meter Net, now celebrating its third birthday with 159 members. Oklahoma amateurs did a fine job in the Field Day Contest. Fourteen stations originated messages to either the SCM or SEC. These were K5OVT/5, K5ISK/5, UAO/5, SXA/5, K5LRU/5, K5HFW/5, K5SAM/5, HMF/5, GU/5, K5CXP/5, EQT/5, PGI/5, K5VOZ/5 and W5-KLH/5. A number of other Field Day stations were also heard. Oklahoma had a good attendance at the West Gulf Convention. Hope all plan to be present at the Oklahoma State ARRL Convention at Oklahoma City, Sept. 10. We missed Bartlesville news this month, but are afraid they beat Muskogee in the Field Day Contest. Guess

(Continued on page 148)

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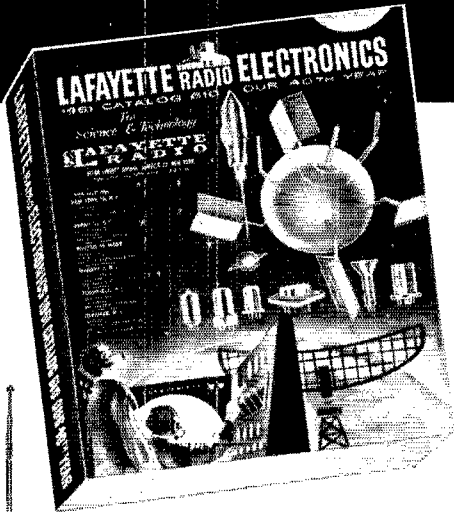
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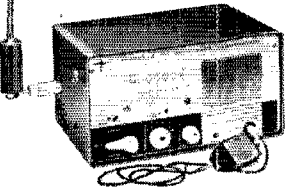
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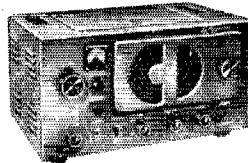
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**A**ND SAY! If you're in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf division, you have an extra "handle" right now for signing up new members. Director elections are in progress in those divisions, and members whose dues have been received at Headquarters by noon, September 20, will be able to vote this year. Wat sa, OM?

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I'm ignorant, but would someone tell me what the "H.B. Super Wing Ding Vertical-Horizontal" owned by VCJ is good for. K3RER also is advertising a "Slow-Mobile." K5ELG is Oklahoma Operator of the Month. Bill is OPS, OBS and NCS on the Sooner Traffic and Nooner Nets. He operates from a wheel chair and is one of Oklahoma's most dependable. Traffic: (June) K5JGZ 143, DLP 52, VRX 47, IBZ 46, DUJ 39, AUX 36, JOA 30, QEF 28, W5WAX 25, K5ELG 20, W5KY 16, WDD 16, K5CAY 15, QAK 14, W5DRZ 13, K5OOV 11, W5MFX 10, CCK 8, K5CBA 7, W5EHC 5, GIQ 5, UYQ 5, K5LUR 4, K8OVD/5 3, K5FZM 2, OVR 2, W5VLW 2. (May) W5UYQ 25, K5OVR 20, CBA 7.

**SOUTHERN TEXAS—SCM.** Roy K. Eggleston, W5QEM—SEC; QKF, PAM; ZPD, RM; K5BSZ. The new officers of the West Gulf DX Club are VU, pres.; CE, vice-pres.; PM, secy.-treas. It was good to see so many from our section at the West Gulf Division Convention in Dallas. I am sure everyone enjoyed the convention; it was one of the best I had attended in some time. K5QWU is the new EC for Pt. Arthur. Congratulations to K5MXO on receiving the BPL Medallion. K5ABV is a new ORS in Austin. K5WIC is in College Station. K5YHX is an OPS in San Antonio. The new officers of the Houston Amateur Radio Club are HSD, pres.; K5BSZ, vice-pres.; LSE, treas.; K3ALF, secy.; ITA, parliamentarian; and K5KDN, program chairman. Field Day activity was strong in Southern Texas, and from the reports I have been getting some of the clubs should have nice scores. The San Antonio Police Department has 14 amateur operators on its roster. MIF is running a new Apache. DJA and BKL are another one of the father-and-son teams heard in Southern Texas. The 7290 Traffic Net had 44 sessions, 1197 stations, and 457 messages. KOK is the new president of the El Paso Radio Club. K5ABV is taking two physics courses at the University of Texas during the summer, so don't imagine we will hear much from him until they are finished. Traffic: K5WIC 546, MXO 123, W5ZPD 55, K5ABV 40.

## CANADIAN DIVISION

**MARITIME—SCM.** D. E. Weeks, VE1WB—Asst. SCMS; A. D. Solomon, VEIOC, and H. C. Hillyard, VOICZ, SEC; BL, VOIEK is now using ultra modulation with excellent results regularly working G-Land on 75 meters with good reports. He also reports sending out 22 Field Day infringement notices! OC has spent the summer in the British Isles. OM has returned from the VE3 district where he visited AUU and BZB. Newly-elected officers of the NBARA are IZ, pres.; WF and CL, vice-pres.; FN, secy.-treas. The NBARA Net has changed to 9:30 A.M. Sun. on 3790 kc. The next VEI Contest will be divided into two sections, phone and c.w., to be held on different week ends. Watch for dates and rules which will be announced shortly. VO2AV reports the following new calls from Goose Bay: VO2AV, VO2ER, and VO2PC. VO2GB, VO2EB and VO2FS have been transferred. Your SCM returns to radio station CFNB as asst. chief engineer and will be residing near its 50,000-watt transmitter at Smithfield. The correct mailing address is not available at the moment but will be known shortly. Traffic: VO1EX 19, VEIOM 14.

**ONTARIO—SCM.** Richard W. Roberts, VE3NG —From all reports Field Day was a dandy with good weather and good conditions. Many of the VE3 boys are portable at this time of year from their cottages, etc. A fair amount of traffic originates from these stations. Listen for them. NG was maritime mobile during Field Day. 6VP/3 was a visitor to Ontario. Howie was formerly VE3VP. CFR will travel to Bermuda soon. EII will be off to VE1-Land soon. DTO and DXZ are portable at Port Severn. DZA is portable at Menford; Likewise BYQ at Lake Baptiste. KI is mobilizing in Ontario. RG is s.s.b. RW still is in Toronto taking treatment. IB is coming along FB and will be home soon. The Windsor Club had an FB Field Day outing and with the Detroiters across the River is forming a 10-meter net to be called the Windee Net. Try 28.8 Mc. Sat. The Third Grey-Bruce Picnic was held in July. 3AFU/3 was in operation. VD will be heard on 14 Mc. soon. BUR was in W1-Land in July. NF visited DTO and DXZ. CYS is at Crystal Beach. The AREC gang in the Timmins Area had a full-time emergency with floods, etc. DQL was the EC in charge. CWA is a newcomer to the c.w. nets. The Peterboro ARC is showing ARRL movie Aids. Five of its members passed the D.O.T. exams. GB has been maritime mobile on his cruiser en route to Picton via Trent and Lake Ontario. Once again look over your appointments and if due for reendorsement send the certificates to me S.A.P. Make sure that your subscription is paid up first. Our congrats to 2HE as ARRL Vice-Pres. and to CJ as Canadian Division Director. Traffic: VE3-NG 92, AIL 88, DPO 77, BUR 59, CN 55, AUU 40, NO

*(Continued on page 150)*





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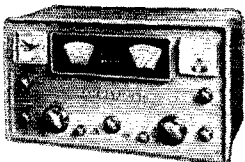
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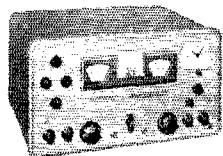
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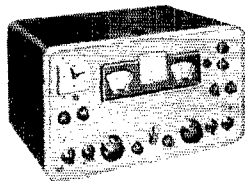
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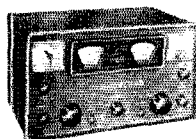
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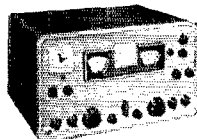
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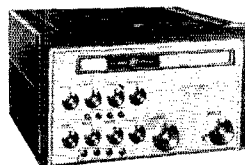
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**QUEBEC—SCM, C. W. Skarstedt, VE2DR**—Thanks for nominating me for another term as your SCM. I promise to do my best but can only do so with your continued cooperation. Many local groups were well organized for the June Field Day activities. A few of these were JC/2 at Rawdon, 11 operators; ADX/2 at St. Bruno with 18 willing hands; AWD/2 at Beauharnois kept 4 operators busy; MO/2 at Trois-Rivieres with a record 26 bodies; also CO, BN/NL, APX/2, etc. VV always is helpful to hams in distress. JS enjoys his S-Line gear. BB finally got on the air but needs a good 80-meter antenna. QA is rebuilding his final, AQQ (ex/TX) expects to operate mostly with mobile equipment. ABE is back on 80-meter phone. BAY uses the S-Line and intends swapping a trap antenna for an 80-meter dipole. Congrats to WT for a well-deserved RM appointment. Even during the summer months the Lake Shore Darts, Drafts, etc. is a very popular club. Meetings are held the 1st Tue. at Green Hornet, Valois. WA2CNS/VE8 moves lots of traffic. We would like to hear from other northern stations. TA was confined to the hospital. K2VFX/VE2 reports great activity on 144 Mc. with good openings. TT and LI worked beyond 600 miles. HY is one of our few TT enthusiasts and has made several solid contacts on 7 Mc. with English stations. *Hope to see you all at the Eastern Canada ARRL Convention in Montreal, Sept. 16 and 17.* Traffic: WA2CNS/VE8 261, VE2WT 202, EC 21, DE 18.

**BRITISH COLUMBIA—SCM, Peter McIntyre, VE7JT**—Field Day messages were received from the following: Totem, BQ/7, North and West Vancouver Club, Vancouver Club ARV/7, Victoria Short Wave Club EZ/7, RN/7, Prince Rupert Club ASL/7, Royal City ANW/7, Terrace ARA AJY/7, Point Grey ARC QR/7. The BCEN, on 3650 kc., is looking for more outlets in the smaller places throughout B.C. as well as stations in Alberta. Anyone interested, contact any of the following on 3650 kc. Mon. through Sat. from 1900 to 2000: AOT, AAF, JQ and BAZ. A very successful meeting of members of the GCEN was held at the QTH of JQ and all present were lavish in their thanks to Stu's XYL for a burdened table of food. The boys came from Vancouver Island, Prince Rupert and Quesnelle Bull Harbour. Of course they really came to see the new jr. operator, born just a couple of days before the meeting. The enthusiasm of the group for the BCEN was something to listen to, especially those from the Interior who travelled all night to get there. Those present were AAF, AOT, AAI, ALZ, BDC, APE, AMW, BES, BDZ, BAZ, AQY, VJ, ABV, AEW, JQ and JT. Traffic: VE7AMI 112, AAF 72, TT 72, AOT 43, AMW 15, ALZ 7.

**MANITOBA—SCM, M. S. Watson, VE4JY**—Acting, SCM, Jim Elliott, VE4IF. Your SCM, JY and his XYL are having a marvellous and interesting trip in Europe, but Mel says he would rather live in Winnipeg. NS has her station set up at her QTH in Virden. SR and his XYL report a very fine vacation through the U.S.A. to the East Coast and home. Stu had many contacts on mobile. AP, has been active again and putting out an FB signal. CP has been very busy getting married. OX worked 41 countries in his first month on the air. JE has the Heathkit twins for mobile and fixed work. RE has left Winnipeg for the East. AJ has been very consistent on 20 meters. LQ has his full phone privileges now. JW and the Beausejour Club were augmented with many operators and stations on all bands and had a most complete coverage of the amateur frequencies for Field Day. NW is spending his vacation at Gull Lake, is doing a lot of building, we understand. QZ has a new Globe Chief and is putting out an FB signal. JF and JQ have both moved to Dauphin and set up a business there. HH is spending some time at the Army camp at Shilo. IF and GE are spending the month of July at their cottage at Lee River. IM is on the air again. The 1960 Manitoba Hamfest will be held in Brandon Sept. 3 and 4. Traffic: VE4PE 6, CB 5, AN 4, IW 4, RB 4.

**SASKATCHEWAN—SCM, Harold R. Horn, VE5HR.** Field Day activity this year was much improved. The Saskatoon Club ended up with a fine outdoor supper at the site. CU and QC did an excellent job carving and serving. WYADS was a Saskatoon visitor and renewed some old school-day acquaintances. LM, with an SB-10 on s.s.b., does OK. PJ has a DX-100. NQ has an all-band rig ending with 500 watts in the final. DZ is a busy XYL, having gathered in 21 various award certificates and some yet to come. GW is planning a new antenna. LQ, GT, UC and RL are all kept busy week ends building cabins at Emma Lake. PA did a good job keeping the station on the air from the Scout Jamboree. TH also was there as Scout Master and took along a portable transceiver. BJ is now ZM at Wakaw and was

(Continued on page 152)



# MicroMatch® RF LOAD RESISTORS COVER THE RANGE:

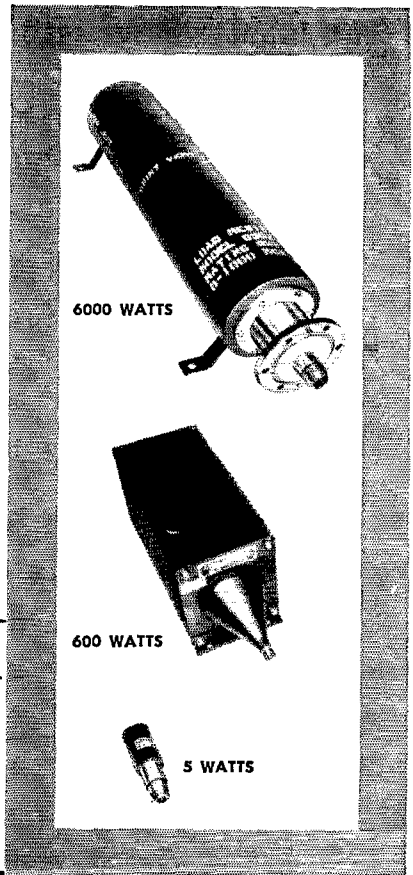
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SPECIFICATIONS		RF LOAD RESISTORS	
Model No.	Frequency Range (mcs)	RF Power Dissipation (watts)	RF Connectors
601	0-3000	5	N, C or BNC
603	0-3000	50	N, C or BNC
633	0-3000	50	N, C or HN
634	0-3000	150	N, C or HN
635	0-3000	200	N, C or HN
636	0-3000	600	N, C or HN
638	0-2000	6000	3 1/2" flange



Many other special models have been designed and manufactured to meet your particular space and input connection requirements.

