

QST

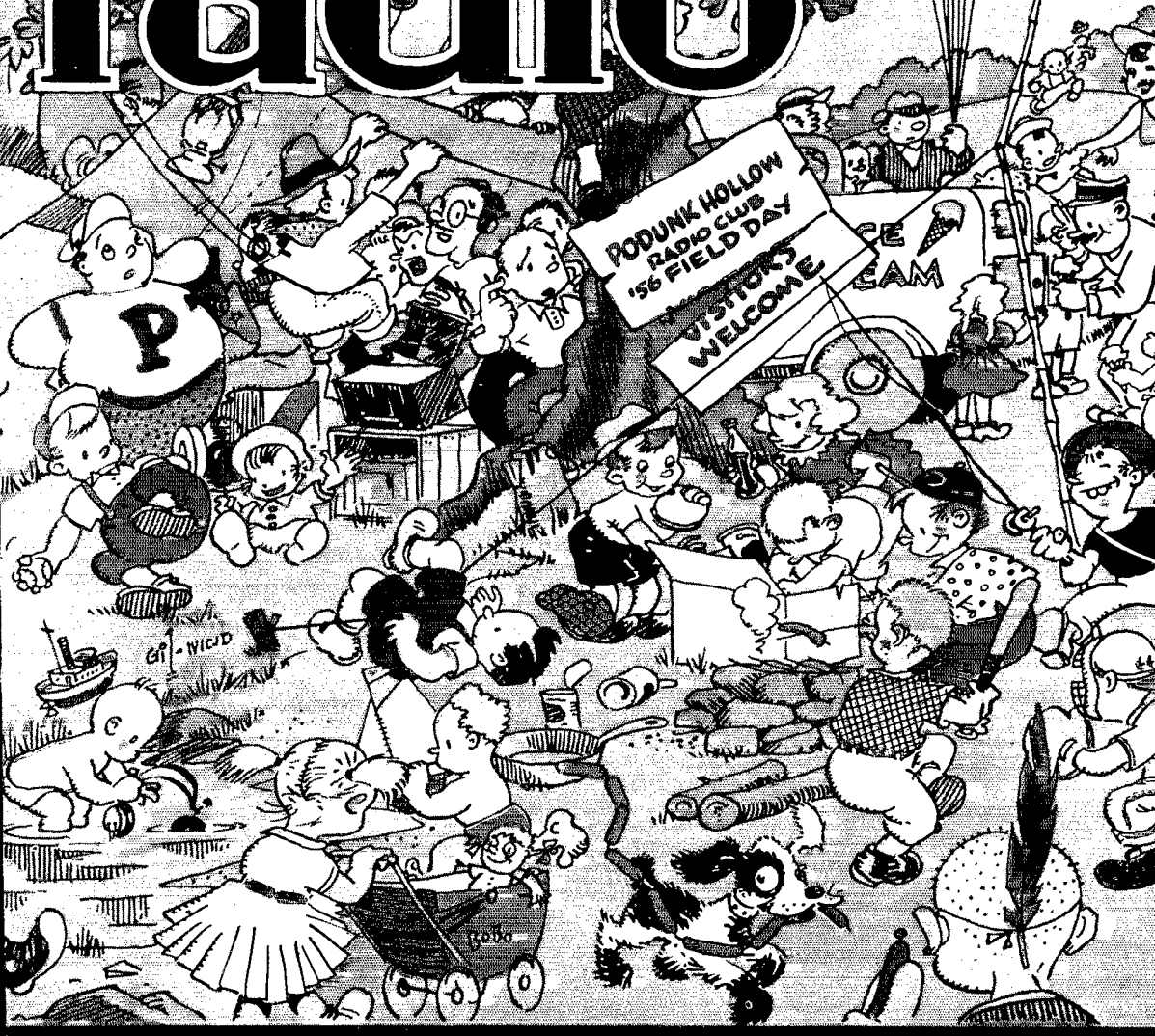
July 1956

50 Cents

55c in Canada

depend entirely to

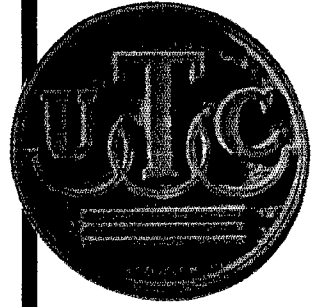
amateur radio



OUR MILLIONTH FILTER SHIPPED THIS YEAR...

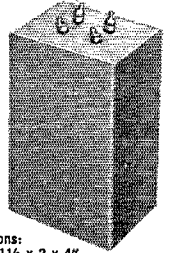
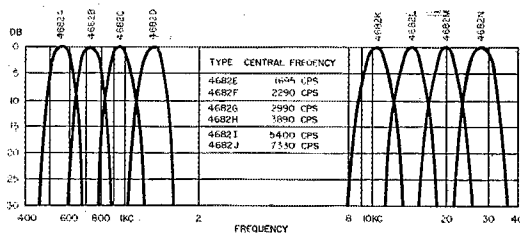
FILTERS

FOR EVERY APPLICATION

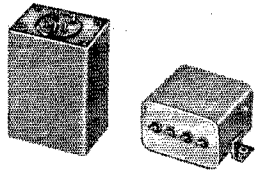


MINIATURIZED FILTERS

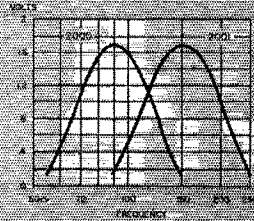
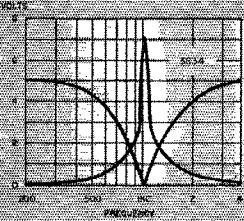
UTC's miniaturized filters are available in a wide variety of types and applications. These filters are available in a wide variety of types and applications. These filters are available in a wide variety of types and applications.



Dimensions:
(4682A) 1 1/2 x 2 x 4"



Dimensions:
(3834) 1 1/4 x 1 3/4 x 2-3/16",
(2000, 1) 1 1/4 x 1 3/4 x 1 5/8"



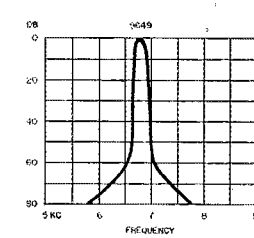
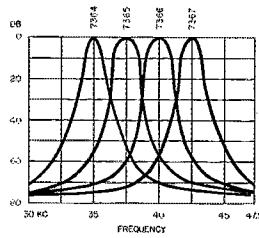
AIRCRAFT FILTERS

UTC has produced the bulk of filters used in aircraft equipment for over a decade. The curve at the left is that of a miniaturized (1020 cycles) range filter providing high attenuation between voice and range frequencies.

Curves at the right are that of our miniaturized 90 and 150 cycle filters for glide path systems.

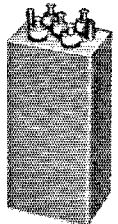
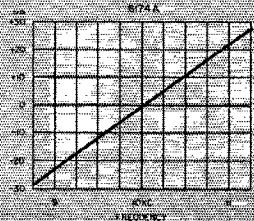
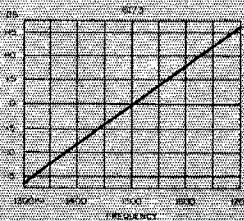
CARRIER FILTERS

A wide variety of carrier filters are available for specific applications. This type of tone channel filter can be supplied in a varied range of band widths and attenuations. The curves shown are typical units.



DISCRIMINATORS

These high Q discriminators provide exceptional amplification and linearity. Typical characteristics available are illustrated by the low and higher frequency curves shown.

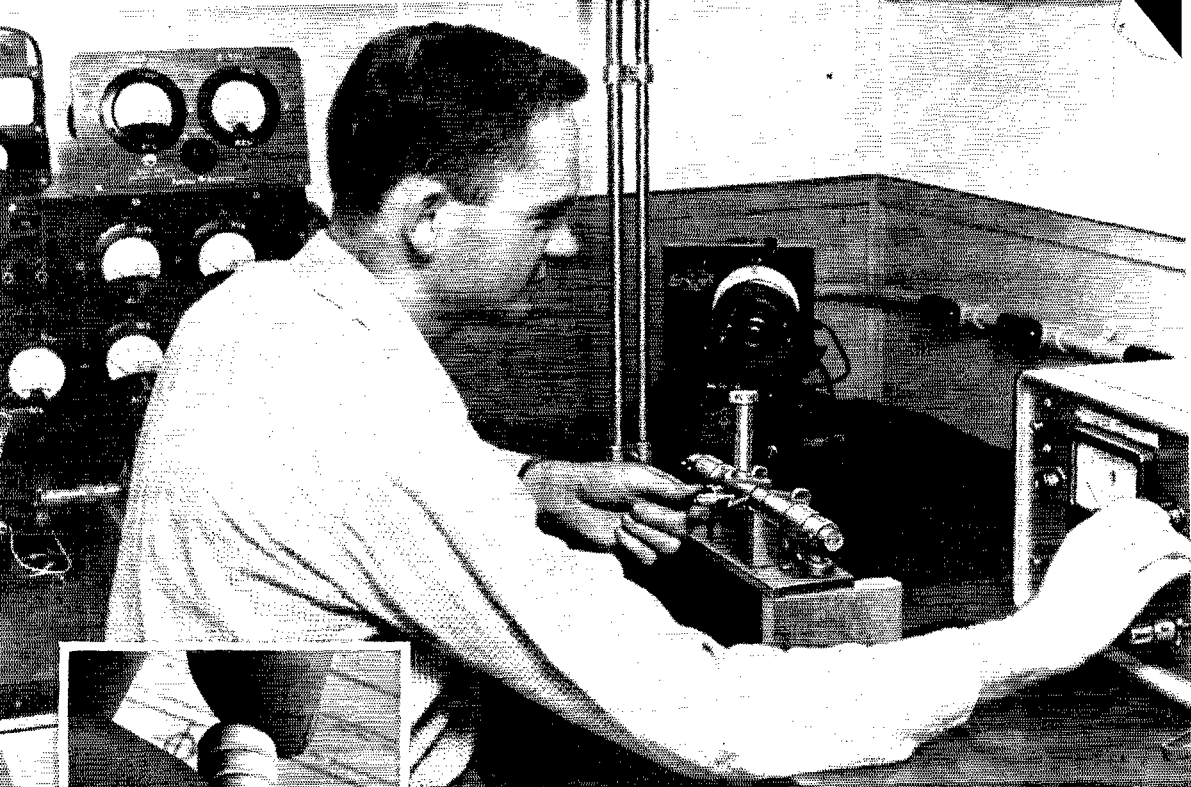


Dimensions:
(6173) 1-1/16 x 1 3/4 x 3",
(6174A) 1 x 1 1/4 x 2 1/4"

For full data on stock UTC transformers, reactors, filters, and high Q coils, write for Catalog A.

UNITED TRANSFORMER CO

150 Varick Street, New York 13, N. Y. EXPORT DIVISION: 13 E. 40th St., New York 16, N. Y. CABLES: "ARLAE"



Left: smallest receiving tube—a General Electric 6BY4, only $\frac{3}{8}$ " high! **Above:** Robert Bailey tests a micro-miniature tube at 900 megacycles for noise factor and power gain.

Amateur know-how is asset to W4JZO in development work on G-E micro-miniatures!

ROBERT BAILEY, W4JZO, is a development engineer in General Electric's Owensboro, Ky., receiving tube plant. His work centers on u-h-f, and he has taken active part in the design of G-E micro-miniature tubes—new ultra-compact metal-ceramic types with outstanding performance. A TV-tuner triode, the 6BY4 is the first micro-miniature, with others to follow.

U-h-f designers are helping to shape the electronic world of tomorrow. According to Bailey, they need the amateur's willingness to search for new solutions to new problems. Bailey strongly endorses ham philosophy as an approach to

creative effort in his field. He stresses this in a G-E engineering course he conducts, and takes every opportunity to keep active as a ham by working the 75, 40, 20, and 10-meter bands with mobile phone equipment he has designed.