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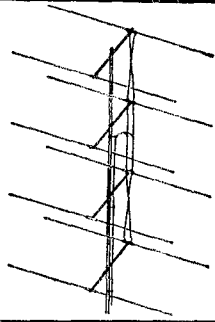


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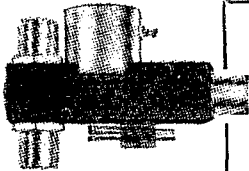
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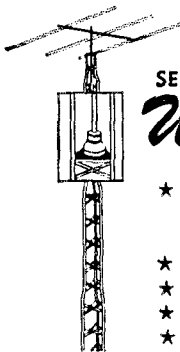
We invite inquiries for coaxial relays using types 'N' 'C' 'HN' 'BNC' and 'UHF' connectors.

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- ★ Streamlined in appearance.
- ★ E-Z "Instant" Installation.
- ★ Extra large, 1 1/2" base width.

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32 ft. spire with anchor base  
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surprised when IIR dropped in for directions to the YMCA camp. Nice meeting you, John. Sorry, fellows, I cannot make it to the hamfest but have fun. It is with deep regret that we show NZ under Silent Keys. Norm was one of the newer hams and will be missed by many.

QST

## June V.H.F. Party Results

(Continued from page 69)

KN1NVE 30-10-3-B	W6ZVY 18-6-3-B
K1H51 (K1s H51 HRM) 3003-143-21-AB	W6HCQ/6 (6 ops.) 4208-254-16-ABC
K1LKR/1 (K1LKE, KN1MON) 2240-140-16-AB	W6SLQ/6 (9 ops.) 3392-204-16-ABC
K1GRP/1 (5 ops.) 660-66-10-AB	<i>East Bay</i>
<i>Western Massachusetts</i>	W6RCY 385-77-5-B
W1RFU 8463-203-39-ABC	<i>San Francisco</i>
W2BVU/1 3388-208-36-ABCD	W6AJF 1680-92-16-ABCD
W1QFO/1 747-83-9-B	W6KOP 100-25-4-B
W1HDQ/1 704-64-11-AB	<i>Sacramento Valley</i>
W1UCB 112-14-8-AB	K6YHJ 369-41-9-AB
W1STR 56-12-4-AB	W6BDQI 297-33-9-AB
W1NBN/1 (7 ops.) 34578-645-51-ABCD	W6GGV/6 (8 ops.) 6118-248-23-ABCD
K1LAG/1 (K1s CQF LAG MFK) 6003-207-29-AB	<i>San Joaquin Valley</i>
W1GEP/1 (W1GEP, K1AHD) 12-14-3-B	W6SDM/6 (6 ops.) 2352-101-21-ABCD
K1BZT/1 (K1s BZT CLT) 6-3-2-A	W6RRN/6 (4 ops.) 432-48-9-AB

### ROANOKE DIVISION

<i>New Hampshire</i>	<i>North Carolina</i>
W1FZ/1 4250-165-25-ABCD	K4HGK 1785-105-17-A
K1NXX/1 1248-77-16-ABD	W4VHH 60-15-4-B
K1ATL 560-40-14-AB	W4WDH 40-20-2-B
K1NIOGR/1 560-80-7-B	W4FUC 18-2-9-B
K1GIB 324-36-9-AB	W4MOE/4 (4 ops.) 1012-92-11-A
W1IQD/1 216-19-9-AC	<i>South Carolina</i>
W1CTW/1 16-8-2-C	W5ARQ/4 176-16-11-A
W1MHL/1 (4 ops.) 12572-677-58-ABCDE	K4RLX 112-14-8-A
W1TNO/1 (W1s TNO YQH) 1728-96-18-AB	W4TLC 60-10-6-AB
<i>Rhode Island</i>	K4ACK/4 (K4ACK, W4TLC) 407-37-11-A
W1AJR 7371-169-39-ABC	<i>Tennessee</i>
K1CRN 2613-201-13-B	W4LTU 6336-198-32-AB
W1VXL 798-57-14-A	K4VWH 4321-149-29-AB
W1UHE 168-12-7-CD	K4EUS 736-46-16-AB
W1VXL/1 (7 ops.) 5934-258-23-AB	K4FCL 276-23-12-A
W1JFF (W1s JFF WLG, KN1MON) 549-61-9-B	K4AWQ 33-11-3-A
<i>Vermont</i>	W4KDH (4 ops.) 3328-128-26-AB
W1UIZ/1 1712-275-52-ABCDE	<i>West Virginia</i>
W1IPJ/1 (7 ops.) 3859-175-22-AB	W8DDQ 1584-72-22-AB
K1HBN/1 (K1s JTO IBN OVC) 217-31-7-A	K8AOM/8 370-37-10-A
W1HZ/7 (multiop) 1760-148-11-ABCDE	K8CAY/8 (K8s CAY OEN, K4VIZ) 2952-123-24-AB

### NORTHWESTERN DIVISION

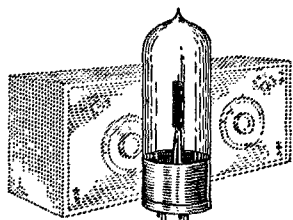
<i>Montana</i>	<i>Colorado</i>
W7EGN 56-8-7-A	W8AZT 2175-87-25-AB
W7CJN 50-10-5-AB	W8LC 1704-71-24-AB
<i>Oregon</i>	W8TH 1533-73-21-A
K7J8J/7 108-25-4-ABD	K8MRY 494-38-13-A
W7HBI 84-10-6-ABCDE	K8CLJ 420-35-12-A
W7WCM/7 62-1-2-B	W8MOX 12-6-2-B
K7AUG/7 (9 ops.) 1078-92-11-ABCD	<i>Utah</i>
W7RGS (W7s GIZ RGS UYT) 558-91-8-ABE	W7QDJ 40-8-5-AB
W7CS/7 (W7s UCS QLC NTN) 539-77-7-AB	<i>New Mexico</i>
<i>Washington</i>	K5IQL 1180-59-20-AB
W7RT 1989-116-17-ABC	K5UYF 12-6-2-AB
K7GAF 400-80-5-A	<i>Wyoming</i>
K9DWB/7 8-8-1-A	W4DLY/7 864-54-16-AB
W7HZ/7 (multiop) 1760-148-11-ABCDE	K7MFA 6-3-2-A

### PACIFIC DIVISION

<i>Nevada</i>	<i>Nahama</i>
K7JFO 44-11-4-A	K4BEI/4 (K4BEI, W4KX) 888-74-12-A
<i>Santa Clara Valley</i>	<i>Eastern Florida</i>
W6ASH 2310-143-15-ABC	W4LIP 12,480-320-39-A
WV6ELS 395-79-5-B	W4GLO 9900-300-33-A
	K4RNG 6475-175-37-A
	K4IXG 2850-114-25-AB

(Continued on page 164)

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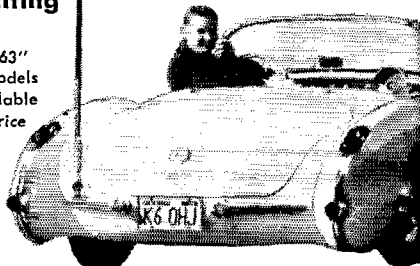
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"Package" . . . includes Band Spanner and plated, heavy-duty spring mount. . . . . **38.00**

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W4FNR 2349- 87-27-A  
W4RMU 2028- 78-26-AB  
K4EBT 1242- 69-18-A

### Georgia

K4JPD 1343- 79-17-A  
K4KLD 1056- 68-16-AB  
K4SNF 46- 23- 2-B  
K4KTC/1 4- 4- 1-A  
W4NRS/4 1- 1- 1-B

### West Indies

CO2ZX 77- 11- 7-A  
CO2DL (3 oprs.)  
590- 40-14-A

### SOUTHWESTERN DIVISION

#### Los Angeles

W6UGA 966-138- 7-A  
W6NLZ 903-32-21-AB/CD E  
W6BWA 192- 24- 8-AB  
W6JWL 96- 11- 6-1D  
K6BCV 92- 23- 4-B  
WA6DHM/6  
WA6CID (9 oprs.)  
5136-428-12-ABC  
WA6DOD (WA68 DOD CFT)  
420- 70- 6-AB

#### Arizona

W7QIZ/7 7- 7- 1-A  
W7RUX/7 (4 oprs.)  
930- 65-15-ABC

#### San Diego

WA6JMQ 108- 27- 4-A  
K6GPG/6 (4 oprs.)  
3952-280-13-ABCD  
WV6KGZ (WV6KGGZ,  
K6HVT)  
114- 38- 3-B

#### Santa Barbara

W6HPH/6 231- 27- 7-BD  
W6FYW 8- 4- 2-B  
K6UMM/6 (4 oprs.)  
3839-349-11-AB

### WEST GULF DIVISION

#### Northern Texas

K5BBG 5616-208-27-AB  
W58FW 2736-114-24-A  
K5SMU 2380-119-20-A

K5KVE 1092- 78-14-A  
K5GHR 648- 54-12-A  
K5TXX 540- 54-10-AB  
W5FEG 473- 43-11-A  
W5AQS 440- 40-11-A  
W5PVT 210- 21-10-A  
K5RBN 78- 26- 3-A  
K5OBO 36- 18- 2-A  
K5RAK 20- 10- 2-A  
K5KWB 6- 6- 1-A  
K5RTP 6- 6- 2-A  
K5BDL 4- 4- 1-A  
K5TKR (K58 TKR JFW)  
5913-219-27-A

#### Oklahoma

W5VCJ 2240-112-20-A  
W5PZ 78- 26- 3-B  
K5RJI/5 (K58 RJI YBC  
ZGV)  
2664-111-24-AB  
K5GQX (K58 GQX QOP)  
1188- 66-18-A

#### Southern Texas

K5RAE 2090- 95-22-A  
W5GBH 1566- 47-15-A  
W5RJT/5 (K58 RJI YBC  
ZGV)  
2664-111-24-AB  
K5VGD (K58 VGD YAV)  
440- 55- 8-A

### CANADIAN DIVISION

#### Maritime

VE1BC 930- 62-15-A

#### Quebec

VE2TT (VE28 AXV TT)  
410- 41-10-AB

#### Ontario

VE3BQN 2286-119-18-ABC  
VE3AIB 882- 93- 9-ABC  
VE3CIK 650- 65-10-AB  
VE3DUU 426- 71- 8-AB  
VE3AQQ 425- 85- 5-B  
VE3CZV 204- 51- 4-B  
VE3DEL 40- 10- 3-B  
VE3BAF/3 (VE38 BAF BNZ)  
26- 13- 2-A

#### Saskatchewan

VE5GQ 24- 6- 4-A

#### Alberta

VE6DB 28- 7- 4-A

<sup>1</sup> Multiple Operator Award Winner; <sup>2</sup> W3KMY, opr.;  
<sup>3</sup> K2ARO, opr.; <sup>4</sup> Novice Award Winner; <sup>5</sup> WIWPR, opr.;  
<sup>6</sup> Hq. Staff, Not Eligible for Award; <sup>7</sup> WHIOY, opr.  
Check logs: W4NUT, VE6FF. **QST-**

## YL News and Views

(Continued from page 69)

a picnic at their home in suburban Medfield. Local weather conditions were close to perfect for the three days, adding to the pleasure of the whole weekend.

To the Women Radio Operators of New England a vote of appreciation would seem in order for conducting the convention and bouquets to the convention committee for the excellence of the affair!

### HOWDY DAYS CONTEST

Sept. 28-30, 1960

The YLRL will conduct a "Howdy Days" contest for licensed YLs only, to run from 12 Noon EST Wed. Sept. 28 to 12 Noon EST Friday, Sept. 30, 1960. A "Howdy Week" contest was conducted last year. It is hoped that the shorter contest period this year will draw greater interest.

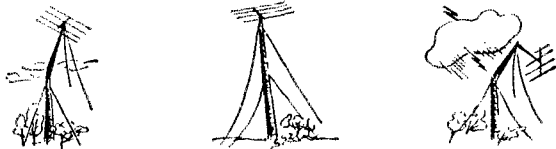
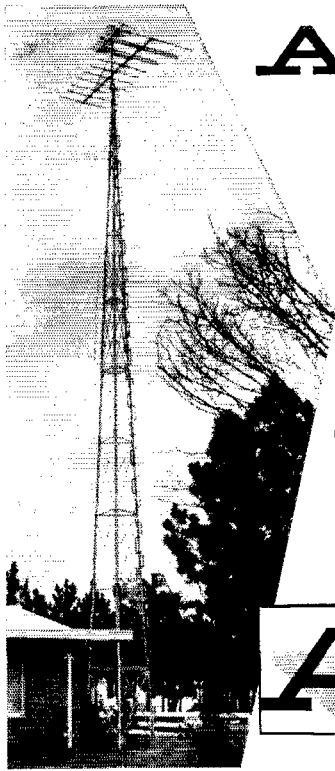
YLRL Vice President Lillian Beebe, W5EGD/3, says that "Howdy Days" is a get-acquainted fun party for all YLs who would like to chat with old friends and meet new ones. No gimmicks involved—just fire up the rig and ragchew the three days away. Here are the rules: Score will be based on licensed YL contacts only. All

(Continued on page 156)

# AERMOTOR

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**WON'T TIP! WON'T TILT! WON'T TOPPLE!**

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### COMMUNICATOR OWNERS

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## How A QSO ... And A COUPON — Led to a Hilltop QTH



One Saturday not long ago I was QSO with a W9 on 75. He mentioned how busy he was, with service contracts for 2-way commercial mobile rigs in his town. Before the heterodynes got too bad, he told me that it was a large source of extra income for him.

That evening, as the XYL was watching the one-eyed monster, I was reading the new QST. The Lampkin ad offering a free booklet on mobile-radio maintenance caught my eye. I had never answered the ad before, but I remembered the QSO, and sent in the coupon. Now I have my own extra-income business and from the profits I'm buying a home and antenna farm on the highest hill in town!

THE SAME COUPON IS BELOW — BETTER MAIL IT, NOW!



LAMPKIN 105-B  
FREQUENCY METER  
RANGE 0.1 TO 175 MC AND UP  
PRICE \$260.00 NET

LAMPKIN 205-A  
FM MODULATION METER  
RANGE 25 TO 500 MC  
PRICE \$270.00 NET

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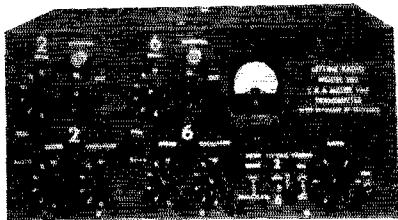
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MFG. DIVISION, BRADENTON, FLORIDA  
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With Mobile Connections and A. C. Supply**

The 262 contains the identical RF sections of the 2 meter 242 and the 6 meter 212 transmitters on one chassis, with a single 742 audio and power supply section. The only switching necessary to change bands is in the filament circuit. The separate RF sections make RF switching unnecessary, providing the same high efficiency of single band transmitters. Each RF section has its own tubes and circuits, comprising 4-5703's as oscillators and drivers, 2-6146's as final amplifiers, 12AT7 crystal mike amplifier, 6V6 audio driver, 2-6Y6's class B 100% push-pull plate modulator, 5U4G rectifier. Two separate antenna outputs are provided with coaxial connectors on the front of the transmitter. These are connected to swinging links, controllable from the front panel, matching antennas from 52 to 300 ohms. The 262 uses standard 8 mc. crystals and will operate with the Lettine VFD. A socket is provided at the rear for relay connections. Cabinet 8 x 17 x 8 inches. Weight 32 lbs. Will operate mobile from a 1E-103 dynamotor. Completely wired and ready to operate.

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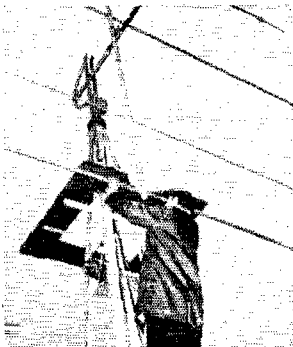
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bands and all modes of emissions may be used. Only one contact per station may be claimed. Contacts on nets not permitted. No multipliers will be used. Score two points for each YLRL member worked — one point for each non-YLRL member worked. Logs are not required. Submit a list, stating date, time, calls, name, QTH, whether YLRL member or not, to YLRL Vice President Lillian Beebe, W5EGD/3, 923 Kent Ave., Baltimore 28, Maryland, before October 15, 1960. The Vice President suggests that all YL nets close during the contest period, although, of course, the choice of closing the nets lies with the individual net officers.

**CLUB NEWS**

*Chicago YLRL* — New officers are Pres. W9GME; V.P. K9UHD; Secy.-Treas. K9LIW. W9GME will also edit the *QUEEN'S KEY*, quarterly club bulletin.

*Florida YLs* — *Floridors YL Week*, a new club project, is scheduled for the week Jan. 8-15, 1961. Details later.

*San Diego YLRC* — New officers are Pres. W6VSL; V.P. W6EVU; Secy. WA6RTZ; Treas. WA6CBN. W6GGX, Pat, is the new custodian of the club's Missions to Missiles certificate, issued to any amateur who contacts seven club members. Submit log extract to W6GGX, Pat Mulheim, 4275 Del Mar Ave. San Diego 7, Calif.

*W4YLARC* — W3TSC, custodian of the new club certificate, reports that famed award collector OM W2QHH received certificate #1, with the second going to K5YTB, Barbie

— \* — \* —

OM K6BX reports that K6OQD, Jean Kinchelec, became member #27 of the new Certificate Hunter's Club and the first YL member. (Membership requirement is possession of 25 or more amateur achievement awards.) K6BX predicts 100 CHC members by the end of 1960 and 1000 by Dec. 1961. He expects YLs "to constitute 25% of the membership because of their appreciation of amateur achievement awards and because of their interest in giving them." K6BX's Directory of Certificates and Awards has a section devoted to all YL awards and certificates. For information on the directory, which contains complete information on some 350 awards from over 50 countries, write to Cliff Evans, K6BX, Box 385, Bonita, California.

**Conventions**

(Continued from page 12)

the Hotel Statler-Hilton in New York City on Saturday, October 15. A pre-convention get together is to be held the previous evening.

Top-rated technical talks on DX, s.s.b., v.h.f., antennas, RTTY, along with special meetings for those interested in each of the subjects are being planned. There is to be a "mammoth" QSL contest. Equipment manufacturers will display the latest ham gear.

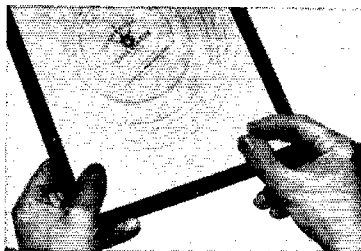
Co-chairmen Chet Drexler, K2EAF, and George Droste, W2IN, point out that this is going to be a "real old-fashioned convention." Handling special assignments is the Communications Club of New Rochelle, tickets; New York Radio Club, exhibits; Droste, Guy Brenner, K2EFB, and the Staten Island Amateur Radio Association will be running the FCC exams and code contests. Dave Talley, W2PF, of the Radio Club of Brooklyn is in charge of the Royal Order of the Wouff Hong ceremonies. Harry Dannals, W2TUK, and the Lake Success Radio Club are handling awards with Ed Pillar, W2KPQ, and the Single Sideband Amateur Radio Association presenting the s.s.b. program. Publicity is being directed by Wayne Green, W2NSD.

Convention pre-registration is \$1.50 per OM

(Continued on page 158)

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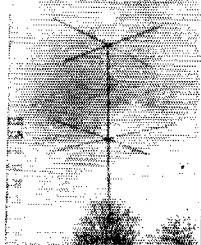
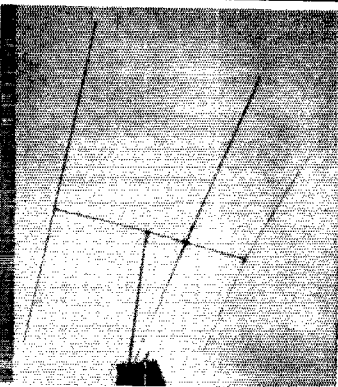
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This revolutionary beam dominates the 20/40 field (also works on 15). Engineered design gives better gains, lower SWR and greater F/B ratios. Total radius of 3' 9" allows installation ANYWHERE. Beam weighs only 14 lbs. complete. Heavy duty supporting mast included in cost. Not a kit. Easily tuned. Fitted for coax feed. Other feeds can be used efficiently. Chuck, W2CSE, says "They tune very sharp. Front to back exceptional." Join Chuck and the many others who are completely satisfied. **\$94.50**

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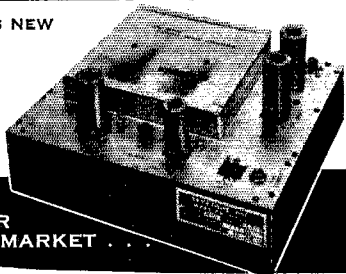
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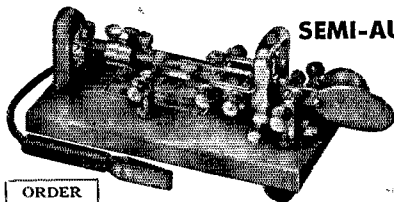
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and \$1.00 for YL or XYL. Prices will be higher at the door. Banquet tickets, including general admission, are \$9.00 for OM's and \$8.50 for the gals. Registrations or banquet ticket requests should be sent to HARC Convention, P.O. Box 971, New Rochelle, New York. Checks should be made out to "HARC Convention."

**Moon Bounce**

(Continued from page 64)

veloping background noise and bits and pieces of Sam's slow-speed c.w. could be read. The first east-west 1296-Mc. moon-bounce transmission was an accomplished fact!

**Acknowledgments**

The success of the first 1296 Mc. amateur "Project Moon Bounce" could never have been achieved without the unselfish, generous help of a number of amateurs. This was truly a group undertaking, supported and encouraged by many amateurs, scattered across the United States. Highest tribute should be given to the following in the Eimac Gang Radio Club: Bill Eitel, W6UF; Hank Brown, W6HJB; Willy Sayer, WA6BAN; George Badger, W6RXW; Bill Orr, W6SAI; Ray Rinaudo, W6KEV; Al Clark, W6MUC; Bob Sutherland, W6UOV; Carl Whitlow, W6WBC; Bob Morwood, K6GJF; Allan Beer, K6GSO; Charlie Anderson, W6IVZ; Hugh MacDonald, W6CDT; Mac Parks, W6NBD; Lee Perry, W6VW; Dick Kramer, W6FBR; and Hal Jones, W6ZVV.

Other amateurs who contributed to the moon-bounce project are: Mike Krivohlavek, K6AXN; Maj. O. Ray Hill, K6MLZ (ARDC); Capt. Wm. Bettis, W5RLU (SAC); Jo Jennings, W6EI; Bob Melvin, W6VSV; Cmdr. R. Campbell, W4CCN/6 (USN).

QST

**Happenings**

(Continued from page 67)

experimental stations are involved in complaints of interference. In the 1959/1960 fiscal year the Department investigated 25,188 complaints of interference of all types and in all services. Of these, only 92 were found attributable to amateur faults — off-frequency operation, harmonics, parasitics, key clicks, overmodulation or other spurious radiation. The breakdown is as follows:

Interference to standard broadcast stations	10
Interference to television reception	59
Interference to both TV and BC	19
Interference to other services	4

As VE3CJ says, "Apparently we are not so bad!"

QST

**"NEW" — HAM BENCH PLANS \$1.00**

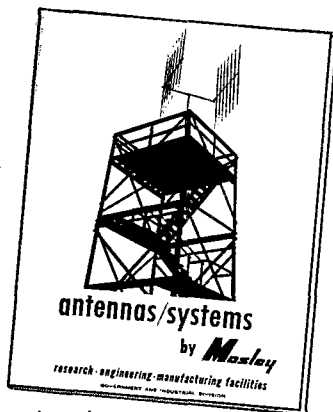
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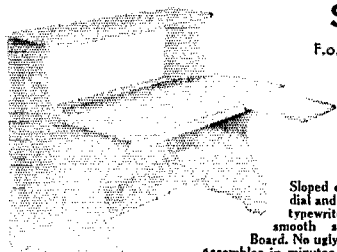
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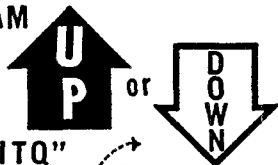


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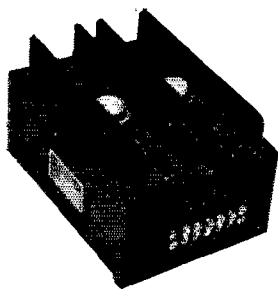
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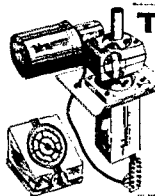


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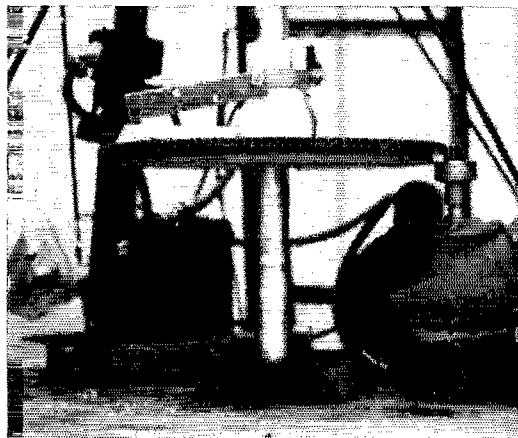
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# Junk-Box Magic

BY H. W. MORGAN,\* KØJTP

HAVING on hand a what-cha-ma-jigger and wishing to have a whatsit I modified the what-cha-ma-jigger in the following manner and came up with the best whatsit I've ever seen. Many articles in the ham journals start out with "having on hand some piece of gear" and wanting something else, "I proceeded to convert". Usually the piece is some "one in a million" gear from the junk box. This is another such article, so read on at your own risk. I wonder how large some junk boxes are. Mine has expansible dimensions.