W4JZO has been a radio amateur since 1946. Like hundreds of other hams who design, build, and test G-E tubes of all types, he brings to his work extra experience and resourcefulness—qualities reflected in a superior G-E product. Buy the tubes that hams help build! Your G-E tube distributor stocks them. *Tube Department, General Electric Company, Schenectady 5, N. Y.*

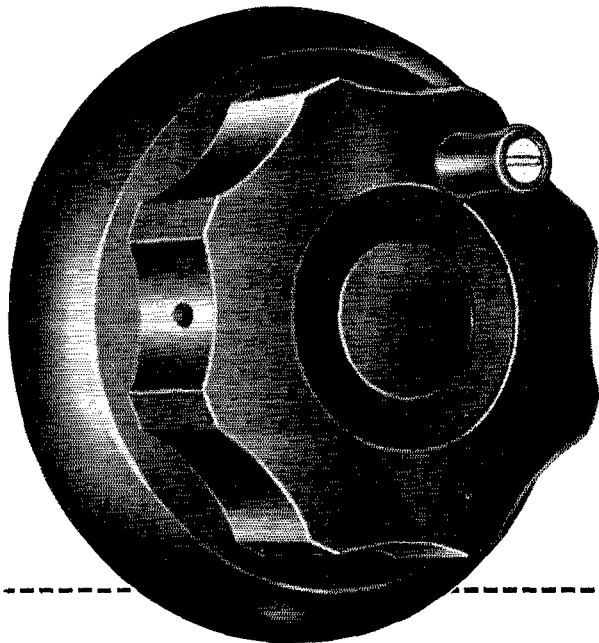
Progress Is Our Most Important Product

GENERAL  **ELECTRIC**

ANNOUNCING

*Collins Gear Reduction Tuning Knob
for*

new *fine* tuning



New ease and accuracy in Sideband tuning are featured in Collins Gear Reduction Tuning Knob for the 75A-4 and KWS-1.

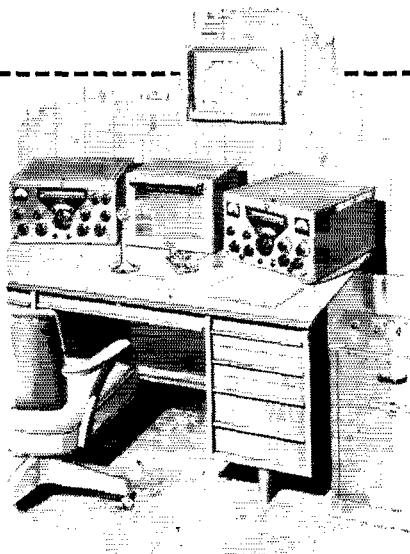
Operating on a 4 to 1 ratio, this quality accessory to the top SSB transmitter-receiver team eliminates the Dial Drag and has no detectable backlash. After simple installation, you'll experience smoothness unsurpassed in tuning any type signal—SSB, CW or AM. The Knob is also adaptable for best tuning of the earlier models in the 75A series.

Available soon at your nearest distributor—\$15.00.

It's easy, smart to own Collins

You can now operate the finest SSB station while taking up to 18 months to pay small installments. This is a *sound investment* with Collins' consistently top trade-in value and the resulting low cost per day. Ask your Collins distributor for the figures today.

Visit Collins exhibit at the National ARRL Convention in San Francisco July 6, 7 and 8.



Collins

CREATIVE LEADER IN COMMUNICATION





JULY 1956

VOLUME XL • NUMBER 7

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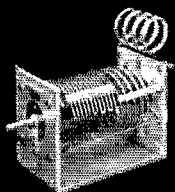
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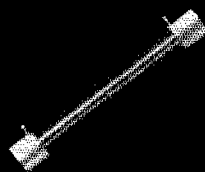
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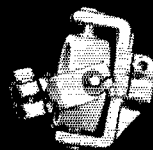
medium powered
pi-network inductor



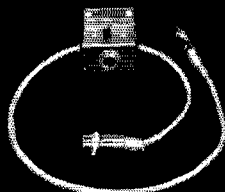
filament choke



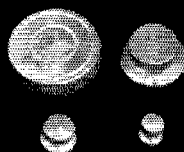
r-f plate choke—
transmitting type



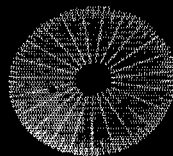
insulated flexible
universal shaft coupling



microphone
adapter unit



tuning knobs



incremental
dial plates



frequency marked
dial plates

8 new quality products from B&W

MODEL 851 Medium Powered Bandswitched Pi-Network Inductor Assembly

An ultra-compact, highly efficient, integrally bandswitched pi-network inductor assembly for single or parallel tube operation 80 through 10 meters. Rated for 2000 VDC at 250 ma input SSB-CW... 1250 VDC at 200 ma input for AM. Minimum measured "Q" of 300.

Filament Chokes For Grounded Grid Amplifier

Broadband characteristics 80 through 10 meters. Requiring no tuning. Used with standard type filament transformers. Model FC-15 is for use with one or two tubes drawing not more than 15 amps total filament current. Model FC-30 is for one or two tubes requiring not more than 30 amps total filament current.

R-F Plate Choke—Transmitting Type

Ideal for parallel or series fed circuits. High quality grooved steatite form. Operates 80 through 10 meters. Rated for 2500 VDC at 500 ma.

Insulated Flexible Universal Shaft Coupling

Model 5300 permits a maximum of 30° angular as well as 1/8" axial misalignment of two opposing shafts. One shaft may be above ground potential. 15,000 volt silicone glass insulation.

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Provides all necessary circuitry for switching a single microphone and push-to-talk features on transmitter-SSB generator combinations.

Use Model 51MCA with B&W 5100-5/51SB-B

Use Model 51MCA-B with B&W 5100/51SB

Use Model 51MCA-C with Collins 32V/B&W 51SB

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Satin-etched, machined aluminum knobs dress up any piece of equipment... give it a professional appearance. Four sizes available, one plain, three skirted. Models 900-903.

Incremental Dial Plate

Just right for indexing any rotating knob. Highly attractive. Marked with white lines over soft grey finish. 3 1/4" diameter. Model 3828.

Frequency Marked Dial Plates

Ideal for use with B&W turret assemblies and other bandswitched assemblies. Measuring 2 1/4" in diameter, each is marked with five band positions.

Model 3818 is marked 3.5—7—14—21—28

Model 3819 is marked 160—80—40—20—10

Model 3829 (3 1/2" diameter) is marked 3.5—7—14—21—28

Write for literature, or see these fine products on display at your distributor's

B & W

BARKER & WILLIAMSON, INC.

237 Fairfield Avenue, Upper Darby, Pa.

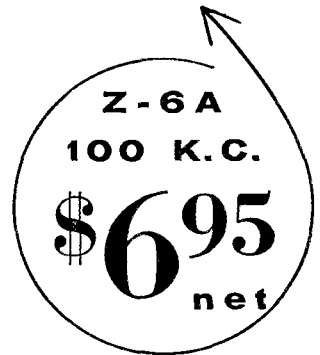
Calibration on the nose . . .



thanks to PR's

100 K.C. FREQUENCY STANDARD

A dependable secondary frequency standard is a MUST for today's amateur station . . . to determine band-edge . . . to keep the VFO and receiver properly calibrated. Now you can buy a really dependable, commercial-quality PR 100 Kc. Crystal at reasonable cost. The Type Z-6A is hermetically sealed, razor-accurate, unconditionally guaranteed. Get it at your jobber.



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Crystals



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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. *All amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

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Northern Texas* Oklahoma Southern Texas New Mexico	W5TFP W5GIG W5QDX W5FPB	Ray A. Thacker Ewing Canaday Morley Bartholomew Einar H. Morterud	Dallas Stillwater Austin Bel Air Albuquerque
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Alberta British Columbia Yukon Manitoba Saskatchewan	VE6MJ VE7JT VE4HL VE5HR	Sydney T. Jones Peter M. McIntyre John Polmark Harold R. Horn	10706-57th Ave. 981 West 26th Ave. 109-13th, N.W. 1044 King St.
Alberta British Columbia Yukon Manitoba Saskatchewan	VE6MJ VE7JT VE4HL VE5HR	Sydney T. Jones Peter M. McIntyre John Polmark Harold R. Horn	Portage la Prairie, Man. Saskatoon

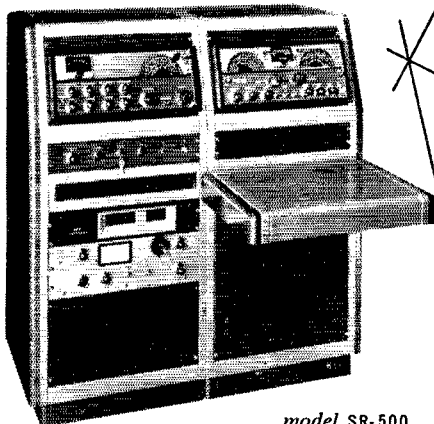
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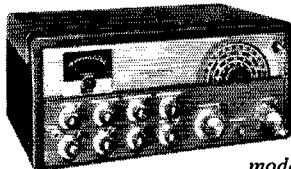


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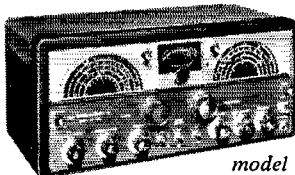
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THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



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“It Seems to Us...”

IGY

The concentration with which hams pursue their hobby sometimes insulates them from the events of the outside world, but we doubt if even the most single-minded has failed to read or hear something about the upcoming International Geophysical Year. Beginning just a year from now, it will see an unprecedented cooperative effort on the part of scientists all over the world in collecting scientific data calculated to increase man's knowledge of the planet he inhabits. Dr. Berkner's article in this issue describes the overall objectives and something about the plans for their accomplishment. It's good reading, so take off a few minutes from your rag-chewing or DX-hunting and see what it's all about.

Does the radio amateur fit into this picture? Indeed he does. Scientific organizations are looking to him to provide assistance of a type that no other body of hobbyists — or professional organization — could supply. Plans for one such project, involving observations of amateur signals with the object of uncovering the basic causes of some propagation phenomena not now completely understood, are rapidly approaching completion. You'll be hearing more about this soon through the pages of *QST* and many of you, we know, will want to be active participants.

Probably nothing in recent years has stirred the public's imagination like the proposed Earth Satellite. How amateurs can help in this project is the subject of our second IGY article in this issue. This one won't be easy. It is primarily a task for a group such as a radio club, at least as envisioned at present. It will take technical skill. It will take organizing ability, and it will probably be necessary to enlist the cooperation of industrial and educational laboratories who may be able to lend equipment and space. It will take hard, sustained work. The reward? Satisfaction in chalking up another achievement for amateur radio, and the thrill of having participated in one of the outstanding scientific events of the century. Is your club big enough for the job?

The years 1957–1958 should be a high spot in amateur radio just as they will be in scientific progress. There will undoubtedly be other ways in which amateurs can participate in IGY — one possibility, for example, is that a world-wide communication network will be set up for transmitting information for the Alerts — providing interesting activities for practically anyone that wants to take part. We've made worthwhile contributions to scientific progress in the past; let's make the most of this opportunity to make secure our place in the sun.

COMING A.R.R.L. CONVENTION

- June 9-10 — Rocky Mountain Division, Estes Park, Colorado
June 15-16-17 — West Gulf Division, Galveston, Texas
July 6-7-8 — ARRL National Convention, San Francisco, Calif.
July 27-29 — Northwestern Division (Alaskan Territorial), Anchorage, Alaska
July 28-29 — Alberta Province, Edmonton, Alberta

A.R.R.L. ALASKA CONVENTION

Anchorage, Alaska — July 27-28-29

The Anchorage Radio Club is sponsoring the convention in Anchorage, July 27, 28, 29.

Anchorage is situated on Cook Inlet with the most beautiful mountains in the world all around. To see the sunset in Alaska at this time of year is an inspiring sight. As you look north, you may see the sun setting and rising at the same time.

There will be many awards this year. The registration fee is \$1.50, payable on arrival. There will be a \$5.00 advance deposit charged for anyone who would like the Club to make a hotel reservation for them. Deposit will be refunded upon arrival at hotel.

The Anchorage Amateur Radio Club found it necessary to change the dates of the convention to July 27, 28, and 29 so that all amateurs could participate in the evacuation of the cities in the Territory of Alaska on July 22.

You can drive to Alaska now from anywhere in the States. So, pack up your old kit bag full of harmonics and plan a vacation in Alaska.

A.R.R.L. ALBERTA CONVENTION

Edmonton, Alberta, Canada — July 28-29

The Northern Alberta Radio Club is sponsoring the 1956 A.R.R.L. Alberta Convention to be held in Edmonton, Alberta, Canada, on Saturday, July 28 and Sunday, July 29.

Feature speaker will be Goodwin L. Dosland, WØTSN, President, American Radio Relay League, who will present an address of interest to all amateurs. There will be activities for all: for the OM; technical talks and demonstrations, an on-the-air station, contests; and, for the YL or XYL, who is not technically-minded, an entirely separate social program. There will be fun for the entire family with contests for all.