KØJTP's Whatsit.

Having on hand one cubical quad constructed from various and sundry pieces of equipment with ideas from the *Antenna Book*, *CQ*, *QST*, government publications, and a brilliant thought of my own, and requiring a rotator to turn the thing, which is slightly too heavy for a TV rotor, and not having the wherewithall to purchase heavy duty gear, I looked in the junk box. Lo and behold, it contained a one-third horse motor from an old X-ray table (if you happen to have one you also can convert it to a usable piece of rotating equipment). This motor had reduction gears reducing the speed to 25 r.p.m. and being of one-third horsepower I considered it to have sufficient power to rotate my cubical quad.

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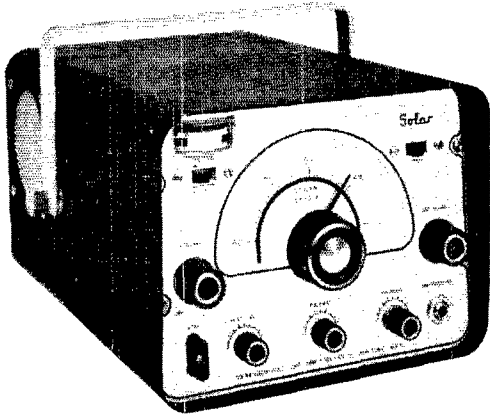
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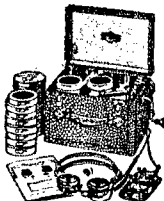
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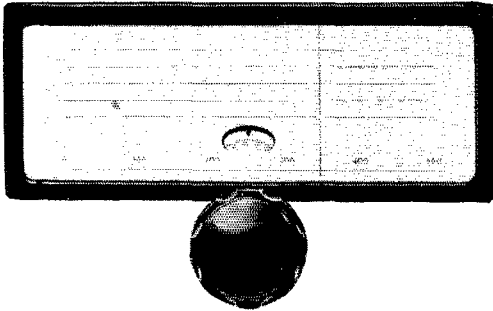
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Send your QSL or post card for free descriptive folder.

was complete with limiting switches and a master switch marked "up" and "down". It is easy to convert "up" to "clockwise" and "down" to "counterclockwise". It is harder to convert a motor from 220- to 110-volt operation, particularly when the field coil wires are buried inside of the housing. An attempt to contact a brother-in-law, an electrician, finds him on vacation. I'm in a hurry so a hurried trip to a commercial establishment and a bill for \$8.57 and the motor works.

Now this motor has a shaft coming out at right angles to the shaft of the motor itself and said shaft is equipped with a sprocket and a motorcycle chain. There are 18 teeth on the sprocket. I want approximately 1 r.p.m. on the cubical quad. This means 450 teeth on a sprocket fastened to the shaft of the antenna. They don't make one. There wouldn't be room to house it in the base of the tower if they did make one. They don't make one with half that number of teeth, for at this time I would settle for 2 r.p.m. The junk box does not contain anything to help. Pulleys and belts cause slipping problems so I visit another friend who runs an automobile parts shop and we look for the largest gear with the greatest number of teeth with a small gear to mesh with it and here we have a little luck. The starter gear, the largest in stock, has 149 teeth and there is a small drive gear which fits having only 9 teeth and we come down to a little less than 2 r.p.m. and again we are in business. The big gear has no spokes or hub, so just happening to have a hand saw, I rig up a jig and cut out a piece of plywood to fit the center of the gear, cover it with a coating of waterproofing material, drill a 1 $\frac{1}{4}$ " hole in the center (I have to buy a new expansion bit as the bit part of my old one has disappeared, cost \$2.85) and I have now to devise a means of fastening the gear to the wooden pulley.

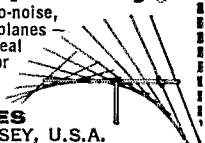
This is easily solved by a torch and silver solder, some brass lugs on the big gear, drill the lugs and fasten them with screws to the wooden pulley. I always wanted a silver-soldering torch anyway. I find that the small gear locks in one direction but not in the other so a spot welding job and drilling and tapping for set screws is in order. Since the machine shop is run by a backdoor neighbor of mine the bill is only \$.50 and well worth all of it.

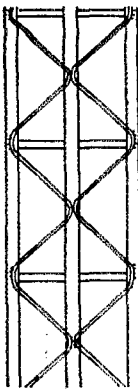
Now we turn out a hub for the wooden pulley on our trusty wood-turning lathe which we just happen to have, split it, clamp it to the antenna shaft with a U-bolt, screw the large wooden pulley to the base of the hub, mount the motor on its side with the aid of two shelf brackets,

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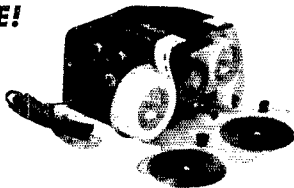
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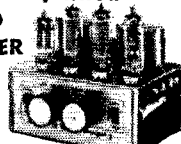
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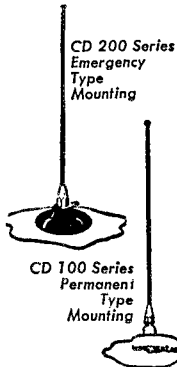
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mount the limiting switches with two more shelf brackets, also from the junk box, and we are ready to wire the equipment.

As they say in all of the articles wiring is "straight forward". There are just four switches, two double-pole single-throw relays, one double-pole double-throw relay to reverse the field coils of the motor and thereby the direction of rotation. This relay was hard to come by. It was not available locally, lists in the catalogue at \$6.82 and the first one received was broken so we had to wait two weeks to start the wiring job. The limiting switches require a little manipulation from time to time but so far we have not twisted off the coax that leads to the antenna. All operations to date have been with me at the tower, my XYL at the control switches, and my daughter outside the ham shack window to relay signals. I think I will get up courage enough to try it without assistants this week.

All we have to do now is protect the whatsit from the weather. The double-pole double-throw relay would not fit in the switch box with the other two relays. It is enclosed in a plastic bag. See the photo. The bottom of a plumber's aid should fit nicely around the shaft and give some protection to the opening in the housing when we have had time to build it.

What direction does the antenna point? Why ask me that? I've been thinking of a nylon fish line run through screw eyes with a weight on the end to dangle outside the window of the ham shack. I will then attach a pointer to the fish line which should travel up and down as it winds and unwinds from the hub of the pulley. A waxed pencil to mark the window at different levels should indicate the directions and it would be easy to correct for shrinkage of the fish line, slippage of the shaft, jumping of the gears, or icy conditions in the winter.

Please excuse me while I take another look in the junk box. QST

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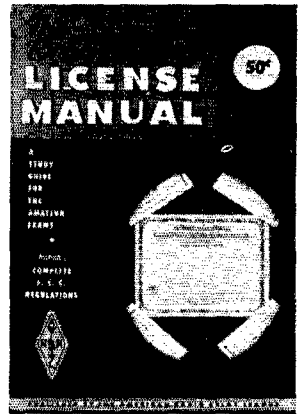
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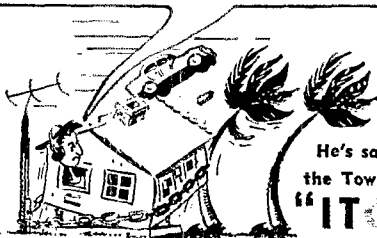
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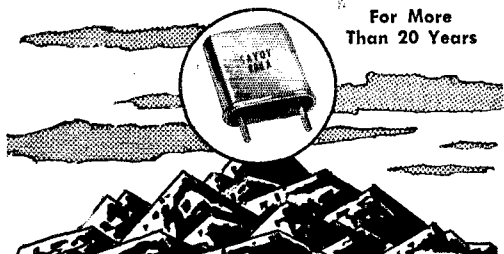
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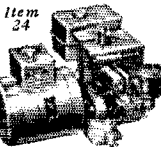
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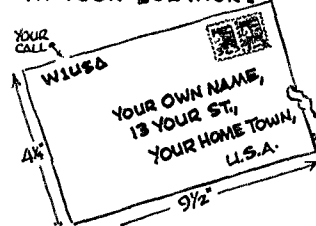
Terry W9DIA

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W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.  
W6, K6 — San Diego DX Club, Box 16006, San Diego 16, Calif.  
W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.  
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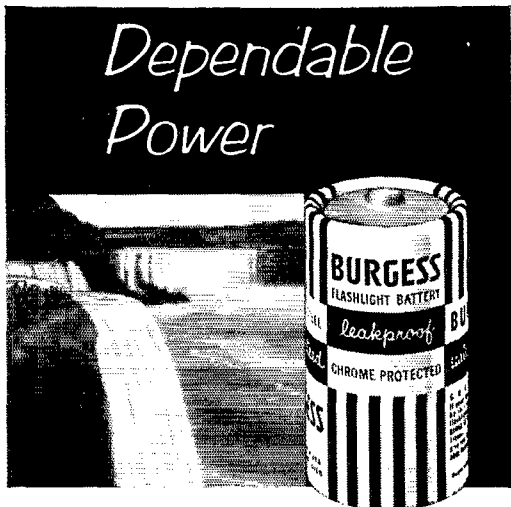
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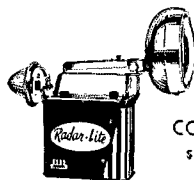


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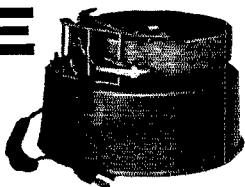
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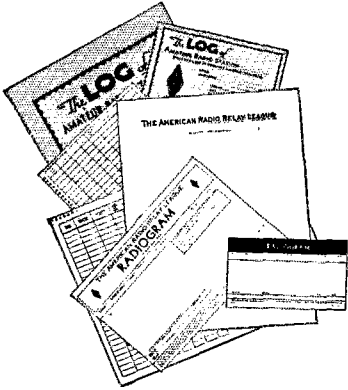
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FREE TRIAL?  
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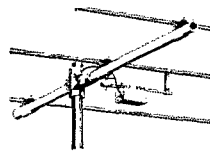
## HENRY HAS IT!

Equipment at both Henry stores may be traded back in 90 days at full price on new equipment. Our time payments save you money because we finance ourselves. Write, phone or visit either Henry store to get better equipment at less cost on better terms.

**Henry Radio Stores**

Butler 1, Missouri  
Orchard 9 3127

11240 West Olympic Blvd.  
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### BEAM EXPENSE

can be lowered with a beam designed to last.

- THREE BAND • TWO BAND
- SINGLE BAND

TENNALAB 417 S. Tenth St.  
Quincy, Ill.

### New Pantograph-Action MICROPHONE ARM by Pantolite

Your microphone is held steadily — Arm swings 360 degrees: swivels vertically to any desired point. Finest expansion arm ever designed. A superb addition to your rig!

For Light, Med. or Heavy Mike; state which.

**\$15.75**

(BRACKET FOR DESK OR FOR WALL MOUNTING AVAILABLE. STATE WHICH).

POSTPAID WITH CHECK OR MONEY ORDER. ADD 10% FOR C.O.D.

**Estelle's Studio**

82 Church St., Dept. Q  
Manasquan, N. J. CA 3-2025

# HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, at less than the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertising may use more than 100 words in any one issue nor more than one ad in one issue.

*Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

**WANTED:** Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

2ufd 4000V DC capacitors, \$5.00 each, or 2 for \$9.00. F. G. Dawson, 5740 Woodrow Ave., Detroit 10, Mich.

**COAXIAL Cable.** New surplus RB-54A/U, 58 ohms impedance —30 ft. prepaid, \$1.00. Radio magazines, buy, sell, trade. R. Farmer, 3009 No. Columbia, Plainville, Texas.

**ALL types of transmitting and receiving tubes wanted.** Also aircraft or ground receivers and transmitters. Hamgear or test equipment. For immediate action for cash write or phone Ted Dames, W2KUW, 308 Hickory St., Arlington, N. J.

**MOTOROLA used FM communications equipment bought and sold** W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

**WANTED:** Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N. Y.

**ANTENNA** 80-40-20-15-10, \$21.95. Patented. W4JRW, Lattin, Box 44, Owensboro, Ky.

**MICHIGAN Hams!** Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrman 8-8262.

**HAM TV Equipment** bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

**CASH for your gear.** We buy, trade or sell. We stock Hammarlund, Hallicrafter, National, Johnson, Gonsert, Globe, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H. & H. Electronic Supply, Inc., 506-510 Kishwaukee St., Rockford, Ill.

**SSBERS!** Keep up with SSB news and views! Join the Single Sideband Amateur Radio Association, dedicated to furthering good SSB operating; promoting advancement of SSB equipment and disseminating SSB technical information. Read "The Sidebander," official publication of the SSBARA. Dues \$3.00 yearly. Write for membership application, sample "Sidebander" to SSBARA, 12 Elm St., Lynbrook, N. Y.

**"PIG-IN-A-POKE"?** Not if you visit Ham Headquarters, USA and see and choose from the hundreds of "Like-New" bargains in the world-famous Harrison Trade-in Center. More for your money, because tremendous turnover makes lower overhead! Terms, trades. Send postcard for mouth-watering photograph and price list Q-6. For the best in all new and used equipment, it pays to come to "Ham Headquarters, USA" BCNT, 73, 8th Harrison, W2AVA, 225 Greenwich St., New York City, N. Y.

**KWM1 and a few high plate dissipation tubes** wanted, 304T1/TH 4-1000A, 4PR60A, etc. Ted Dames, W2KUW, 64 Grand Place, Arlington, N. J.

**CASH for used short wave ham receivers, transmitters and accessories.** Trear, W9IVJ, 2023 N. Harlem Ave., Chicago 35, Ill. Tuxedo 9-6429.

**CHICAGOLAND Amateurs!** Factory authorized service for Hallicrafter, Hammarlund, Globe, Gonsert. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halsted St., Chicago Heights, Ill. Tel. SKYline 5-4056.

**FREE Bargain list,** Box 575, New York 8, N. Y.

**QSL'S? SWLS? Finest and largest variety samples 25¢ (re-fund).** Callbooks (Fall) American calls, \$5.00; Foreign calls \$3.00. "Rus" Sakkers, W8DED, Box 218, Holland, Mich.

**QSL-SWLS.** Reasonable, Samples 10¢. Glenn Prnt., 1103 Pine Hts. Ave., Baltimore 29, Md.

**QSL "Brownie,"** W3CJH, 3110 Lehigh, Allentown, Penna. Samples, 10¢ with catalogue, 25¢.

**QSL-SWLS.** Samples 10¢. Malco Press, 1937 Glensdale Ave., Toledo 14, Oh. o.

**QSL'S New design, lower prices, fast delivery.** Catalog 25¢ (coin only), refundable, Dick Crawford, K6GJM, Box 607, Whittier, Calif.

**QSL'S.** Twenty exclusive designs in 3 colors. Rush \$3 for 100 or \$5 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

**CREATIVE QSL and SWL Cards.** Are you proud of your card? If not let us print your next order. Write for free samples and booklet. Personal attention given to all requests. Bob Wilkins, Jr., KN6ZMT, Creative Printing, P. O. Box 1064-C, Atascadero, Calif.

**QSL-SWLS.** Samples free. W4BKT Press, 123 Main, McKen-ae, Tenn.

**QSL'S** Samples dime. Sims, 3227 Missouri Ave., St. Louis 18, Mo.

**QSL'S Taprint.** Union, Miss.

**SUPERIOR QSL's** samples 10¢, Ham Specialties, Box 3023, Bellaire, Texas.

**QSL'S 3-color glossy.** 100—\$4.50. Rutgers Varityping Service, 7 Fairfield Rd., New Brunswick, N. J.

**QSL'S WAT.** Box 1, Brecksville, Ohio.

**G. FRITZ quality QSL's.** New location, P.O. Box 1684, Scottsdale, Arizona. Samples 25¢ deductible. Be sure you get our card-of-the-month deal. Introductory Arizona Special!

**QSL'S-SWLS:** That are different, colored, embossed card stock, and "Kromekote," Samples 10¢. Turner, K8AIA, Box 953, Hamilton, Ohio.

**QSL-SWLS,** reasonable prices. Samples 10¢. Robert Bull, WBXT, Arlington, Vt.

**QSL'S \$1.00.** Riesland, Del Mar, Calif.

**QSL'S Lapel pins,** samples dime. Kephart W2SPV, 4309 Willis, Merchantsville, N. J.

**QSL'S SWLS.** XYL-OMs (sample assortment approximately 95¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototypical, snazzy, unparagoned cards (Wow!). Rogers, K0AAB, 737 Lincoln Ave., St. Paul 5, Minn.

**PICTURE QSL Cards** of your shack, home, etc., Made from your photograph. 1000, \$13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

**GLOSSY QSL'S:** 100 4 colors, \$3.50. Others less, Samples 10¢. Dick W8VXK, 7373 No. M-18, Gladwin, Mich.

**DELUXE QSL'S.** Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

**QSL'S** Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

**QSL'S SWL'S** Nicholas & Son Printery, P.O. Box 11184, Phoenix, Arizona.

**QSL-SWLS,** 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

**QSL'S:** Send 25¢ (refundable) for samples. W6CMN, Schuch, 6707 Beck Ave., North Hollywood, Calif.

**QSL-SWLS.** Free Samples. Spicer, 4615 Rosedale, Austin 1, Texas.

**QSL'S Kromekote 2 & 3 colors,** attractive, distinctive, different. Free ball point pen with order. Sample 10¢. K2VOB Press, 162 Midland Blvd., Maplewood, N. J.

**QSL'S.** 100 for \$3.00. Glossy, distinctive design. Samples free. R. A. Larson Press, 32 Midland Ave., Stamford, Conn.

**QSL'S \$1.75 per 100** postpaid U.S. only. Glossy, red and green. All orders mailed within 10 days. Free sample. Hobby Print Shop, Umatilla, Fla.

**QSL'S:** Cartoons, colors, samples 25¢. Chris, W9PPA, 365 Terra Cotta Ave., Crystal Lake, Ill.

**DON'T Buy QSL's** until you see my free samples. Bolles, 7701 Tisdale, Austin 5, Texas.

**ATTRACTIVE QSL'S.** Pearce, 192 Osborne, Danbury, Conn. QSL'S Samples, dime. Printer, Corwith, Iowa.

**QSL'S-SWLS,** distinctive, reasonable Samples 10¢. Al-Mar Crafts, Box 6052, Riverton Heights, Wash.

**QSL cards,** 6 designs to choose from, 2 designs for the mobile operator. All designs are new and original. The cards are post-card size. Printed in 2 colors on the front of a glossy Kromekote card. \$2.75 for each 100 cards. Send \$5 for sample brochure to Williams Printing, P.O. Box 2597, Van Nuys, Calif.

**QSL'S.** Stamp brings samples. Eddie Scott, W3CSX, Fairplay, Md.

**OUTSTANDING QSL'S (1 1/4" high call letters).** One style, 3/2 color (QSO data on address side), 5 ink, 7 cards choice; 100, \$2.75. Samples free. Garicopy, 2624 Kroemer Rd., Ft. Wayne, Ind.

**QSL'S 100 3-color,** \$3.00. Sample sheet, 10¢. RBL Print M.R. 12, Phillipsburg, N. J.

**QSL'S** Reasonable, nice designs, samples dime, W2DJH Press, Warrensburg, N. Y.

**MODERN QSL'S,** dime. Filmmcrafters, Box 304, Martins Ferry, Ohio.

**QSL'S.** Attractive, colorful. Variety of type styles and backgrounds. Samples 10¢. K6QAO Press, 5013 Enfield Ave., Encino, Calif.

**QUALITY QSL'S** Samples and prices, 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

**RUBBER Stamps** for hams, sample impressions, W9UNY, 542 North 93, Milwaukee, Wisconsin.

QSL5-SWLs are different, colored, embossed card stock and "Kromekote." Samples 10¢. K8A1A, Turner, Fox 953, Hamilton, Ohio.

QSL5. Quality and economy complete samples dime. QSL Printing, Box 12351, Houston 17, Texas.

QSL5. Fine quality. Choose your own combination of 7 styles, 10 card stocks, 8 ink colors, photos, \$2.50 up. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

QUALITY QSLs at reasonable prices, \$2.00 per 100, samples 25¢ (deductible). K4ICH Press, 3506 Van Winkle Circle, Chattanooga, Tenn.

QSL5. Economy prices, prompt delivery. Send for samples. W7HZ Press, Box 183, Springfield, Oregon.

WANT 1925 and earlier ham and broadcast gear for personal collection, W4AA, Wayne Nelson, Concord, N. C.

RECEIVERS: Repaired and aligned by competent engineers using factory standard instruments. Authorized factory service station for Collins, Hallicrafters, Hammarlund, National, Harvey-Wells. Our twenty-fourth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Notice, \$1.50; General, \$1.75; Extra, \$2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

LOWEST Prices: Latest amateur equipment. Factory fresh sealed cartons. Self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Ridge Rd., Stamford, Conn.

GREAT surplus values!! BC-603 Receiver New \$17.00—R-26/ARC Rec 3-n mc New \$12.95, used exc \$7.95—BC-659 Transceiver with PE-120 \$19.95—1-47/ART-13 Transmitters 34/AP \$49.00—Sound-Powered Dynamic Phones Pr. \$4.75—Rec. Microwave R-111/APR-5 \$39.00—Collins CFI 82-Q for Q-5'er compli. w/tubes & instructions \$5.95—Collins Mod. Xformer 100 watt 811-PP to 813 final \$3.95—RA-62-C Power Supply A-C for SCR—225 VHF 100/60 exc. New \$59.50—Kits only for above, \$17.00—Ground-plane VHF antennas 30-200 MC New \$9.95—Hi-Mu Electronics—131 Hamilton St., New Haven, Conn. Store hours 10—5 Sat. 9—12.

TOROIDs: Unused 88 mhy like new. Dollar each. Five, \$4.00. pp. DaPAul, 101 Starview, San Francisco, Calif. After Sept. 1st our address will be at 309 So. Ashton, Millbrae, Calif.

S.S.B. Xfrms, exact type for W2EWL Special and other sideband units: hermetically sealed, brand new set of 3 for \$3.00. Brand new G-E 100 watt (audio) multi-impedance modulation xformer (10 lbs.) \$6.12. No. c.a.d. include postage. Send stamp for list of other gear. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, N. Y.

FOR Sale: Tickets to the one and only—The Original Syracuse VHF Roundup, October 8, 1960. Write K2TXG, 317 Clover Ridge Drive, Syracuse 6, N. Y.

BEGINNERS. Code memorized in one hour. New method. Used in Armed Services, ham radio, scouting, "Ketchum's Hour Code Course", \$1.00 postpaid. Money back guaranteed. O. H. Ketchum, 10125 Flora Vista, Bellflower, Calif.

THE Annual Peoria Hamfest will be held at Exposition Gardens, Youth Building Sept. 18, 1960. Advance registration \$1.00; at the gate, \$1.50. Contact Larry Pearsall, W9FDY, 2224 Herold, Peoria, Ill.

WANTED: 6 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

GELOSO Italian amateur rcvr. In perf. condx. \$250. K0TGW, Wichita, Kansas.

ATTENTION Mobiles! Lecce-Neville 6 volt 100 amp. system, \$50; 12 volt 50 amp system \$50; 12 volt 60 amp system, \$60; 12 volt 100 amp syst. \$100. Guaranteed no ex-police car units. Herb A. Zimmerman, Jr. K2PAT, 115 Willow St., Brooklyn 1, N. Y. Tel. ULster 2-3472 or Jackson 2-2857

WANTED: Your buy or sell list. State price, condition. Small buyer fee. WZLMS Exchange, D'Amico, 319 Maryland St., Buffalo 1, N. Y.

SAN FRANCISCO and vicinity: Communications receivers repaired and realigned. Guaranteed work. Factory methods. Special problems invited any equipment. Commercial two-way equipment. Factory service Lecce-Neville and Delco alternators. Associated Electronics, 58 South P St., Livermore, Calif. W6KF, Skipper.

WANTED: KWM-2. Selling out everything else. Write for list. W6EBY, 789 Garland, Palo Alto, Calif.

FOREIGN. Domestic radio magazine subscriptions: OTH stickers: 1000, \$1.00; 3-line rubber stamp, \$1.00. Hart, W8VVD, 467 Park, Birmingham, Mich.

FOR Sale: SCR-522 rcvr E-xmtr w/pwr supp. for \$50. Never used. Lesher, 25 No. Market St., Elizabethtown, Penna.

SELL: New DX-100 built but never used. Need the cash. Will sell cheap. K2URG, Tel. FI 3-4498, 80-43rd 240th St., Belle-rose 26, L. I., N. Y.

FAST Service, send stamp for QSL samples, K2 Press, Box 372, Mineola, L. I., N. Y.

FOR Sale: Going mobile! 60 ft. Aeromotor tower, take it down and take it home, \$250.00; Vicking II and VFO, \$179; home brew PP813 rig, complete with speech amp., 838 a.m. plate mod., and all pwr. supplies, adjustable bias for use as linear amp. Built as I.I.T. graduation project, complete with layout, schematics, and full report on operation. Rack mounted, \$450.00. W9RDX, River Forest, Ill.

NC-125, like new condx, \$115; AF-67, in gud condx, \$115. K6SDE, 855 La Milpita, Santa Barbara, Calif.

SELL: SX-100 with R-46B, \$200; Globe Chief 90, \$35. K2VYY, 35 Larchmont Rd., Fords, N. J.

FOR Sale: Johnson base load 6. 6v dyn. Elmac A54, Gonset Super Six, noise limiter, carbon mike, \$125. K2ONS, Frank Cotugno, 87 Brooklyn Ave., Westbury, L. I., N. Y.

GLOBE-SCOUT, 680, \$60.00; prefer local deal. W3ATW, 222 Elizabeth Dr., Lancaster, Penna.

CLEANING Shack: SB-10, \$79; Seneca \$175, transistor power supply, \$25; ATC-1, 50.00 electronic flash, converters, miscellaneous list, W4API, 1420 South Randolph, Arlington 4, Va.

HELP Wanted: Top-notch man for amateur sales, assist in merchandising, handle trades, and supervise service department. State qualifications and starting salary desired. Write: Newark Electronics Corp., Attn. G. Levenfeld, 223 W. Madison St., Chicago 6, Ill.

FOR Sale: Heath VFO, \$16; Gonset Super Six mobile converter, \$427, \$351; 12V Dynamotor 625 v., .225 Ma. output, \$10, or all for \$75.00. K5SKL.

FOR Sale: SX-71 Hallicrafters rcvr. Elmac PMR-7 mobile rcvr and 12 v. power supply, best offer, W910I, Mary E. Esler, 514 Wilson St., Little Chute, Wis.