Plan to be in Edmonton, July 28 and 29. Edmonton is situated in Canada's Mountain Playground near the world-famous Jasper and Banff National Parks.

Advance registration fee of \$5.00 for each OM, \$3.00 for each YL or XYL includes the main banquet and Sunday Buffet Lunch. For further details and accommodation assistance, write N.A.R.C., Box 163, Edmonton, Alta.

HAMFEST CALENDAR

Illinois — The Annual Central Illinois Radio Amateur Picnic will be held on Sunday, July 15, at Spittler Woods, 8.3 miles from downtown Decatur off route 121. Admission free. Bring your own lunch. Registration, 11:00 A.M.

Illinois — Hamfesters Radio Club is holding their 22nd annual picnic at a new site, on Sunday, August 12, at Santa Fe Park, 9100 So. Wolf Road. Site can be reached from the east by taking Route 4A (Archer Ave.) to 87th Street, in Willow Springs, and turning west to the Grove. From the west, take Route 66 to 79th Street, east to Wolf Road. Kiddie rides, convenient parking right at one of the many tables, modern facilities, and plenty of shade, are some of the features of the Park. Radio displays, food and refreshments. Bring your equipment for sale or trade. Events for kiddies and grownups, at the liveliest and friendliest gathering in the midwest. Advance donations, \$1.00; \$1.25 at the gate. Contact W9IWR for tickets or information.

Indiana — The Indiana Radio Club Council's Annual Hamfest will be held in Franke Park, Fort Wayne, Indiana, Sunday, July 15. Registration, \$1.50. Plaques to be awarded to Indiana club winning Field Day contest, and to Indiana's "Outstanding Amateur." Certificate awards to winners of their Council-sponsored contests. There will be entertainment, activities and items of general interest for the young and old. Plenty of picnic tables, also a shelter house.

Indiana — The Turkey Run V.H.F. Picnic at Turkey Run State Park on July 29. Registration begins at 9:00 A.M. Bring the family and enjoy a basket lunch with us. Swap table and activities for the ladies. For additional information, write W9ZHL, P. O. Box 186, No. Terre Haute, Indiana.

Iowa — The annual picnic sponsored by the South West Iowa Amateur Radio Association is to be held July 15, at McKinley Park in Creston, Iowa. All amateurs invited.

Maryland — The Maryland Emergency Phone Net will hold its annual picnic at Braddock Heights Park, in Braddock Heights, Maryland (5 miles west of Frederick, Maryland, on Route US 40-A) on Sunday, July 22, from 10:00 A.M. until —. There will be contests, ladies' and children's programs, and a rummage sale. Advance registration from C. C. Worsley, W3TYJ, 104 Northwood, Silver Spring, Maryland, at 50¢ each; children under 12 admitted free.

Michigan — The Saginaw Valley Amateur Radio Association will be host to the amateurs of Michigan at the MEN and BR picnic to be held in Saginaw on July 15. Lots of entertainment, games, and contests for the hams, XYLS, and Jr. Ops. All hams and their families are cordially invited. Registration, \$1.00 for hams; 50¢ for XYLS; children free. Advance registration through W8COW, 2825 Cooper Street, Saginaw.

Montana — The 21st annual Glacier-Waterton International Peace Park Hamfest will be held Saturday and Sunday, July 21-22, at Aparz Camp Ground, West Glacier, Montana, on beautiful Lake McDonald in Glacier National Park. Special events and contests. Cabins, camping and trailer space available. Come as you are and bring the XYL and Jr. Ops. for an enjoyable visit to Montana. For further information, write Frank B. Hart, W7UPR, Route 1, Sunset Drive, Kalispell, Montana.

Pennsylvania — The South Hills Brass Pounders and Modulators, Inc. announce their 18th annual hamfest to be held on Sunday, August 5, at Totem Pole Lodge South Park, Pittsburgh, Pa. Festivities start at 12:00 noon. The inevitable Swap and Shop, plus demonstrations and activities for young and old, will make this the outstanding ham event of the year. Games to keep the Jr. Op busy. Contests to occupy the XYL. Plenty of picnic space. Plan now to attend. Register in advance and save. Pre-registration ends July 21. Make checks payable to South Hills Brass Pounders and Modulators, Inc. Send \$1.50 to S. J. Zolinas, W3QWW, 423 Parkwood Road, Pittsburgh 10, Pa. Tickets \$2.00 at the door. Novice tests will be given; bring your examination papers. Club station, W3PIQ/3, will operate on 29.2 Mc. to "zero in" the mobiles. See you at the hamfest.

Ohio — The Cleveland Area Council of Amateur Radio Clubs will hold an all-day basket picnic at Granger Lake Park on Sunday, July 29. Games for all, plenty of fun. Bring the kiddies and XYL. Registration 1:00 P.M. Admission \$2.50 per family. Granger Lake is located on Medina County Route #21 between U. S. Route 21 and Ohio Route 94. Contact W8PCJ for additional information.

The International Geophysical Year

A World-Wide Scientific Program

BY L. V. BERKNER *

• In just twelve months the International Geophysical Year — the “IGY” — will be in full swing. Plans now approaching completion contemplate that radio amateurs will be in there pitching along with scientific teams from forty-some nations in all parts of the globe. This article, adapted from an address given at the IGY Symposium of the American Association for the Advancement of Science held at Atlanta, Ga., gives the background picture of the IGY — the areas in which new knowledge is sought and the methods by which scientific data will be accumulated. The author is President of the International Council of Scientific Unions and Vice President of the Special Committee for the International Geophysical Year.

Dr. Berkner, by the way, also was 9AWM in the early '20s. Old timers will recall his station as being prominent in DX and traffic handling in the 200-meter era.

TO UNDERSTAND THE OBJECTIVES OF THE IGY, one should endeavor to visualize the gross setting of our environment. We live on the surface of a huge globe, some 8000 miles in diameter, hanging in space a few million miles from a number of other planets that circle the Sun. We can dig holes perhaps 5 or 6 miles into the surface of our planet or descend to the ocean bottom, but this is the limit of direct observation downward. We are surrounded by a heavy atmosphere, opaque except for the narrow “window” at the wavelengths of light, and a

* President, Associated Universities, Inc., 350 Fifth Ave., New York 1, N. Y.

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Dr. John P. Hagen, Director of the Earth Satellite Project, displays a scale model of the three stage rocket which will propel the first man made satellite into its orbit. The model, 1/25th of actual size, shows the various parts of the 72 foot long rocket which measures only 45 inches in diameter, at its base. Shown are the first stage rocket, right foreground, the second stage and the third, with satellite attached. A pointed nose cap which drops away from the man made moon encases the satellite on its flight outside the earth's atmosphere.

(Wide World Photos)

◆

little larger “window” that admits some radio wavelengths from space. But only recently has man risen as much as six miles above the surface. Thus our existence has been confined to a thin veneer within 5 or 6 miles from the surface of our globe. It is a veneer sandwiched on the upper side by the insulating atmosphere and the space beyond, and on the lower side by the unplumbed depths of the Earth's interior.

The environment within this veneer is controlled almost completely by circumstances arising outside of it. The character of our continents and oceans depends in an important way on events that occur far below the surface and within the Earth's interior. The energy that supports our daily existence comes largely from the Sun, 92,000,000 miles away. This solar energy varies somewhat with time, although, unfortunately, some of the most important changes are apparent only at wavelengths that do not penetrate our atmosphere. Even the atmosphere in which we are immersed and the oceans around us are in complex fluid motion, driven by energy received from the Sun. And our Earth and its atmosphere fly through a space filled with all sorts of atoms and electrons and streams of particles flying at high speed and other miscellaneous “crud,” and perhaps even magnetic or electric fields in space. Moreover, our written history of observation of the system extends at most over only a millionth of its lifetime, so that the character, extent, and



rapidity of major changes are not clearly defined or understood.

Geophysical Problems

The objective of geophysics is to describe the character of our surroundings so that the organization and the interrelationship of the several elements of those surroundings can be comprehended. Since man cannot "see" very far, or very much, by direct observation, he must use the tools of every natural science to acquire information from which the character of his surroundings can be deduced. Since he is largely insulated between the layers of Earth and atmosphere, he must follow assiduously every observable clue that nature provides, so that its real meaning and its relationship to other parts of the system can be developed. Gradually, step by step, man is constructing a mutually consistent description of his surroundings. And as man learns to understand, and to describe the nature of his surrounding environment, he can invent means of utilizing it for his benefit, or at least circumventing its more damaging aspects.

Consider, as an example, such an obvious question as: How much energy does the Earth receive from space and how much and in what way does this energy change with time? Clearly this is a very important question since this energy is the basis of warmth and growth; it drives the circulation of our atmosphere and oceans, thereby creating climate and weather; it ionizes our atmosphere to support our long-distance communications; it determines the extent of ice storage near the poles, thereby adjusting our ocean levels; its changes may provide critical trigger effects that may initiate a whole chain of the most important consequences to our daily lives.

To measure the received energy and its changes is a complex matter that only now is becoming possible. In the visible spectrum of the Sun, the heat balance of energy received by the Earth and radiated back to space depends greatly on the relative cloud cover of the Earth. Just how this varies from day to day, week to week, or year to year, is not known. Measurements of the Earth's albedo¹ by means of the artificial Earth satellite in the next few years may answer this vital question with reasonable precision for the first time. Then, we will know the variation of the driving energy that underlies meteorological events. The invisible radiation, the ultraviolet and X-rays from the Sun can be deduced by measuring their ionizing effects on the outer atmosphere, or by direct observations with rockets or the artificial Earth satellite. At these wavelengths the variations of solar radiation are known to be very large, and though the total energy is small, the radical changes may trigger much larger energy changes in the unstable atmosphere through variation in critical photochemical products. Energy received

from particles must be deduced by observation of the aurora, the air glow, meteors, and cosmic rays. Again, while the total energy from such sources may be small, the variations may well trigger radical changes in the unstable atmospheric system of circulation. Likewise, the interchange of energy between the atmosphere and the oceans is vitally affected by the circulation and heat storage of the ocean systems.

No one would deny that if we are to understand and perhaps control our weather and climate, we must observe and define the relative part played by each element of this complex system. But the solution of such fundamental and complex geophysical problems requires careful and coordinated observation of the events of our environment over the whole Earth. To obtain such data is the objective of the International Geophysical Year.

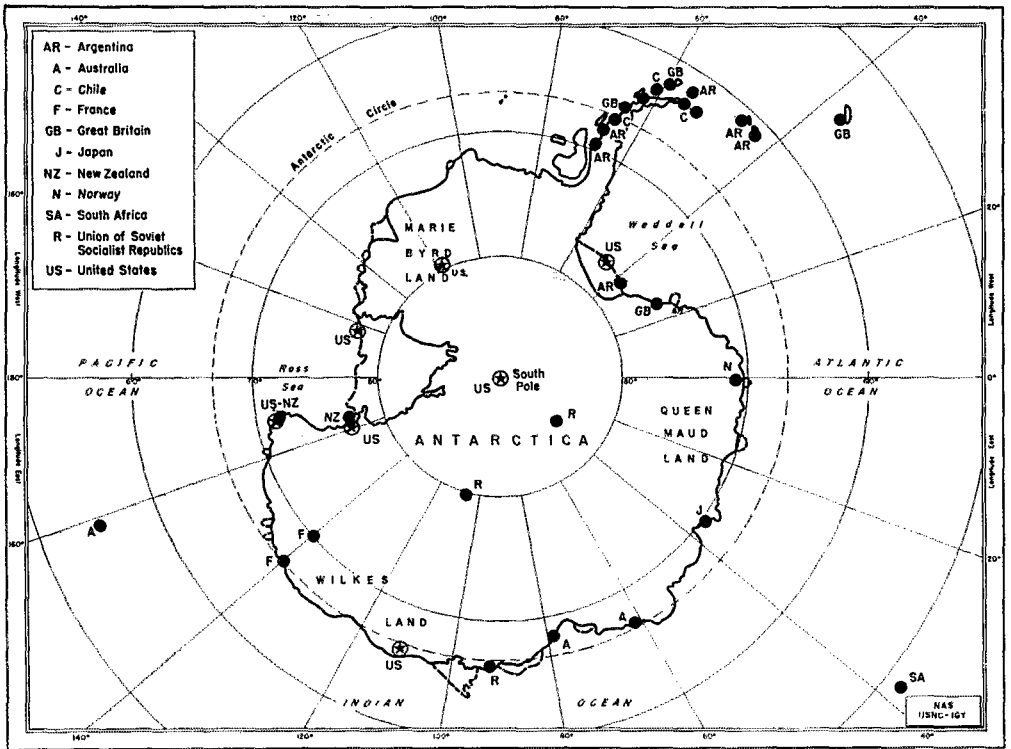
What the IGY Is

During the International Geophysical Year, from July 1, 1957 to December 31, 1958, the nations of the world will undertake a concentrated series of geophysical observations in accordance with a well-formulated international cooperative plan. The objective of the plan is to describe in detail the world-wide pattern of each of many terrestrial phenomena such as weather disturbances, ionospheric and geomagnetic storms, aurora displays, *et al*, and the changes of pattern of the disturbances as they develop in time. Since a single observer on the Earth sees only that aspect of a terrestrial disturbance apparent in his own locality, the whole pattern of the disturbance can be described only after synthesis of many simultaneous observations at suitably spaced intervals over the Earth's surface. What is needed is the sort of picture of the detailed structure and of successive changes of the event that would be seen by an observer looking at the Earth from space.