FOR Sale: Johnson Viking I, absolutely in new condx. \$150; Gonset Super Six converter, \$35.00; Astatic Channel Chief TV booster, \$10; pair of Chancellmaster stereo spkr cabinets w/spkrs 6 inch, new, \$35. J. B. Bullock, 412A Whitman Drive, Haddonfield, N. J.

WANTED: Collins "S" Line. List units, condx, serial numbers, etc., and lowest price. W3QKW.

WANTED: Modulation transformer for Meissner 150B. W1HRR, Taconic, Conn.

WIRED and tested Heathkits, new and unused, DX-40, \$89.95; DX-20, \$54.95 and others. Send orders or write for prices to C-V Electronics, Box 4578, Sarasota, Fla.

COMMUNICATORS Wanted: Bayside Mobile Electronics, Box 104, Bayside, L. I., N. Y.

LEARN Code. Qualify for Amateur or Commercial license. Free Book, Candier System, Dept. Q-10, Box 9226, Denver 20, Colo.

WANTED: Old time commercially built and unaltered amateur spark transmitting and audiotone receiving equipment. Al T. O'Neil, Camp Lakeview, Lake City, Minn.

COLLINS 75S-1, \$395; 32S-1, \$495; 112B-A console, \$145; all like new, late serials together \$1020. W2S16, John Ashton, 224A Rye Colony, Rye, N. Y. Tel. WOODbine 7-5520.

MOSLEY TA-33, in exc. condx, \$65; B&W FC-30 choke \$5.00; H&W \$50.00 coil, \$20; two Elmac 4-250As, \$25 ea. including socket; two Johnson 500E-20 variables, \$5 each. Converted prop-pitch, \$20. Joe Shank, Jr., W8KBT, Box 1486, Huntington, W. Va.

WANTED: Prop-pitch motor, reasonable, Manning, Box 563, Riverside, Mich.

SELL Gud SX-99, \$85.00, Edison, Camdenton, Mo.

CANADIANS! Excellent Apache transmitter \$275 or trade for good Ranger plus \$75 cash. VE5BN, Shellbrook, Sask. P., Canada.

DX-100 with Apache Pi network, \$100; Panadapter BC1031-C w/book 110V 60 cycle, \$45. Allow for postage. Will return overage. K7KEL, 1328 Carlson Dr., Klamath Falls, Ore.

WANTED: Collins filters F455-08, F455C-08 and F455C-31, also Collins 51J RK. State model, Condition and price in first letter. W7IYW, 3116 S.E., 39th, Portland 2, Oregon.

FOR Sale: Viking Viking, \$300; Hammarlund HQ-150, \$190; Hy-Gain 3-el Mini-Tribander, \$35. Like new condx. Jerry Heller, K2CDO, 108-41 65 Rd., Forest Hills 75, N. Y.

FOR Sale: Factory reconditioned Elmac AF67 xmtr. PMR7 rcvr, 6-12 volt power supply, all band antenna assembly, fiberglass whip, Master-matcher, center loading coil, field strength meter, E-V dynamic mike, cables, rack, sundries. All for \$275. Also NC-200 with matching speaker for \$80. K1GGP, Maurice Finer, 379 Central Ave., Milton 37, Mass.

FOR Sale: Have several G.G. linear filament chokes, \$5.50 each. K4PJ, 1126 Elizabeth St., Eau Gallie, Fla.

FOR Sale: Hallicrafters HT-30 single sideband exciter. Like new condition. \$225. John D'Angelo, KIAFT, 412 Bryant St., Malden, Mass. Tel. DA-6597

COLLINS 75S-1 new condition, \$395; Gonset G-66B with 3-way power supply, only \$165. R. K. Pond, Jr., 1607 Singleton, Wichita Falls, Texas.

CANADA Touring? Through Eastern Quebec along St. Lawrence River, special rates, ham facilities available at VE2OU's Hotel "Chalets 'Les Pelerins'", Notre Dame du Portage, Quebec, P., Canada.

SELL Or Swap: Leica Focomat II-A automatic enlarger with turret lens. Want Hallicrafters SX-101 MK III-A or equivalent. Also sell or swap Leica III-F with many accessories and lenses for ham gear. What have you? H. J. Wright, 1123 Karen Road, Montgomery, Ala.

NOVICES: Ideal 6L6 c.w. xmtr. ARRL design, separate input and output tuning, 4 tubes, power supply, everything included! Almost new! \$20. K1EHO, Box 733, New Canaan, Conn.

HT-33, Mark I, w/pair of new 4CX300A tubes, estate of W3ALE. Best offer received by Sept. 30th. Write or call W3QV, 1033 Arbut Rd., Abington, Penna. Phone 215-884-3240.

HQ-140-X, in exc. condx, cost \$279 new, make an offer: Hallicrafters SR-75 transceiver, \$50.00. W5KKH, 719 Carolyn, Austin, Texas.

SALE: New Eston VHF sweep generator model 984, Elmac 6-12V mobile PMR6A rcvr and power supply, Q multiplier Heathkit, and Johnson Viking Adventurer. Make best offer. K3HUO, 5430 Clairton Blvd., Pittsburgh 36, Penna.

KWM-1 DC supply, \$125; cable and mount, \$40.00; Bassett antenna, \$20. Norman L. Rowe, 6 Greenbriar Lane, Port Washington, N. Y. Telephone MAnhasset 7-0717.

SELL BC-1306, Highest bid. Don't know condition or what it is. Robert Jamison, Rte. #3, Medina, Ohio.

VACUUM variable 20-675 ufd; 10 Kv driven by 24V DC motor. Beautiful, never used. Instructions. \$35.00. Six meter xmttr converted (TU-5B) w/ps and mod. \$30. 600 volt VR. PS, \$15, 300 volt VR pwr supply. \$12; prefer local sale last 3 items. W3CUO, Walt Clevelentine, 711 A rch St., Spring City, Penna.

RCA Transistor course, \$5.00; U/Mass. Electricians course, \$5.00; Pickett slide rules, #4, \$10; 800, \$8; #1010-T, \$6; Hydro wiring iis. \$10; Supreme multimeter, \$5; Heath 6V-12V battery eliminator, \$20. Frank Witmer, G.P.O. Box 1893, New York 1, N. Y.

FOR Sale: Regency ATC-1 transistorized mobile converter 350; Heathkit Model TC-2 portable tube checker, \$25. John Lambert, W9KVL, 1640 Baker St., Wisconsin Rapids, Wis.

GONSET 2M Communicator; 110V AC 6V DC, relay operated push-to-talk, separate S-meter, VFO and speech preamp. Halo antenna. Excellent cond. Mitchell Katz, W2KPE, NYC phone: BO 8-0672.

VALIANT: \$325, GPR-90 revr, \$375, D-104 mike and stand, \$23.00; Monitone, \$18; Vibroxep, \$15; miscellaneous. No shipping. K6EYV, 11898 Edgewood Circle, Garden Grove, Calif. Lehigh 9-4921.

QSTS in good condition. 1923 to 1955 run. Make offer. Ilda Causse, 409 Pontiac St., Lester, Penna.

HEATH DX-35 and VF-1, Manuals excellent. \$55.00. Oakland area, K6LVH, Clarke, 4749 Rollinshills Way, Castro Valley, Calif.

HALLICRAFTERS S-40A, \$50, Harvey-Wells TBS-50C, \$40; PE-103, \$10. K1MUN, Joe Phillips, 4 Naples Ave., E. Norwalk, Conn.

SELL: Globe Chief 90, mod. c.w. and phone, modulator included, \$50. Inquire of K0WVC, 603 North St., Decorah, Iowa.

HQ-145 receiver, calibrator, timer and large speaker. used only two months. \$225; Deluxe Vibroxep, unused, \$17.50. M. S. Albuquerque, 146-31 60th Ave., Flushing, L. I., N. Y.

TELREX-TB7E, new; still in original carton, 10-15-20 M, single RG8U feedline, no traps, no coils; cost \$160. Sell \$120 or best reasonable offer. W4NO, 1705 Essex Road, Charlottesville, Va.

PAGING System complete. Consists of: 1 Bogen Preamplifier, model JX50, series E25 240 watt; 1 Bogen amplifier, model H050, series HE4, 175 watt; 6 Dictagraph Miracle receiving units; 1 Shure Mike, mod. 708A, 1 Sigratorne, plus miscellaneous phone equipment. Will sell all or part. Melvin J. Schutz, K9HYE, 319 W. 40th Pl., Chicago 9, Ill.

SELL: Firm, cash and pick-up only; All 2 months old, perfect: (a) KMM-2 with noise blanker installed; (b) AC supply Collins; (c) DC supply, Collins; (d) Mobile mounting tray, (e) console speaker, (f) 20M M Telrex and 100 ft. ea. RG8, 11 and 125 and 20 M Hellihp; (g) Ham-M rotor, and 100 ft. cable; (h) Hy-Gain 40-10 vertical; (i) HV 1800 and 400 supply and misc. parts for KW final; (j) 15100, K2REC, Babylon, L. I., N. Y., Tel. MO 7-0526. Going VHF.

LAST item: Morrow 5 BRF and FIR combination with 6 volt pwr. supply. \$70.00. Free instructions for 12V conversion or will convert and guarantee, \$10.00. W. H. Parker, 2402 Springvale, Dallas 34, Texas.

HALLICRAFTERS SX-100, in exc. condx, will demonstrate within 50 miles, \$180, Howard E. Hopkins, W1VBR, North Scituate, R. I.

SEND for your free copy of the newest magazine in the nation. Non-technical, full of news and pictures of events in the lives of hams. Write: Monitor-90A, 507 West Davis, Dallas 8, Texas.

FOR Sale: Collins KWM-2 with A.C. supply, 4.400 G.G I Kw. bandswitching final. In exc. condx. \$1,000. W4NKZ, Leo G. Birgenheier, 2109 Long Ave., Port St. Joe, Florida, P.O. Box 205, Phone BA1 9-2181.

HT-32 transmitter, in exc. condx, \$385. KJMSMN, 3924 Monroe Ave., Baton Rouge, La.

SELL: Hallcrafters SX-101 Mark III. Used but in gud condx, \$275. W2YTH, Yardley Rd., Mendham, N. J.

FOR Sale: Hallcrafters SX-100, exc. cond. only 4 mos. old, \$185. Fred Sinkankas, 1511 N. Division St., Davenport, Iowa.

FOR Sale: Hammarlund SP-600, \$300; RCA AR-88, \$200; ART-13, w/xtal osc. unit, all tubes, spare 813, \$30.00; BC-221, \$45.00; tubes: 4-1000-A, \$55.00; 4-400-A, \$17.00. K1ALL/8 2660 Galewood Ave., Kettering, Ohio, Tel. AX 3-0857.

FOR Sale: SX-28A, clean, gud condx. \$85; matching speaker, \$10.00; Bernard Goyer, W1UFP, Allen St., Hampden, Mass.

TRADE: Radio TV test equip, for complete mobile rig. Write for details and list. All in like-new condx and perf. condx. Danny A. Giancola, 199 Elm St., Struthers, Ohio.

COLLINS 516E-1 power supply, used eight days, \$200 prepaid. K5KFX.

WANTED: Grebe equipment and literature. Old gear, books prior to 1926. W8JDV, 500 Church St., Mason, Ohio.

COMPLETE Mobile rig, \$225.00; Elmac AF-67, PMR-6A, James power supply, all-band ant., etc. Also 110V AC supply. W6LRQ, R. Leo Gray, 424 30th St., N.E., Cedar Rapids, Iowa.

KWS-1, excellent condx, extras. \$1000. Bernard Kahn, M.D., W6KCC, 710 E. Santa Clara Ave., Santa Ana, Calif. K1Mberly 3-377.

WANTED: Real good buy commercial SSB exciter needing repair. K6TWL, Clarke, 4749 Rollinshills Way, Castro Valley, Calif.

COLLEGE. Must sell NC-300 and other, NYC area only. Pete Kominsky, 370 W. 204th St., N. Y. 34, N. Y.

FOR Sale: Stancor 30 watt mobile xmttr w/500 volt Vibrator pwr. supply & cables, \$35.00; Conset Super 6, \$25.00; 6 volt battery chrg. \$15.00. J. Marsh, K2DZR, 16 Dellwood Ct., Colonia, N. J.

WANTED: Vacuum variable, Jennings UCS-200 to 400. W9WUO, Bob Ruffer, 2035 So. 24th Ave., Broadview, Illinois. Phone F1 4-2319.

ELDICO SSB-100-F. Brand new, in factory carton with manual and warranty. Finest SSB-AM-CW exciter on the market. Efficient, 100 watts output on all bands 75 through 10 meters with adjustable pi-net output to match input to grounded grid linear or antenna. Extremely stable. Double crystal-lattice filter for beautiful unusually potent sharp clean signal with maximum suppression and excellent audio. Built-in scope. Fully guaranteed. Will ship. Cost \$790, sacrifice for \$595. C. Brooner, P.O. Box 261, Morton, Ill.

SELL: Adventurer, screen modulator, Johnson VFO, \$65. Joel Spiegel, 69-31, 168 Street, Flushing 65, L. I., N. Y.

SELL: National 98 with Heath Q-multiplier, both for \$85. Donald Van Wagner, 33 Mitchell Ave., Poughkeepsie, N. Y.

SELL: HQ-100C, \$100; DX-20, \$20.00. Both in exc. condx. Will ship in Florida. K4TTO, 4435 S.W. 13th St., Miami, Fla.