Because terrestrial phenomena recognize no national boundaries, their description requires common agreement among nations on the places where observation should be undertaken, the kinds of measurements to be made, the observing apparatus to be used, the standards and timing of measurements, and the form of presentation and publication of the results. This agreement has been arranged among the scientists and governments of the world by the International Council of Scientific Unions functioning through its Comité Spécial Année Géophysique Internationale.

During the IGY, observations will be undertaken in eleven branches of geophysics including meteorology, geomagnetism, the aurora, the air glow, ionospheric physics and disturbance, geodesy (precise latitudes and longitudes), cosmic rays, glaciology and climatology, oceanography, gravity, and seismology. Moreover, the Sun will be under continuous observation by a score of stations around the Earth for changes in sunspots, bright chromospheric eruptions, changes in the photosphere, and modifications of the

¹ "Albedo" is an astronomical term, and is the ratio of the light reflected from an unpolished surface to the total of light falling upon it.



corona that may underlie the origins of resultant disturbances on the Earth. In fact, the interval 1957-58 was chosen for the IGY because the activity on the Sun will be nearing the maximum of its eleven-year cycle, rising sharply from the minimum in 1954 to the interval of the IGY when solar effects on the Earth are likely to be the greatest of the present epoch.

While many kinds of observations will be made continuously or at least several times each day, the more difficult, or the specialized and concentrated observations, will be made by all geophysical stations on a specific calendar of Regular World Days. Three to five Regular World Days are scheduled each month. In addition, just after the equinoxes in March and September, and the solstices in June and December, ten-day intervals of very concentrated observation of meteorological and related phenomena, known as World Meteorological Intervals, are scheduled in the attempt to define more sharply meteorological effects at the time of seasonal change. When unusual events are observed on the Sun that may presage magnetic, ionospheric, or auroral disturbances, an Alert will be transmitted to all observers several days in advance of the expected disturbance. If conditions persist on the Sun that are likely to produce terrestrial disturbance, a Special World Day will be announced one day in advance of the expected disturbance over a worldwide communication network, so that all stations will be ready when the disturbance begins. The predictions will be made by the Central Radio Propa-

gation Laboratory of the National Bureau of Standards, Boulder, Colorado, with the advice of centers at Paris and Tokyo that will assess the data from which predictions are formulated.

Observation Points

Since geophysical stations cannot be thickly spaced everywhere, especially over the oceans, a world grid or network of stations has been organized. This network will involve thousands of observing stations. It includes lines of stations from pole to pole along meridians 70°-80°W, 10°E, and 140°E, with auxiliary meridians across Asia at approximately 105°E and 90°E. Crossing these are a band of stations around the equatorial zone that includes the geographic and geomagnetic Equators, and regions of intense observation around the geomagnetic poles of the Arctic and Antarctic in the vicinity of the zones of maximum auroral activity (23° below the geomagnetic poles).

Special emphasis is given to normally inaccessible regions such as the Antarctic where 12 nations plan more than 30 bases to form a network over the unknown "seventh continent." Antarctic observations will be made not only in all branches of geophysics, but also field parties will branch out over the continent to make auxiliary observations as well, such as measurement of the ice thickness so that a reliable estimate of the total of Antarctic ice above sea level can be made. This survey will tell us, for example, whether the Antarctic is a real con-

continent, or only a group of islands overlaid by an immense ice sheet, how fast the ice is melting, and how much the seas will rise as the Antarctic warms. Measurements of seismology and gravity bearing on the interior structure of the Earth will be included in the inaccessible regions to be occupied during the IGY.

In the Antarctic, the United States plans six stations: The main base and air base, Little America, near Kainan Bay 77°S, 162°W; alternate air and support base, McMurdo Sound 77°S, 172°E; main base, Knox Coast 67°S, 110°E; main base, Weddell Sea, 75°S, 62°W; advanced base, Marie Byrd Land, 83°S, 120°W; advanced base, South Pole, 90°S. This is the first attempt to establish a base on the two-mile high plateau at the South Pole. In addition, the U. S. plans to provide assistance to New Zealand's two scientific stations at McMurdo Sound and Cape Adaire, 179°E, 72°S. Field parties will fan out from these stations and regular air service from New Zealand to Little America and McMurdo Sound is anticipated, with local air service between bases. In addition to New Zealand and the United States, other nations are planning Antarctic or sub-Antarctic bases as follows: USSR, three; Australia, three; Great Britain, nine; France, three; Japan, one; Norway, one; South Africa, one; Chile, three; Argentina, eight; with possibly two other bases by these or other nations. Thus, the whole continent will be covered, with many additional stations on islands, such as Macquarie, Kerguelen, and South Georgia, in the surrounding sub-Antarctic seas. Even more extensive geophysical research is planned for the now more accessible Arctic regions, of which far northern Canada is most important since it contains the north magnetic pole.

To give utmost meaning to the Antarctic work, the participating nations have joined in a series of Antarctic conferences at which joint plans have been developed. They have agreed on the location of bases to provide the best distribution of stations from the point of view of the required scientific observations. They have developed a joint radio network between stations to ensure quick interchange of observations. They have agreed on an Antarctic weather central to be established by the United States at Little America. Here, Antarctic meteorological data will be received daily, and Antarctic weather maps drawn and forecasts formulated. For the first time the Antarctic meteorological pattern will be defined not only for scientific understanding, but also to aid day-to-day Antarctic operations in the other scientific fields. Collaboration will provide mutual support for field parties from bases of other nations, and greatly reduce the hazards of field work. The Antarctic program represents international collaboration of the highest type.

Questions Under Study

But the concentration of work in the Antarctic is only an example of the work of more

than 40 great nations in the international planning for the IGY over the whole Earth. Typical of the hundreds of geophysical problems to be examined are questions in meteorology: A huge mass of icy air, wobbling unstably like an inverted jar of jelly, rests on the two-mile high Antarctic plateau. From time to time, a huge cold mass breaks off to come tumbling down from the plateau and originating the meteorological shock waves described by Simpson on the Scott Expedition of 1911-12. The network of Antarctic and of meridional stations is designed to answer questions such as: How do these shock waves move and influence the Earth's weather? How much interchange of air mass occurs between northern and southern hemispheres? At what levels does this interchange occur?

In geomagnetism: How do the electro jets flowing daily between the geographic and geomagnetic equators form and dissipate? What are the effects of these electro jets? How much electric current flows in auroral arcs? How do geomagnetic storms affect the electron distribution in the ionosphere?

In aurora: When auroral arcs are displayed, do they extend all around the Earth? During geomagnetic storms, do auroral displays move closer to the equator, or do they spread out over a wider band both north and south of the zone of maximum auroral activity? Do auroral arcs appear in corresponding Arctic and Antarctic latitudes simultaneously? Is there a zone of auroral activity near the geomagnetic poles during geomagnetically quiet intervals?

In oceanography: Are the bottoms of the oceans dying with loss of oxygen? What is the cause of the seasonal lowering of the oceans near the polar regions, and do they lower alternatively or simultaneously at both poles?

In cosmic rays: From geomagnetic focussing of cosmic rays into certain regions of the Earth, what can be ascertained of their nature and processes of origin? What is the character of the Earth's field outside the atmosphere where it couples with the particles of space?

In the ionosphere: How do ionospheric disturbances that affect radio transmission develop in size and move from the poles during a geomagnetic storm? Are existing theories of ionospheric disturbance on the right track? How does radio absorption develop and move at the time of disturbance?

In geodesy: What is the exact location of any point on the Earth? (New methods promise an increase in accuracy between 500 and 100 feet.) Consequently, what is the exact shape of the Earth? From precise observation of its distortion under the pull of the Moon and the Sun, what is its rigidity and what can be deduced of its interior structure?

To examine such typical problems, every type of available instrumentation will be used, including ships at sea, instrumented balloons launched daily to altitudes of nearly 20 miles, dozens of rockets carrying instruments up to

(Continued on page 126)

Twenty-Five Watts for the Beginner

A Simple 80-Meter C.W. Transmitter and Power Supply

BY C. VERNON CHAMBERS, W1JEQ

• This simple transmitter is an inexpensive job designed for the beginner who wants to get started on 80 meters. It features crystal control, use of a low-cost but rugged sweep tube, simple and neat construction, d.c. and r.f. indicators, TVI preventive measures, and an antenna coupler. The article also describes a combination power unit that will supply the regenerative receiver described in the June issue, as well as this transmitter.

THE TRANSMITTER AND POWER SUPPLY shown in the photographs were designed to complete a simple station for the beginner when combined with the regenerative receiver described in an article in the June issue.¹ The points brought out in that article in argument for building one's own first receiver apply equally to the rest of the station equipment. For learning the whys and hows of amateur equipment, there is no substitute for firsthand experience. Few, if any, of the components used in this transmitter will be wasted when the time comes to go to higher power. In fact, the unit might be used intact as an element in a rig of higher power. Meanwhile, it will provide the beginner or Novice with a dependable, relatively-inexpensive transmitter that is easy to construct and operate. The

¹ Mix, "The Novice Special," *QST*, June, 1956.

The 25-watt Novice transmitter is built into 6 × 7 × 12-inch aluminum utility case (Premier AC-1276). Tuning controls at the left and right are for the antenna coupler and the oscillator plate circuit, respectively. I_2 , a pilot-lamp assembly used as an r.f. output indicator, is below the antenna control. I_1 is at the lower right-hand corner of the panel. The meter is a Shurite model 950. National type R dials are used with the tuning controls and the crystal socket is a Millen 33102.

unit includes an output-coupling circuit designed for use with a balanced antenna system. The supply for the transmitter will also take care of the receiver described in the June issue.

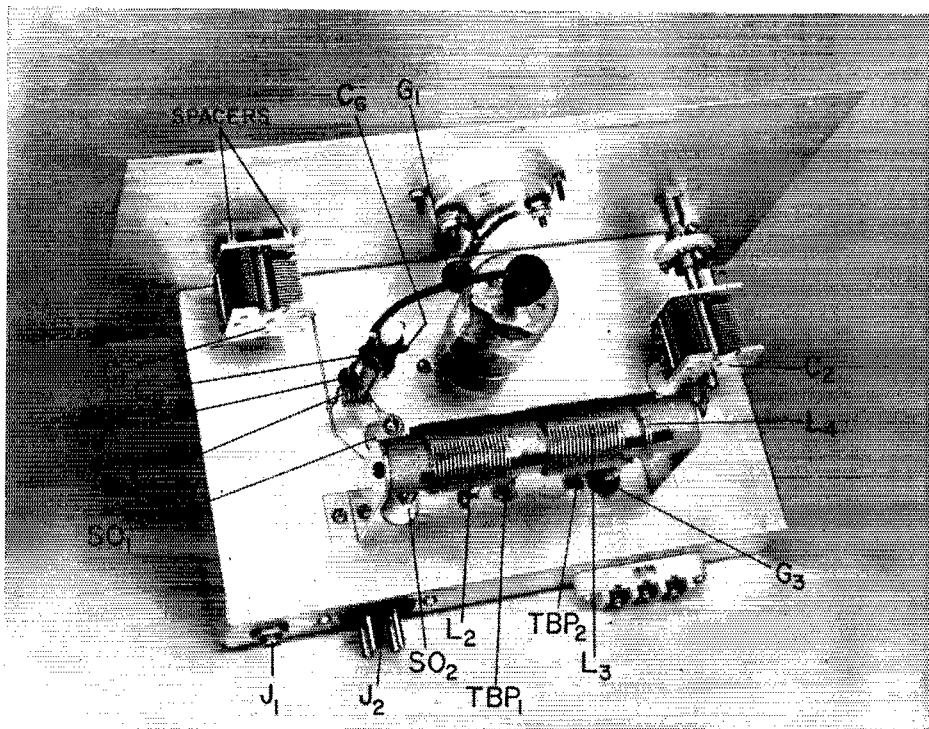
Transmitter Circuit

The circuit of the one-band oscillator-type transmitter is shown in Fig. 1. It is the familiar crystal-controlled arrangement of a tuned-grid tuned-plate oscillator circuit. It works well with a large variety of tubes. In this case, the tube — a 6DQ6A — is an inexpensive one recently developed for TV sweep-circuit applications. The tube sells to hams and servicemen for only \$2.25 or so. It has high perveance which means that high power output can be obtained with low driving power.