FOR Sale: Heathkit SB-10 SSB generator. In vry gud condx. \$85.00. Edward Wise, Box 833, Emory Branch, Atlanta 22, Ga. Tele. ME 4-2905.

GONSET Super Six, \$20.00; Communicator II, 6M; 6.115, 12V, adaptor, manual, crystal, \$100; excellent S38-E, \$40; 20W, 80-40 transmitter, xtal, \$10; transistor code oscillator, speaker, \$2.00; 10W, Hi-Fi, \$5.00. SWR meter, \$2.00. K8HKT, 1431 Blackpond, Copley, Ohio.

WANTED RBL-5 receiver. 15-600Kc. For sale; new Transitrone No. TR-3000 T-R switch. Robert Ireland, Pleasant Valley, N. Y.

SALE: NC-173 with spkr, \$100; Royal KMG mill, overhauled, new platen, \$300. Walt Gardiner code-sender. DeBard, 840 Reeves Ave., Reno, Nevada.

TECHNICIANS! Partly completed six meter kits for sale: International FCV-2 converter, 6 meagacycle IF, \$10; LW-50 xmttr, in fair condx, \$15.00. Write for details to Walter Deemer, 450 Edgeshill, Ardsley, (North Hills), Penna.

HARVEY-WELLS Bandmaster Deluxe TBS-50D with mike, TVI filter, Globe Antenna Tuner, APS-50 power supply, VFO and manual; 80-2 meters, exc. condx. \$105; ARC-5 VHF revr with cascade RF amplifier modified for CAP use. \$25.00. Paul Wade, 118 Circle Dr., Waverly, Tenn.

LEAVING For school; Must sell, Eldico SSB-100A, in mint condx, \$365; new Drake 1A, \$225; Gerco SB-2000, PL-17A amplifier, power supply, \$240; NC-300 and spkr, \$260; 20W, QFT-1 Heath 10-60 custom VFO, \$200; 2 Heath VF-1, each, 90 watts 6 meter SSB heterodyning unit, \$60; National 6 meter converter \$25; Heath 0-10 scope, \$50. Also relays low-pass, D-104, stand, tower. Will accept orders on any or all. Interested in KWM-2, Bob Gerard, K2SGO, 351 Willets Rd., Roslyn Heights, N. Y. Tel. MAyfair 1-7822.

HAM Radio Instructor, 3 evenings weekly, private electronics school, local hams. New York City. Phone GR 3-2242.

MOBILE: For sale-Gonset G66B, 3-way supply; G77 6/12 volts, 6 volt 100 amp. alternator, rectifier, regulator, all excellent condx, \$375. Will C. Risley, Brainard Hill Rd., Hingham, Conn.

SELL: Hallcrafters SR-34Ac, gud condx, \$280.00. K2UOK, 151 East 80th St., N. Y. C.

NATIONAL NC240CS revr, w/spkr \$110; in exc. condx. Money back guarantee. W0ZHI, 2444 D, Lincoln, Nc.

HQ-129X, w/spkr, \$120; BC348N, \$50; BC314G, \$39; BC455, \$6.50; ASL-9, BC453, 120V AC, \$15.00 each; LS7, \$2.50. E-200C, \$45.00. M. J. Marshall, 455 Washington Ave., Dumont, N. Y.

OLD Timers, historians and collectors: Write for information about "Old Timers' Bulletin" to be printed at cost. Bruce Kelley, W2ICE, Main St., Holcomb, N. Y.

VIKING Valiant for sale, Wired, New condx, less than 25 hours use. Prefer Bay Area sale. Norm Cohler, K6RET, 975 Darien Way, San Francisco, Calif. Tel. JU 4-4053.

SELL: NC-98, QF-1; 120 W, C.W. phone xmttr, VFO all bands, best offers; D-104 mike, \$12.00; Rotor, \$5.00. Advance Relay CB1C2, C115 V AC, \$5.00. K2YZG, 1193 Lincoln Pl., Brooklyn, N. Y.

VALIANT Transmitter, professionally reconditioned; \$300, SX-71, matching spkr, \$125.00; QF-1 \$5.00; in exc. condx. Plus shipping costs. Michael Richter, K2HMR, 1 Oxford Blvd., Great Neck, L. I., N. Y.

CE20A link couplings, OT-1 Bandhopper VFO, 100W, GG amplifier, \$250; Globe Scout 63B wit h 10 Novice xtals, \$55.00, WA2FSD, 11 Burbury Lane, Great Neck, N. Y. HU 2-2737, Marty Siegel.

HAMMARLUND HQ-110C, like new condx, will ship to first registered check or m.o. in original carton, \$170. Or local trade for mobile rig, Jorge A. Lugo, WA6HXA, 1801 Centinela, Santa Monica, Calif.

SELL: Latest WRL-500B. Like new condx. Complete with D-104 and "G" stand, Jones MicroMatch, \$550.00. Will deliver free up to 100 miles. W2GSL, William Schubeck, 52 1st Ave., Franklinville, N. Y.

FOR Sale: HQ-170, \$240; DX-35 with VFO, \$50.00; Heath SWR meter, \$6.00; Hy-Gain tri-band with CDR rotor Ham-M and 30 ft. tower with 100 ft. of coax, \$140. K8DNN, 829 East Mitchell, Cincinnati 29, Ohio.

FOR Sale: HRO-50T, coils, A, B, C, D, G, H, J, AA, AB, AC, AD, xtal calibrator, spkr, Hammarlund HC-10 four months old, instruction books, excellent combination for SSB or CW. All units in fine condition. All for \$450.00. Will consider selling portions. Wells Chapin, 942 Arden Lane, Birmingham, Michigan. Phone MIDwest 6-1703.

GOING SSB. Sell Johnson 6N2, 6N2 VFO, UT-1 power, Eico mod., factory wired, used less than two months, new, \$240; Electro-Voice 015 xtal mic w/stand & switch, new condx, \$8.00. Sell Heath XC-2, two filters 8-ol, 2 M, ant. stacking harness, 100 ft. RG-8U, very new, \$70. K8OUL, 6334 Huntington, Lincoln, Nebraska.

HIGHLY Effective home-study review for FCC Commercial phone exam. Free literature. Wallace Cook, (Q9), Vox 10634, Jackson 9, Miss.



**YOUR Call Letters or name on rubber doormat, 18" x 28". Blue, black, red or green Ivory lettering 12 letter limit, \$5.45. Send only \$1.95. Shipped C.o.d. plus postage. Fred McFeeters, 26 Mohawk Ave., Watertord, N. Y.**

**SX-43, \$75; Gonset mobile combination wired for 12 volts. Super Six and Commander, \$75. Doug Gordon, K6PUN, 1188 Pearson Rd., Paradise, Calif.**

**FOR Sale: FB DX-20 for \$30.00. K7GAX, Box 784, Benson, Ariz.**

**WANTED: Communications receiver, defective or inoperative. State price and condx. Ted Bergstrom, W1QW/2, 232 W. Spruce St., E. Rochester, N. Y.**

**FOR Sale: Collins 310-B3 exciter, perfect condx, \$125. Modulator to match, \$20.00. W4CSC, Christiansburg, Va.**

**DIRT Cheap, Globe Chief 90-A, Knight Deluxe receiver with speaker, S-meter, screen modulator, key, mike, rocks, etc. Exc. condx. Make an offer. Will be considered. Kim Mitchell, College Heights, Arkansas.**

**SURPLUS Resistors—100,000 ohms, 1/2 watt, 5% tolerance, packages of 5: 450 ohm, 5 watt (porcelain), singles in packages, 2 packages for 25¢. Add 4¢ per 2 packages for postage. CK-1081, RK-73, ZP-423 tubes, 50¢ each postpaid. KN85VM, 48 Short, Tiffin, Ohio.**

**SELL: DX-40, very FB condx, AR-3, gud condx; both for \$60. Sri, can't swap. WV6IFA, 8284 Wheeler, Fontana, Calif.**

**SELL: DX-20 top condx, \$30. WA2CBW, 311 N. Clinton, Wrenonah, N. J.**

**COMPLETE SSB Station, late 75A4, SSB100A, pair 4X150A final, extensive station control, Tower, beam, rotator, many extras. No shipping, srl. \$1175. Jaray, 36 Flower Lane, Roslyn Heights, L. I., N. Y.**

**WANTED: Typing reperfector, late serial, 75A4, new condx, reflecting telescope with drive mount. W1WL.**

**SELL: Hammarlund HQ-129-X with matching spkr, Asking \$125. Will split shipping costs from Detroit. David V. Smith, Apt. 203, 1121 N. Kenmore Ave., Los Angeles 29, Calif.**

**SALE: Slightly used; Viking Valiant, factory wired, \$300; Hammarlund Pro 310 RX, \$300; following never used; Telrex Triband beam, \$125.00. Tristo tower with bearing, 40 ft. crank-up, \$140.00; Ham CDR rotator, \$100.00. Austin Schultz, Rte. 2, Lansdale, Penna.**

**WANTED: Hallicrafters HT-33A and SX-62A, state condition and price. Roland Fredericksen, Roseau, Minn. K80IE.**

**FOR Sale: HT-33A, 8 mos. old, Spotless condx, \$500. F.o.b. Middleton, Mass. Albert Lebel, Maple St.**

**WANTED: Reformed schematic for National 100-XA receiver. Please quote price in your first letter. Antonio Conti Munoz, Manuel Montt 032, Santiago, Chile.**

**FOR Sale: DX-100 with SB-10 SSB adapter, in exc. condx. Telrex deluxe 10 meter beam, Johnson Matchbox, Bought Collins equipment. Reasonable for quick sale. 10435 Maybrook Ave., Whittier, Calif. Tel. OWen 1-2311.**

**VIKING II, factory-wired, xmt with Viking VFO and Matchbox, \$195; Hallicrafters SX-99 rcvr with matching R-46B spkr, \$85. Will sell components separately. Write to Marshall Fram, 132 Alienwood Rd., Great Neck, L. I., N. Y., or call HU 7-4527.**

**A Beautiful KWS-1, Astatic 10-D mike, Jones MicroMatch and spare set 4X-9508B. With all KWS-1 modifications done by Collins. Everything perfect. Original owner now disabled by cancer and cannot further operate. Make your best offer for all as one unit. R. L. Pixler, K4JH, Rt. 1, Box 254, Avon Park, Fla.**

**WANT a kilowatt for the coming season? My factory-wired Thunderbolt is for sale. Any reasonable offer considered. L. A. Morrow, W4VQ, 9 Beatwood Road, West Hartford 7, Conn. Phone Adams 2-2073.**

**LOW Overhead gives us an opportunity to quote you a better price for your used gear on new Johnson, Hallicrafters, National, CE, etc. HT-20, \$150; NC-183D, \$175; 32V2, \$250; Heath Mobile, \$195. Holiday Electronics, Blairsville, Penna.**

**COLLINS S Line: 75S-1, 32S-1, 312 B-4, 516 F-2. Used less than 10 hrs. In original cartons, etc. No time to operate. \$1100.00. K4ZBW, 905 No. Island Dr., Atlanta 5, Ga.**

**SELL: Gonset Communicator III, two meters; exc. condition, complete with whip, power cables, 4 xtals, and manual, \$215.00. SX-99, in top condx, all brand new tubes, \$100. Ken Marron, K2PDS, Queens, L. I., Tel. DE 5-0737.**

**SELL: Ranger, gud condx, \$155.00; Globe Chief 90A, in new condx, \$49.50; Globe UM-1 modulator, new with perforated top cover, \$32.50. W3BUD, North Town Creek, California, Maryland.**

**SELL: Heath grid dip meter. Never used, \$20. Rich, WA2FXF, 21 Oregon Dr., Huntington Sta., N. Y.**

**FOR Sale: Globe-King 500A with VFO, \$400. John Smith, 5 Pelham Ave., Port Washington, N. Y.**

**SELL: Kilowatt, engineer-built, in exc. condx; final 813s, best offer near \$600.00. J. Moreland, K6RFW, 508 Wapello, Altadena, Calif. Tel. SY 8-2581.**

**COLLINS 32S-1 with 516F-2 supply, \$560; 75S-1 with 500 cycle filter and BFO crystal \$400; 30S-1 amplifier, \$1060. Used ten hours. W2BBV, 49 Fremal Ave., Yonkers, N. Y.**

**QST 1941-1959 complete run, except 5 missing issues in 1948, 1 in 1949 and 1 in 1954. I.R.E. Journals, 1951-1955 complete run, plus some 1946, 1947, 1948, 1956. Best offer. W3WRU, 5829 23rd Place, S.E., Washington 21, D. C.**

**WANTED: F455J21. K3BOZ.**

**FOR Sale: Gonset GSB-100 SSB xmt, new, in original packing with warranty card, \$449.95. K9QBU, 5804 Kimberly Rd., Ft. Wayne, Ind.**

**NC-300 with calibrator, spkr, \$245; DX-40 and VFO, perfect, \$75, 350 watt 2-stage linear with power in rack, \$55.00. W2DON.**

**WANTED: All kinds teletypewriter equipment, military and commercial; TG-7, #15, #19, #23, test equipment, Collins receivers 51J, 75-A, R-390, etc. Cash or trade for new or used amateur equipment. Write to Tom, W1A/N, Alltronics-Howard Co., Box 19, Boston 1, Mass. (Tel. Richmond 2-0048).**

**WANTED: One or two copies of May, 1935 OST. Send letter indicating your price to H. A. Crossland, W3DX, 4616 Rockville, Norbeck Rd., Rockville, Md.**

**WANTED: Copy of February 1957 OST. Please quote before sending. H. Wing, Chappell Rd., Brier-Adams, Mass.**

**WORLD'S best reconditioned equipment. Shipped on approval. Trades. Terms financed by us. Central 20A \$159.00; Collins 75A-1 \$229.00, 75A-2 \$299.00, 32V-3 \$349.00, 75S-1 \$520.00, 32S-1 \$449.00, KWM-1 \$549.00; Drake 1-A \$199.00; Elmac PMR-7 \$119.00, AF-67 \$129.00; Globe Chief \$39.00; Globe Scout \$59.00; Hallicrafters S-76 \$99.00, SX-99 \$109.00, SX-100 \$199.00, SX-101 \$279.00, HT-32 \$429.00, HT-32A \$499.00, HT-33A \$575.00; Hammarlund HQ-100 \$129.00, HQ-129X \$149.00, HQ-110 \$189.00, HQ-150 \$219.00, HQ-170 \$289.00, HQ-160 \$289.00; Heath DX-35 \$49.00, DX-40 \$65.00; SB-10 \$89.00, DX-100 \$179.00, RX-1 \$199.00, Apache \$239.00; Johnson Adventurer \$39.00, Viking II \$179.00, Valiant \$279.00; National NC-173 \$59.00, NC-300 \$209.00, HRC-60 \$349.00. Many other items. List free. Henry Radio, Butler, Mo.**

**FOR Sale: BC221/AK freq. meter, modulated mod. w/AC power supply and orig. calib. book in compact metal cabinet. \$75 F.o.b. K6AGJ, 281 S. Castanya, Menlo Park, Calif.**

**COLLINS: 6 kc. and 2 kc. 75A4 filters, \$37.50 each; 312A-1 deluxe spkr, \$15.00; 75A4 standard spkr, \$12.00; 75A4 perfect, at \$495 w/3 kc filter; KWS-1 late serial, new condx, no crating, pick-up deal only, \$1250.00. Gonset 101 linear, like new \$350. All personal equipment, clean as new. W0BNF, Box 105, Kearney, Nebr.**

**SIDEHAND Package. See OST June 1958, with mech. filter, \$150; linear amp \$500 with GG 811, BW fl. noise and pi-net, \$30. W6STA, 3959 Madison Rd., Pasadena, Calif.**

**SELL: KW plate and mod. transformers, meters, relays, hi-powered tubes, Super-Pro, signal-shifter, 670w, output, etc. Make an offer. H. Humphreys, 4800S-4860W, Kearns, Utah.**

**SELL: Heath AC-1, \$8.00; airdux balun, \$4.00, K7EVW, Box 25, Oracle, Ariz.**

**75A-4, #365, vernier knob, all significant revisions, \$425; extra filters: 500 cycle, \$35; 2.1 kc., \$30; 6 kc., \$20; homebrew KW SSB-CE 15-80 meters, \$300. W0FUB, 1540-26th St., Marion, Iowa.**

**JOHNSON 50-watt Adventurer, in gud opertg condx, \$30.00. W00UU.**

**PRICED for quick sale: C.E. 20A factory-wired, complete with DeLuxe 458 VFO, 80-10 meters; Astatic 10C mike with chrome stand, Vibroplex bug and Johnson TR switch. Used less than three months. Complete \$240.00. New, in unopened carton. Mosly TA-33 Tribander with 100 ft. new stock RG-8U for only \$80. F.o.b. Parsons. Ray Thacker, K9T11, 1224 Morgan, Parsons, Kans.**

**FOR Sale: Apache xmt, NC-300 rcvr, Matchbox, balun, B&W filter, JT-30 mike, Lightning bug, SWR mtr., antennas for ten to eighty. Certified check for \$500. It all works. Price is low enough so no hassling, pls. Ed Mack, K1BSB, RR1, Box 337, Litchfield, Conn.**

**WANTED: Used 30-50 Mc Communications equipment. Will buy or trade Heathkit Citizen Band equipment on same. L. Gooding, W4HFL, Rt. #1, Clarkton, N. C.**

**SELL: Two brand new 4-125-As, one 304TL, \$20. each. W4LPP.**

**SELL: DX-100, \$175; RME 4300, \$150; Johnson Viking II push-to-talk, improved keying, \$200. All look, perform like-new. Lad Jelen, 3217 W. 100, Cleveland 11, Ohio.**

**SELLING Out: All in A-1 condition: BC610, \$125; NC-300, \$225; DX-100B, \$170; Lakeshore Phasemaster II, Bandhopper VFO, SSB, \$225; Jones MicroMatch complete, \$25; Filter King 6M converter, \$25. Misc. items cheap. Gerald Skeen, K8AON, Box 8, Ripley, W. Va.**

**BOSTON Area only: NC-57, \$50; PMR-6, with 6 and 12 volt supplies, \$70; A-54, all-bands, \$75; 1BS-50A, \$70; APS-50 supply, \$25; Gonset Tri-band, \$25. W9ECV/1, Arlington, Mass. Tel. MI 3-438.**

**FOR Sale: Complete SSB station: 20A, 458 VFO, Pr. 811s final, JT-11 mike, B&W TR switch, SX-101 MK3 in perf. condx. Mosley Tribander, CD rotator, \$500. H. Newman, W2ALM, 91 Falmouth Pl., Albertson, N. Y.**

**APACHE, professionally wired and 10, 15, 20 meter Window antenna for \$240.00. Ernest A. McCall, 10004 E. 34th, Independence, Mo.**

**ESTATE OF K9BYX: Viking Valiant xmt #97F491, Hammarlund rcvr HQ-140XA, in perf. condx, Mrs. M. B. Lewins, 4215 Ellington Ave., Western Springs, Ill.**

**FOR Sale: NC-183D, rcvr, new condx; Millen 90711 VFO, Viking II xmt, complete station if desired. Bob Walker, 105 No. Washington St., Brazil, Ind.**

**NC-98 in excellent electrical condx, immaculate clean, \$108 cash. You pay postage. K5EQP, 5530 East Tecumseh, Tulsa, Okla.**

**SELL: NC-300 w/spkr, DX-100, Matchbox; D-104 mike, Vibroplex bug, SWR bridge, etc. \$425.00. Complete specs and immaculate. K2RVY.**

**FOR Sale: F.o.b. Detroit, Viking Valiant, factory-wired, \$300; 250-23 Johnson Matchbox \$30; D-104 mike and stand, \$16; model 15T HRC Gain Triband beam, \$40.00; all in perf. condx. Will ship all but beam, or pick-up beam. W8GRN, Phil Girard, 14025 Norborne, Detroit 39, Mich.**

Designed for



Application



90672

**The No. 90672  
ANTENNA BRIDGE**

The Millen 90672 Antenna Bridge is an accurate and sensitive bridge for measuring impedances in the range of 5 to 500 ohms at radio frequencies up to 200 mc. It is entirely different in basic design from previous devices offered for this type service inasmuch as it employs no variable resistors of any sort. The variable element is an especially designed differential variable capacitor capable of high accuracy and permanency of calibration over a wide range of frequencies. A grid dip meter such as the Millen 90651 may be used as the source of RF signal. The bridge may be used to measure antenna radiation resistance, antenna resonance, transmission line impedance, standing wave ratio, receiver input impedance and many other radio frequency impedances. By means of the antenna bridge, an antenna matching unit may be adjusted so as to provide the minimum standing wave ratio on the radiation system at all frequencies.

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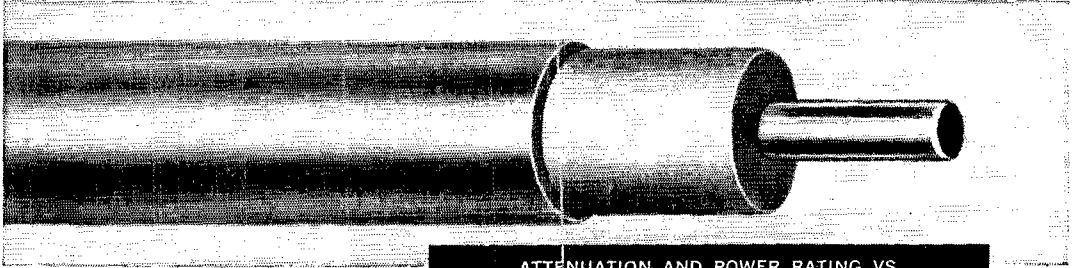


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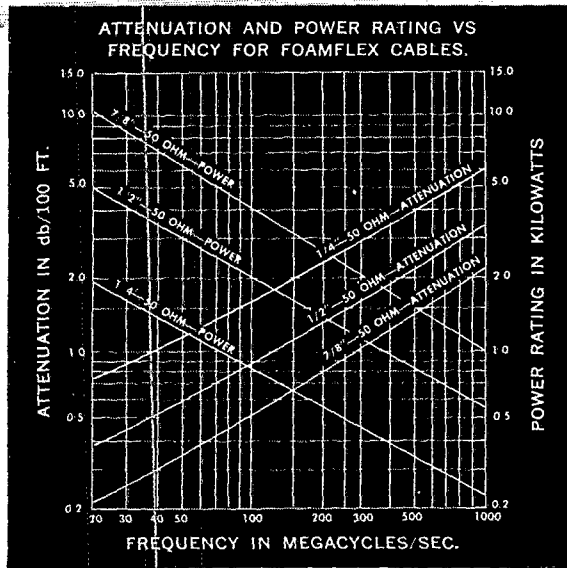
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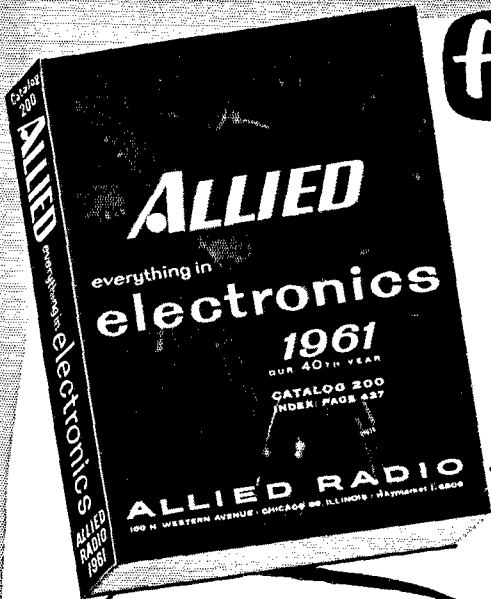
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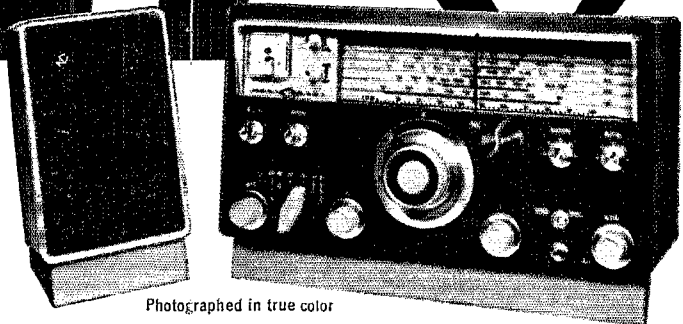
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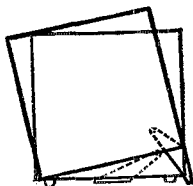
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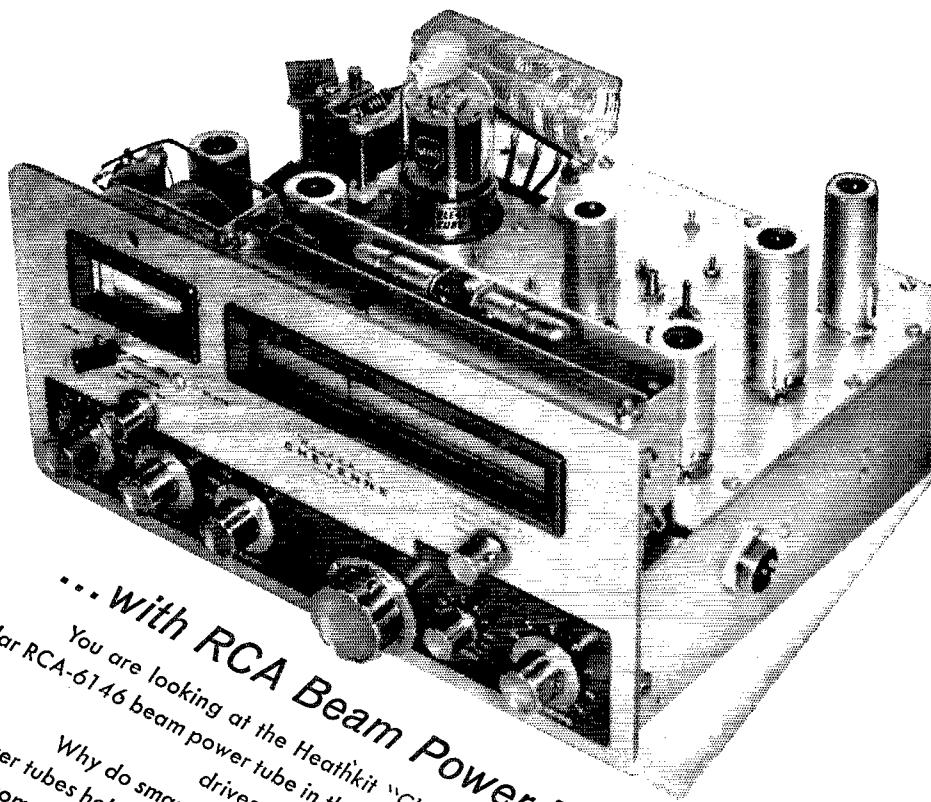
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