In this circuit, the feed-back path is provided through the grid-plate capacitance of the tube. Oscillation will take place when the plate tank circuit C_1L_2 is tuned slightly higher than the crystal frequency. For the Novice, the crystal frequency must fall in the 3700- to 3750-ke. range. A screen-grid tube is used because it requires much less grid-driving power than a triode. Therefore, greater output may be obtained without danger of fracturing the crystal. Since the 6DQ6A is one of those tubes that will draw a high value of plate current even when the screen voltage is relatively low, it will provide maximum power output without consuming appreciable screen power.

At the grid side, R_1 and the crystal Y_1 are tied





Top view of the beginner's transmitter. The aluminum chassis measures $1\frac{1}{2}$ by $5\frac{1}{2}$ by $9\frac{1}{2}$ inches (Premier ACH-400). Chassis and panel are fastened together by J_1 , J_2 and the crystal-socket mounting hardware. The tube socket is centered $1\frac{1}{8}$ inches in from the panel. L_2 , L_3 and L_4 are supported by a 5-inch length of 1-inch-diameter wood dowel. The latter is mounted 2 inches above the chassis by means of aluminum brackets. Metal spacers, $\frac{1}{8}$ inch long, are used between the panel and the front of the frame of C_1 , G_1 , G_2 and G_3 are rubber grommets. SO_1 and SO_2 are $\frac{5}{8}$ -inch cone insulators (E. F. Johnson type 135-500).

in parallel and then connected between Pin 5 of the tube and chassis. The customary grid r.f. choke is not required because of the high resistance of the grid leak, R_1 . The cathode of the

6DQ6A is by passed by C_3 to ground so that r.f. will not have to flow through R_2 , MA_1 , the key leads and the jack, J_1 . Although cathode bias is not ordinarily required in a keyed one-tube

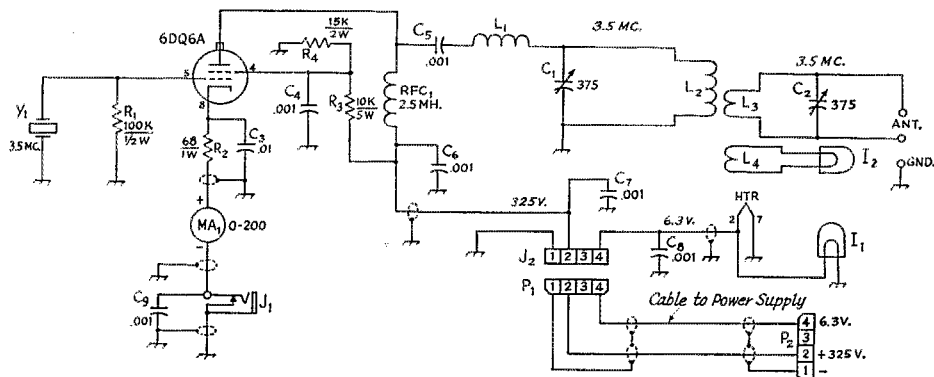


Fig. 1—Circuit of the Novice transmitter. Fixed capacitors are disk ceramic with values in μf .; rest in μm .
 C_1 , C_2 —375- μm f. variable (Allied Radio, Chicago, Catalog No. 61H009).
 I_1 , I_2 —Pilot-light assembly (E. F. Johnson 147-306).
 J_1 —Closed-circuit jack.
 J_2 —4-contact male connector (Amphenol 86-RCP4).
 L_1 —Parasitic coil; 5 turns No. 16, $\frac{1}{4}$ -inch diam., turns spaced wire diameter.
 L_2 , L_3 —5.5 μh . 20 turns No. 20 tinned wire, 1-inch diam., $1\frac{1}{4}$ inches long.

L_4 —Output-indicator coupling loop; 2 turns No. 20 tinned, turns spaced wire diameter.
 Note: L_2 , L_3 and L_4 made from a length of B & W Miniductor type 3015.
 P_1 —4-contact female cable connector (Amphenol 78-PF4).
 P_2 —4-contact male cable connector (Amphenol 86-PM4).
 RFC₁—National R-100S.

transmitter, a cathode resistor, R_2 , has been incorporated in the circuit. Its purpose is to prevent damage to the meter that might otherwise be caused by excessive current during tuning adjustments. The 0-200 milliammeter, MA_1 , indicates the total cathode current of the oscillator tube.

Screen voltage for the 6DQ6A is obtained from the plate supply through R_3 and R_4 which form a voltage divider limiting the screen voltage to approximately 135 volts during normal operation of the transmitter. C_4 is a by-pass capacitor that grounds the screen for r.f.

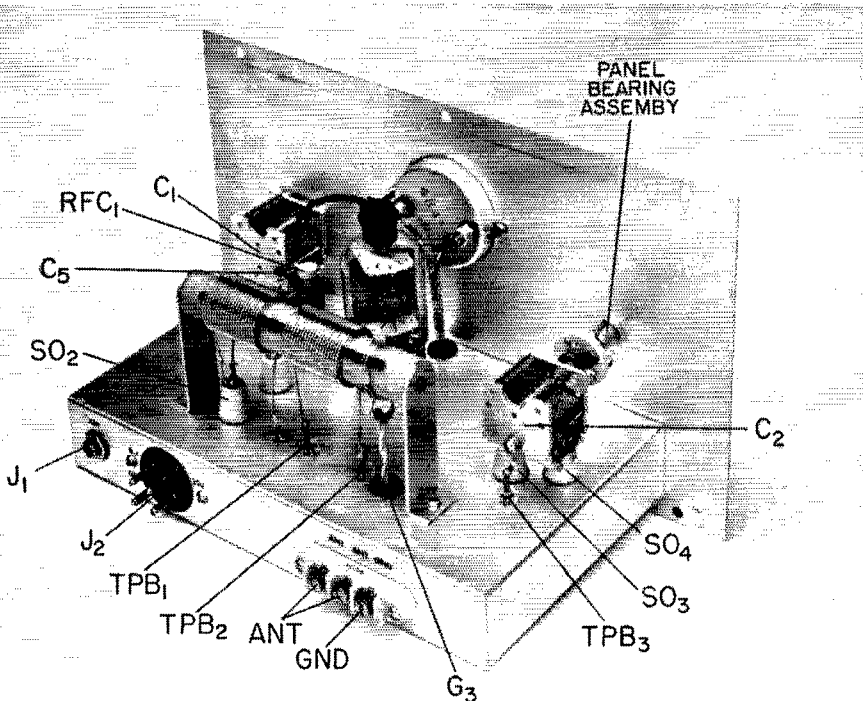
Parallel feed is used in the plate circuit of the oscillator. The plate choke, RFC_1 , must have high impedance at r.f. to prevent short-circuiting the output circuit. Since the bottom of the choke may not be at ground potential under all circumstances, it is customary to include a by-pass capacitor (C_6) at the bottom of the choke as shown in Fig. 1. C_5 allows r.f. currents generated by the tube to pass on into the tank circuit, C_1L_2 , but prevents the application of d.c. to these components. L_1 is a small inductor used to suppress a v.h.f. parasitic oscillation.

A parallel-tuned circuit, C_2L_3 , serves as the antenna coupler for the transmitter. Provision for variable coupling between the oscillator plate circuit and the coupler is made in the mechanical layout. L_4 and I_1 provide an r.f. indicator useful when tuning the transmitter for maximum out-

put. Disk capacitors, C_7 , C_8 and C_9 , are connected at J_1 and J_2 to attenuate v.h.f. harmonic current in the key leads and the power cable. This is for TVI suppression purposes. P_1 , P_2 and the associated wiring are for connecting the transmitter to the power supply.

Construction

The front view of the transmitter shows the layout of the panel-mounted components. It is advisable to start with this phase of the construction so that the panel, after it has been drilled, may be used as a template for marking the front wall of the chassis. For the sake of finished appearance, protect the front of the panel during the marking process by laying it face down on a piece of soft cloth. Mark the necessary holes on the back side of the panel with a scribe or other sharp-pointed tool, remembering that the lay-out pattern will be reversed. Then drill a guide hole at each point with a No. 33 drill. The holes for the crystal socket and the pilot-lamp assemblies are in line across the panel and each is $1\frac{1}{4}$ inches up from the bottom edge. The socket is at the center and the lamps are $2\frac{3}{8}$ inches in from the side edges. The shafts for C_1 and C_2 are directly above I_1 and I_2 , respectively, and each is centered $3\frac{1}{2}$ inches above the bottom edge of the panel. C_1 requires three mounting holes in addition to the shaft-clearance hole and the correct positions may be determined by



Rear view of the 25-watt transmitter. J_1 , J_2 and the antenna terminals are mounted on the rear wall of the chassis. C_2 is insulated from the chassis by means of an isolantite shaft coupling and a pair of Johnson 135-500 cone insulators, SO_3 and SO_4 . TPB_1 , TPB_2 and TPB_3 (National TPB bushings) provide insulated through-chassis leads for the antenna coupler. The antenna terminal strip is a Millen type 37303.

measuring the spacing between the tapped holes in the front of the frame of the capacitor. The meter is centered between the tuning controls with its top edge $\frac{7}{8}$ inch down from the top of the panel.

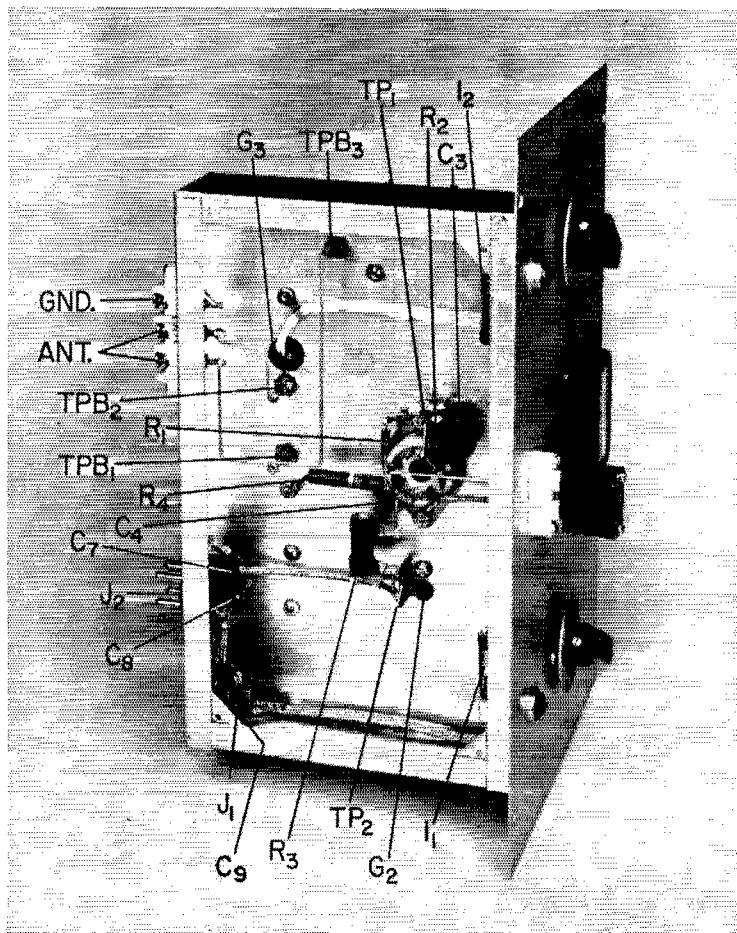
After the guide holes have been drilled, lay the panel over the front wall of the chassis. Allow the panel to extend $1\frac{1}{4}$ inches over each end and $\frac{1}{2}$ inch past the bottom edge of the chassis. The gap at the bottom is to provide clearance for the $\frac{1}{2}$ -inch lip at the front of the utility box used as the cabinet. Now, using the panel as a template, mark the front wall of the chassis for the drilling of the holes for crystal socket and panel-lamp assemblies.

The panel may now be punched and drilled to accommodate the components. Mounting instructions for the meter are included in the packing box, and the spacing and the size of holes for the crystal socket and C_1 may be determined by direct measurement. The capacitor C_1 has a $\frac{1}{4}$ -inch shaft, but the panel hole should be $\frac{3}{8}$ -inch diameter to prevent binding when the control is rotated. The lamp-bulb assemblies require $\frac{7}{16}$ -inch holes and the panel bearing for C_2 takes a $\frac{3}{8}$ -inch hole. When drilling holes for the lamps and

crystal socket, don't forget the similar set of holes that must be made in the front wall of the chassis. In mounting C_1 , use $\frac{1}{8}$ -inch spacers between the capacitor frame and the panel to prevent the $\frac{1}{4}$ -inch mounting screws from bending the front rotor plate. Of course the spacers are not needed if you are lucky enough to have some $\frac{1}{8}$ -inch 6-32 machine screws on hand, or want to cut longer screws down.

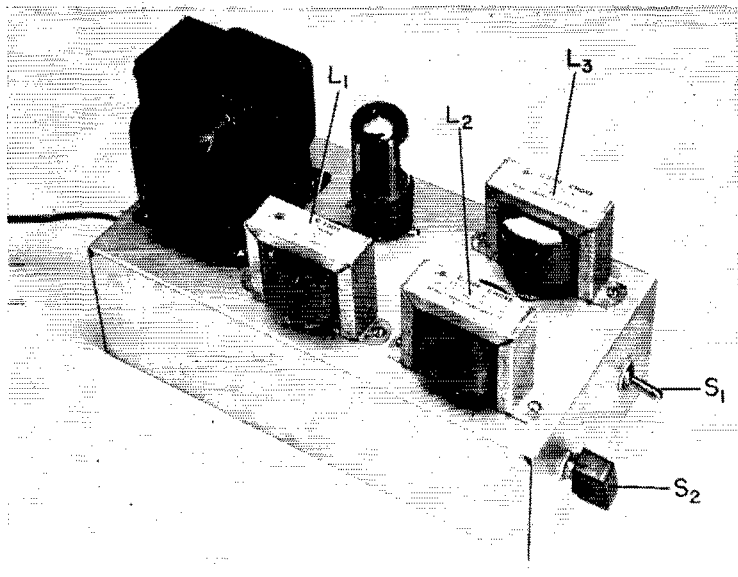
The top view of the transmitter shows the meter leads passing through a rubber grommet, G_1 , located in between the tube and the panel. RFC_1 is centered $1\frac{7}{8}$ inches to the left of the 6DQ6A and a second grommet, G_2 , accommodates the 325-volt lead to the choke. A soldering lug, inserted between the base of RFC_1 and the chassis, is used for grounding the cold side of C_6 . C_5 is connected between the top of the choke and a piece of No. 16 tinned wire that runs straight down to the cone insulator, SO_1 . SO_2 , the stand-off located underneath the coil assembly, is used as a terminal for the leads from the plate end of L_2 and the stator side of C_1 .

A length of 1-inch-diameter wood dowel supports L_2 , L_3 and L_4 at the rear of the chassis. If a



The pilot-lamp assemblies, I_1 and I_2 , are partially visible in this bottom view of the Novice transmitter. TP_1 , a 1-terminal tie-point strip, supports the meter side of R_2 . TP_2 provides a terminal for the 325-volt lead to R_3 and RFC_1 . The twisted-pair link passing through G_3 connects between I_2 and I_4 . C_7 and C_8 are located adjacent to Pins 2 and 4, respectively, of J_2 . Pins 1 and 8 of the tube socket face toward the panel side of the chassis.

◆
 Top view of a combination supply that will take care of a small receiver as well as the transmitter.
 ◆



dowel is not readily available you may be able to find an old broom or mop handle that will fit inside the type 3015 Miniductor. If the wood is a bit too small in diameter to provide a snug fit for the coil stock, it may be shimmed up by cementing a few lengths of "spaghetti" in place as shown in the top view. The general idea is that the coils should fit snugly around the form, but still be free to permit movement for coupling adjustments. The coil form is mounted on a pair of homemade aluminum brackets as shown.

A soldering lug to the right of SO_2 (top view) is used for grounding the cold end of L_2 . Feed-through bushings, TPB_1 and TPB_2 , take care of the through-chassis leads between L_3 , C_2 and the antenna terminals. The link between L_4 and L_2 passes through the grommet identified as G_2 .

The mounting of C_2 requires particular attention. This capacitor is supported on two $\frac{5}{8}$ -inch cone insulators, SO_3 and SO_4 , as shown in the rear view. Turn the capacitor upside down with the shaft facing you. You will see four small holes in the bottom of the frame of the capacitor. The front hole on the right-hand side, and the rear hole on the left-hand side are used for mounting. These two holes should be enlarged with a No. 33 drill, and threaded with a 6-32 tap. Now insert $\frac{1}{2}$ -inch (or longer) 6-32 machine screws in the tops of the two insulators and tighten them with a screwdriver. Cut the heads of the screws off with a hacksaw, and file the ends of the screws smooth. Thread the studs that remain (preferably about $\frac{1}{8}$ -inch long) into the frame of the capacitor.

When mounted on the chassis, the frame of the capacitor is $1\frac{1}{8}$ inches behind the panel. The shaft of the panel-bearing assembly, reduced in length so that it extends about $\frac{7}{8}$ inch behind the panel, is connected to the shaft of C_2 with an insulated coupling. A feed-through bushing, TPB_3 , at the rear of the capacitor, car-

ries the lead from the stator of C_2 to TPB_1 (connected to L_3) and then on to the antenna terminal.

The rear view shows J_1 , J_2 and the antenna terminal strip mounted on the rear wall of the chassis. The placement of these components is not critical. The rear cover for the cabinet, not shown in any of the photographs, is punched with clearance holes for the cable and antenna leads which connect to the jacks and terminals.

A bottom view of the transmitter shows the arrangement of below-deck components and wiring. The r.f. wiring is done with No. 16 tinned wire (also used for r.f. leads on top of the chassis) and remaining connections are made with Belden type 8885 shielded wire. Ordinary hook-up wire may be twisted together and used for the link between L_2 and L_4 .

Power Supply

The transmitter requires a power supply delivering 300 to 350 volts at about 125 ma. A transformer rated at 90 ma. will do because of the intermittent nature of c.w. operation.

The supply shown is designed to take care of the receiver described in the June issue as well as the transmitter described here. If the supply is to be used with the transmitter only, a few of the components may be omitted.

The circuit is shown in Fig. 2. When the power switch S_2 is in the receiving position-shown, the filter is a three-section choke-input arrangement. Under the receiver load, the output voltage will be about 260 volts, and the filtering will be adequate for the receiver. When the switch is thrown to the transmitting position, the first filter choke is short-circuited. This not only cuts out the d.c. resistance of the first filter choke, but it also changes the filter to capacitive input. The output voltage then rises to about 325 under load.

C_4 and C_5 are r.f. by-passes. They help con-

siderably in reducing "tunable" hum that may occur at certain frequencies with a regenerative receiver.

The primary purpose of R_1 is to discharge the filter capacitors after S_1 has been turned off. These capacitors hold their charges for a considerable length of time after the power has been turned off. If it were not for R_1 , there would be danger of a serious shock should the operator accidentally come in contact with the high-voltage circuit.

If the supply is not to be used for the receiver, the first filter choke, L_1 , the transfer switch, S_2 ,

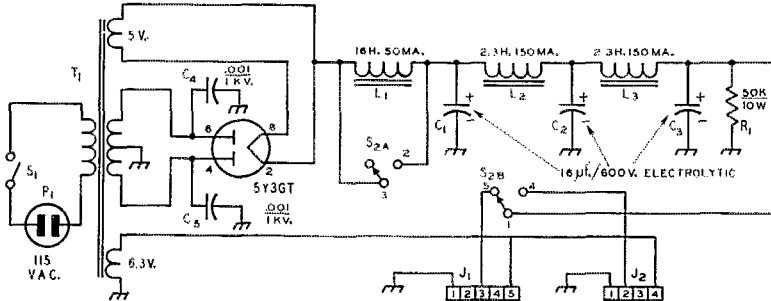


Fig. 2 — Circuit of the combination power supply. If the supply is to be used for the transmitter only, L_1 , S_2 and J_1 may be omitted as discussed in the text. All capacitances are in μf . S_2 is shown in the receiving position.

J_1 — 5-prong tube socket (Amphenol 77MIP5).

J_2 — 4-prong tube socket (Amphenol 77MIP4).

L_1 — 16 h., 50 ma., 590 ohms (Stancor C-1003).

L_2, L_3 — 2.3 h., 150 ma., 60 ohms (Stancor C-2304).

P_1 — A.c. power plug.

S_1 — Toggle switch.

S_2 — Bakelite rotary d.p.d.t. (Centralab 1405).

T_1 — Power transformer: 700 volts, c.t., 90 ma.; 5 volts, 2 amp.; 6.3 volts, 3 amp. (Stancor PC-8409).

and the receiver power outlet, J_1 , may be omitted. The high-voltage line from R_1 should then be connected directly to Pin 2 on the transmitter outlet.

Power-Supply Construction

The supply shown in the photographs is assembled on a $5 \times 10 \times 3$ -inch aluminum chassis. The placement of components on top of the chassis is not critical. All mounting holes can be made with a No. 24 drill to clear $\frac{1}{4}$ -inch 6-32 mounting screws. A $\frac{3}{4}$ -inch hole should be cut under the transformer at the point where the bunched leads come out. Also, a $\frac{3}{8}$ -inch hole should be drilled alongside each of the chokes at the point where the terminal leads emerge. These holes should be fitted with rubber grommets. The socket for the 5Y3GT takes a $1\frac{1}{8}$ -inch center hole.

At the front end of the chassis, the toggle power switch, S_1 , and the rotary power-transfer switch, S_2 , are centered $1\frac{1}{2}$ inches from the sides and $1\frac{1}{2}$ inches down from the top. The two power outlets (a 5-prong tube socket for the receiver, and a 4-prong socket for the transmitter) are similarly located at the rear end of the chassis. These outlets also require a $1\frac{1}{8}$ -inch center hole.

Underneath, various mounting screws are used, as found convenient, for fastening grounding lugs and the insulated tie-points that anchor the + ends of the filter capacitors, the a.c. power

cord and the leads from the power toggle switch S_1 .

The sketch of Fig. 3 shows a rear view of the rotary transfer switch as it is mounted in the chassis. The terminal numbers correspond to those in Fig. 2. The switch is equipped with an adjustable stop which can be set to limit the travel to the two positions needed. As the switch is viewed in Fig. 3, the tongue of the stop should be inserted in the top right-hand hole.

The manner of wiring is not critical except that C_4 and C_5 should be connected directly from the rectifier-socket terminals to a grounding lug

fastened under one of the socket-mounting screws. In most cases, the transformer and choke terminal leads will serve to make the necessary connections.

Testing

Preliminary testing of the transmitter should be done with a dummy load coupled to the antenna terminals. A 15-watt lamp bulb makes a good load. Of course, in addition to the power supply, it is necessary to have a crystal and a key. It is advisable to make the key leads with shielded wire if you happen to live in an area heavily populated with TV receivers. A voltmeter is a convenient instrument to have on hand.

Connect the cable between the 4-prong receptacles on the power supply and the transmitting. Insert the crystal and key plug (key open) and adjust the spacing between L_2 and L_3 , and L_3 and L_4 , to approximately $\frac{1}{2}$ inch and 1 inch, respectively. Rotate C_1 and C_2 to maximum capacitance and close S_1 of the power supply. S_2 of the power supply should be in the receiver position.

After the heater of the 6DQ6A has warmed up, turn S_2 (power supply) to the transmitting position. Momentarily close the key while observing the cathode current registered by MA_1 . It should read approximately 160 ma. Now, rotate C_1 slowly toward minimum capacitance while watching for a sudden dip in current. When C_1 has been adjusted to approximately 70 per cent of its

total capacitance, the cathode current should drop to 50 ma. or so. Tune C_1 a little farther toward minimum capacitance, thereby causing the current to increase to about 55 ma. Next, slowly decrease the capacitance of C_2 . This should cause the cathode current to increase. When the current has reached a value of approximately 70 ma., retune C_1 for minimum current. Repeat these adjustments — C_1 for minimum followed by C_2 for maximum — until the maximum resonant current (with C_1 tuned for the dip) is obtained. With the loose coupling between L_2 and L_3 recommended above, the loaded resonant current should be approximately 80 ma. and the 15-watt lamp should start to light, indicating r.f. output from the transmitter.

The plate power should now be turned off and the coupling between L_2 and L_3 increased (move the inductors closer together). With the spacing between coils set at about $\frac{1}{4}$ inch, apply power and retune the oscillator and the antenna coupler as outlined above. The *minimum* cathode current with both circuits at resonance should be approximately 100 ma. If it is lower than this value, increase the coupling and retune. If the loaded resonant current is above 100 ma., decrease the coupling and retune. *Remember — turn off the plate power before each coupling adjustment.*

Check the oscillator for reliability by opening and closing the key several times. If the current jumps suddenly to a high value (indicating that the circuit has stopped oscillating), adjust C_1 to the high-frequency (toward minimum capacitance) side of resonance. The oscillator should be quite stable when C_1 is tuned off resonance just far enough to cause a 5-ma. increase in current. For example, if the loaded value of current is 100 ma. with C_1 set for the dip, *reducing*

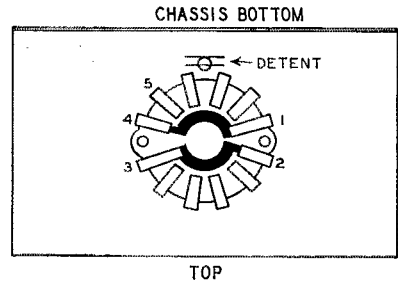


Fig. 3 — Sketch showing a rear view of S_2 with terminal numbering corresponding to that of Fig. 2.

the capacitance of C_1 for a current of 105 ma. should stabilize the operation.

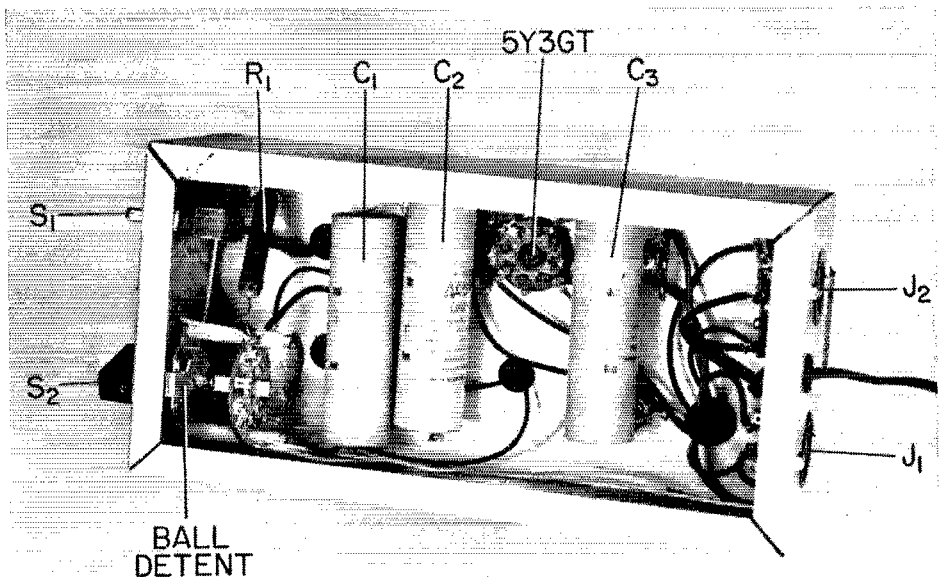
The coupling between L_3 and L_4 may now be increased (move L_3 over toward L_4) sufficiently to cause the r.f. output indicator, I_1 , to glow brightly enough to illuminate the panel jewel. *Turn off the plate power each time an adjustment is made* and increase the coupling very slowly. Overcoupling between the two coils will cause the 60-ma. lamp to burn out.

If a voltmeter is available, it may now be used to check the plate and screen voltages. If the transmitter is loaded to 100 ma., the meter should register approximately 325 volts at the B+ end of R_3 (the side connected to J_2). The screen voltage, measured at the junction of R_3 and R_4 , should be around 135 volts.

The Antenna

While any of a number of different antennas might be used with this transmitter, the output coupling circuit has been designed for one

(Continued on page 138)



Bottom view of the combination power supply.

Antenna Couplers for 50 and 144 Mc.

Shielded Couplers for the V.H.F. Station

• Unless only a short transmission line is needed for the run from transmitter to array, losses may run rather high if coax is used on v.h.f. antenna systems. Yet modern transmitter design and the need for TVI protection demand the use of coaxial output coupling. The best combination for most v.h.f. installations is some form of balanced transmission line for the main run, and an antenna coupler to handle the conversion from the balanced line to the coaxial transmitter connection. Here are shielded couplers to do the job on 50 and 144 Mc.

THOUGH antenna couplers are quite general on lower frequencies, they are still something of a rarity in v.h.f. stations. Why bother with a combination of coils and capacitors, when a simple balun of coaxial line will serve the same purpose?

There's nothing wrong with the balun approach, provided we recognize its limitations. The balun will convert from coax to balanced lines, and step up the impedance from 50 to 200, or 75 to 300 ohms, in the process, but it will do no more. Transmission line of 200 ohms impedance is little used, and the common polyethylene-insulated 300-ohm lines leave quite a bit to be desired, particularly in wet weather. Probably the best transmission line for most v.h.f. installations is the open-wire variety, with impedance ranging from 400 to 600 ohms. A balun will not do the job properly with this sort of line.

In addition, few v.h.f. antenna systems actually present a purely-resistive load of 300 ohms at the transmitter end. Measurement of impedance, at the end of the line or at the antenna, may show values well away from those that can be matched with simple coaxial baluns. A moderate mismatch between the antenna and the transmission line will do very little harm, provided that some provision is made for tuning the line, and for coupling to it properly. That's where our antenna couplers come in. With them you can make almost any antenna system that is fed with a bal-

anced line take power on 50 and 144 Mc. — and that can be highly useful in an emergency.

The writer recently made use of the two antenna couplers described below in this way. Some changes in our arrays for 50 and 144 Mc. had been started, and then were held up by a stretch of the nasty weather that New England can serve up in March. For a week or so we got in some tolerable operating on 6 and 2 by using a 68-foot doublet that is fed with about 100 feet of open-wire line. It was something less than a red-hot v.h.f. antenna, but the couplers made it possible to load properly, and the antenna didn't do too badly. With another coupler of similar circuitry,¹ the same doublet also serves well enough for our occasional excursions on all the "d.c. bands" from 30 to 3.5 Mc.

Construction

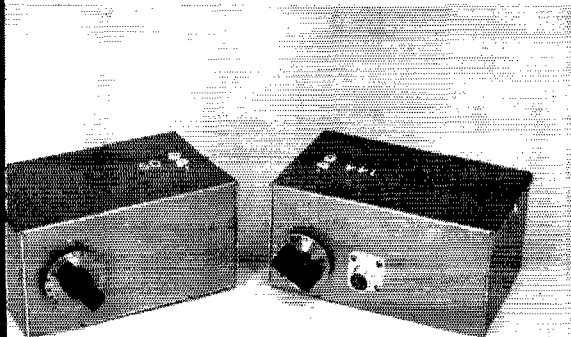
Antenna couplers for lower bands are usually constructed with their tuned circuits out in the open. Shielding is desirable, but the large coils needed for those frequencies would require quite large enclosures. Metal in the field of a coil reduces its "Q", so we should allow for free space all around the coil for at least half its diameter. On 50 or 144 Mc. we can satisfy this requirement and still build the antenna coupler in a compact package.

Our couplers are housed in aluminum utility boxes 3 by 4 by 6 inches in size. These are the two-piece variety, and all the components are mounted on one of the pieces. With only slight modification a standard chassis could be used, the shielding being completed by adding a bottom cover.

The two units are identical in external appearance, and similar components are used. The main tuning capacitor, C_2 , is fastened to the front wall $1\frac{1}{4}$ inches in from the left side. The series capacitor, C_1 , and the coaxial fitting, J_1 , are $1\frac{1}{8}$ inches up from the bottom of the rear wall, $1\frac{1}{8}$ and $2\frac{3}{4}$ inches, respectively, from the left edge, as viewed from the back. A standard crystal

¹ See the Transmission Lines chapter of any recent edition of the *Handbook* for details.

From outside the 50- and 144-Mc. antenna couplers are identical. Opposite sides are shown in this view.



QST for

socket, J_2 , is the terminal for the balanced line. It is mounted on the top, one inch from the edge.

Details of the interior arrangement should be obvious from the photographs. The 50-Mc. coils are cut from commercially-available stock inductors, though they can, of course, be made by hand. The coupling winding, L_1 , is inserted inside the tuned circuit. The polyethylene strips on which the coils are wound keep the two coils from shorting to each other, so no mechanical support other than that provided by the leads is needed. The leads to L_1 are brought out between the turns of L_2 , and are insulated from them by two sleeves of spaghetti, one inside the other. Do not use the soft vinyl type of sleeving, as it will melt too readily if, through an accident to the antenna system, either coil should run warm. In the 144-Mc. unit the positions of the coils are reversed, with the tuned circuit, L_2 , at the center, and the coupling coil on the outside.

The components are designed to stand up under fairly high power. Smaller parts could be used if operation is to be at the 100-watt level or lower, but there would be no great saving in cost. Similar tuning capacitors are used in both couplers, but some of the plates are removed from the one in the 144-Mc. unit. This provides easier tuning, though it has no great effect on the minimum capacitance, and is therefore merely a matter of convenience. The capacitor may be left in its original condition, if you want to save it that way for some other eventual use.

Adjustment

There is only one way to adjust an antenna coupler properly. That is by means of some form of standing-wave bridge. Anything else is guesswork. You can come up with an adjustment that will work, but you will never know if it is the optimum, except by checking the standing-wave ratio on the coaxial line from the transmitter to the coupler.

If you have a power-indicating bridge such as the Micromatch, you make the adjustment with normal transmitter power. With the simpler form of bridge it will be necessary to drop the power level to that recommended for the bridge in question. Adjustment of the coupler is the same for either, however, and once it is set correctly it may then be used for that antenna system at any power level, and with any length of coax, and any transmitter.

Set the bridge to read forward power, and with the antenna connected to J_2 adjust the antenna coupler capacitors and the transmitter tuning

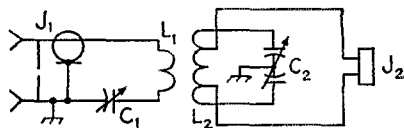


Fig. 1 — Circuit and parts information for the v.h.f. antenna couplers.

C_1 — 100- μ f. variable for 50 Mc., 50- μ f. for 144 Mc. (Hammarlund MC-100 and MC-50).

C_2 — 35- μ f. per-section split-stator variable, 0.07-inch spacing (Hammarlund MCD-35SX). Reduce to 4 stator and 4 rotor plates in each section in 144-Mc. coupler for easier tuning; see text.

J_1 — Coaxial fitting, female.

J_2 — Crystal socket.

L_1 — 50 Mc.: 4 turns No. 18 tinned, 1 inch diameter, $\frac{1}{8}$ -inch spacing (Air-Dux No. 808T).

144 Mc.: 2 turns No. 14 enam., 1 inch diameter, $\frac{1}{8}$ -inch spacing. Slip over L_2 before mounting.

L_2 — 50 Mc.: 7 turns No. 14 tinned, $1\frac{1}{2}$ inch diameter, $\frac{1}{4}$ inch spacing (Air-Dux No. 1204). Tap $1\frac{1}{2}$ turns from each end.

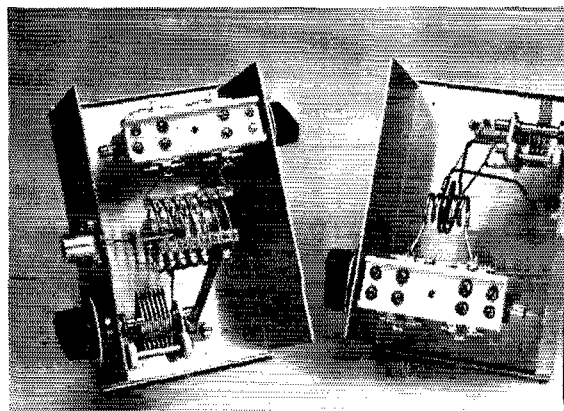
144 Mc.: 5 turns No. 12 tinned, $1\frac{1}{2}$ inch diameter, inch long. Tap $1\frac{1}{2}$ turns from each end.

roughly for maximum reading. Now set the bridge to read reflected power, and adjust the antenna coupler capacitors, first one and then the other, until minimum reflected power is achieved. Unless the line input impedance is very highly reactive it should be possible to get the reflected power reading down to zero, or very close to it. As far as the antenna coupler is concerned, the job is now complete, for the antenna presently in use. Adjustment from here on, for maximum transfer of power from the transmitter, is done *entirely* at the transmitter. If you can't get the transmitter to load properly now, you need some modification of its coupling system. If the bridge shows zero reflected power, the coax link now represents a purely resistive load for the transmitter. Leave it that way, and go to work on the rig!

The couplers were checked in the lab with resistive loads from 100 to 1600 ohms, over which range it was possible to show a 1:1 s.w.r. in the coax line and load the transmitters effectively. This simulates a mismatch of up to 5.3 to 1 for 300-ohm lines, or 4.5 to 1 for 450-ohm lines. It is unlikely that a v.h.f. array built to any standard design will have an s.w.r. of anything like this order. Antennas intended for use on the other bands may present higher or lower values, but a slight juggling of the line length should make it possible to load them effectively with the couplers shown.

— E. P. T.

Interior of the antenna couplers. The 50-Mc. coupler is at the left.



• Recent Equipment —

The PMR-7 Amateur Receiver

OLD-TIMERS will be able to recall when "all-wave" receivers that tuned the broadcast band and the amateur bands were nothing more than conventional broadcast receivers with the ham bands and a b.f.o. added to them. Performance was what you might expect from such a compromise. But those days have disappeared, if the PMR-7 is an example. This new job is an amateur-bands receiver with the broadcast band added.

The PMR-7 is a double-conversion receiver intended primarily for mobile use, but its light weight and compactness suggest that it would work well into plans for portable operation. Since separate power supplies for a.c. or 6/12-volt d.c. operation are available, it isn't hard to visualize using the receiver in the car on the way to a summer spot and then using the receiver for portable work at the temporary ham shack.

To start at the beginning, let's look at a block

diagram of the receiver. Manual gain control is applied to the r.f. stage and the first i.f. stage; a.v.c. is applied to these stages and to the second i.f. stage.

Following the detector, the pentode section of a 6AN8 is used as the first audio amplifier, and the triode section is used as a squelch control tube. Squelch, of course, permits the receiver to be automatically silenced in the absence of an incoming signal, and is a feature that is appearing in many of the mobile receivers these days.

The audio output stage is a 6AQ5. The block diagram shows no voltage stabilization; this is taken care of in the two power supplies, and stabilized voltages are applied to the b.f.o. and to the high-frequency oscillator. An S-meter

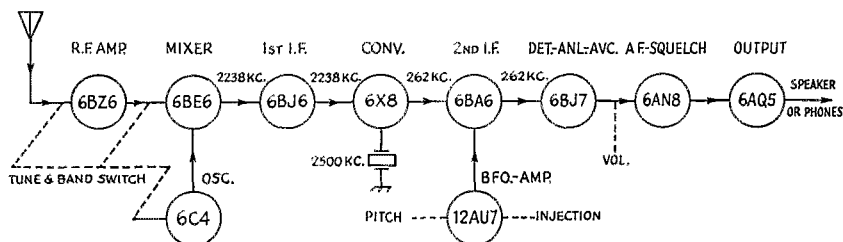


Fig. 1 — Block diagram of the PMR-7 receiver. Manual gain control is applied to the r.f. stage and the first i.f. stage; a.v.c. is applied to these stages and to the second i.f. stage.

diagram of the receiver. A 6BZ6 r.f. stage is used, followed by a 6BE6 mixer with a 6C4 high-frequency oscillator. The first i.f. is 2238 k.c., and a 6BJ6 amplifier at this frequency builds up the gain before the second conversion. A 6X8 triode-pentode converter follows, with the triode oscillator portion crystal-controlled at 2500 kc. The second i.f. is at 262 kc., and a single 6BA6 is used here before the signal is detected in one of the three diodes in the 6BJ7. The b.f.o. is one of the 12AU7 triodes, and the other 12AU7 triode is used as a buffer or "B.F.O. Amplifier." B.f.o. amplifier output is introduced to the 6BA6 grid, and the amplitude of the b.f.o. voltage can be controlled by the injection control, a 10K potentiometer shunting the plate circuit of the b.f.o. amplifier. The purpose of the isolation amplifier is to prevent the b.f.o. from locking in with the signal present at the i.f. amplifier, and to allow variation of the injection voltage without varying the b.f.o. frequency.

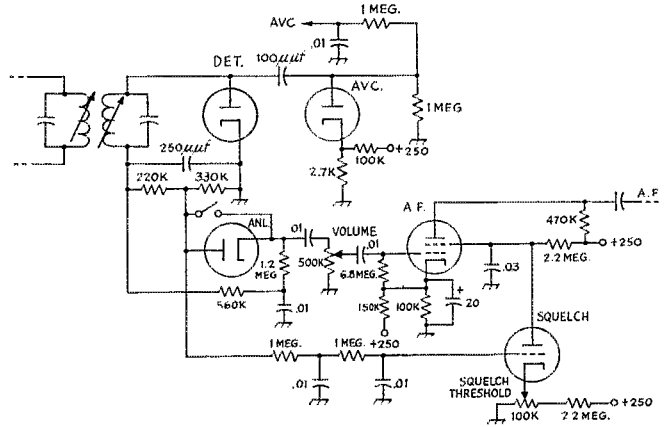
The 6BJ7 is a triple diode that serves as a diode detector, automatic noise limiter, and de-

layed a.v.c. rectifier. Delayed a.v.c. is used to provide maximum sensitivity when a.v.c. is used, since in ordinary a.v.c. circuits, inherent noise in the receiver will reduce the sensitivity of the receiver. Employing delayed a.v.c. prevents this bias from being applied to the amplifiers until the signal at the a.v.c. rectifier diode is in excess of 8 volts.

The selectivity curve printed in the 18-page instruction book shows the 262-kc. i.f. bandwidth to be 3 kc. at 6 db. down.

The PMR-7 weighs only 8½ pounds, and the panel is 4½ inches high by 7 inches wide. The depth is 11½ inches. A slide-rule tuning dial is used, and the tuning knob is a large one on the right-hand side of the dial. String drive moves the three-section tuning capacitor and the scale pointer. A large knob on the left-hand side of the dial provides b.f.o. adjustment; this should be a nice operating convenience during the reception of s.s.b. signals. The BAND SWITCH and ANTENNA TRIMMER are controlled by knobs directly underneath the dial, and concentric knobs at the lower outside corners handle the SQUELCH, INJECTION, R.F. GAIN and AUDIO VOLUME functions. The a.v.c.-off switch is part of the squelch

Fig. 2—The detector, noise limiter, a.v.c. and squelch circuit of the PMR-7.



control. Slide switches are provided for turning on the b.f.o. and the automatic noise limiter.

Circuit Details

To equalize the over-all gain on the various bands, a section of the bandswitch throws in additional cathode bias in the r.f. stage at the lower frequencies. The instruction book doesn't mention it or the reasoning behind it, but it seems like a good principle to keep in mind for a homemade receiver, as a means for getting a good balance between signal-to-noise ratio and signal-handling capability over the frequency range.

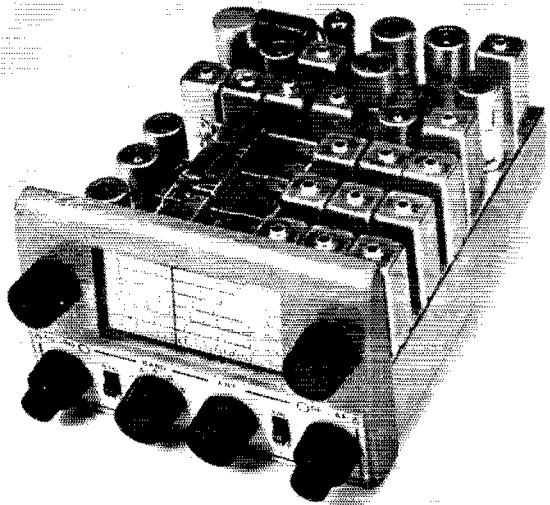
The detector, delayed a.v.c., automatic noise limiter and squelch circuits are shown in Fig. 2. The a.v.c. diode gets its delay bias from the 2700-ohm resistor in its cathode circuit, bled through the 0.1-megohm resistor from the + supply. The automatic noise limiter is the well-

known series type that adjusts itself to the incoming carrier level. In the squelch circuit, the squelch control tube draws plate current through the 2.2-megohm resistor and brings the screen of the audio tube down to a low voltage. This can cut off the audio tube because the cathode of the audio stage is held above ground by the 150K-100K voltage divider. When a signal comes through the receiver, the developed negative voltage at the detector is applied to the grid of the squelch tube and cuts it off, returning the audio tube to normal operating conditions with contact-potential bias. The voltage level at which the squelch tube cuts off is determined by the bias network in its cathode circuit (labeled SQUELCH THRESHOLD).

The PMR-7 and its power supplies are manufactured by Multi-Products Co., Oak Park, Mich.

— B. G.

The PMR-7 is a 10-tube double-conversion receiver intended for mobile, portable or home use. The front-end coils are housed in the nine cans to the right of the tuning gang and in two cans to the rear of the gang.



Accessories for the Single Sideband Station

IF THE AVAILABILITY of accessory equipment is an indication of the maturity of an activity, then single sideband has definitely arrived. Two of the three items to be described would have been welcomed as far back as 1948; the third item meets a demand that grew out of voice-controlled break-in operation.

The "Timemaster"

In rapid round-table and net operation, made possible through the use of voice-operated break-in, there has been some tendency for the operators to forget to comply with the FCC regulation that requires station identification at least once every 10 minutes. The "Timemaster" is designed to help them remember. It is an electrically-driven timer that, running continuously, sounds a bell every 10 minutes to remind the operator that the FCC may be monitoring his transmissions. A knob on the front of the unit permits setting the first interval to anything less than 10 minutes, and a switch is provided for turning the unit off when no QSO is in progress. Housed in a small black plastic box 4 inches high by $2\frac{3}{4}$ inches wide and $2\frac{1}{2}$ inches deep, the Timemaster is inconspicuous in any station.

The "Tonemaster"

Although everyone has a need at one time or another for a convenient source of single-frequency audio tone, the "Tonemaster" will probably find its maximum application in a single sideband station. It is a battery-powered transis-

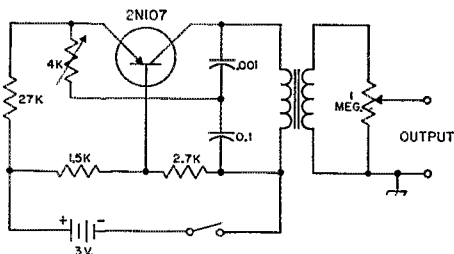


Fig. 1—Circuit diagram of the Tonemaster, a transistor audio oscillator. The 4000-ohm resistor is a feedback control; setting the control to the point where the oscillator is just beginning to oscillate usually results in best output wave form. The transformer is a push-pull audio transformer, Stancor A53C or equivalent.

tor oscillator that delivers a good sine wave, at a frequency of approximately 1200 cycles. An output level-setting adjustment on the panel permits matching the output to normal microphone output or considerably more. Anyone who has scrounged around for an audio tone to use in a two-tone test of his sideband amplifier or exciter will appreciate the usefulness of this little

device. Two penlite cells furnish power for the unit, and the manufacturer says their life in the Tonemaster is the same as their shelf life. The unit we examined gave a slight improvement in output wave form when only one cell was used, but at a natural sacrifice in maximum output voltage. The Tonemaster is housed in a plastic case 4 inches high by $2\frac{3}{4}$ inches wide by $2\frac{1}{2}$ inches deep. The on-off switch is part of the output-level control, and the output terminals are at the rear of the unit.

Low-Pass Audio Filter

The virtues of a low-pass filter in the speech equipment of a phone rig have been talked about for years and need not be repeated here. It is also fairly well known among sidebanders that they can make their rigs a little better by using a low-pass filter to "protect" the audio phase-shift network in their phasing-type exciters. (A filter-type exciter is protected by the sideband filter.) A low-pass filter will also help to reduce high-frequency noise in a receiver, although this is usually not necessary in a receiver that incorporates high i.f. selectivity, as many of the current receivers do. The P2938 is a compact low-pass filter that is down only 6 db. at 3000 cycles but drops rapidly to 40 db. down at 3500 cycles. Beyond this frequency the attenuation is never less than 35 db. (at 4500 cycles), and it is above 40 db. beyond 5300 cycles. The filter has an input impedance of 10,000 ohms and an output impedance of 12,000 ohms, and the fact that the permissible d.c. through it is 50 ma. means that its application is not limited to extremely low-level stages. The filter is so small ($1\frac{1}{2} \times 1\frac{3}{8} \times 2\frac{1}{8}$ inches) that it should be easy to find room for it in almost any piece of existing equipment. A two-page instruction sheet shows its circuit, frequency response, and several suggestions for connecting it in the equipment.

The Timemaster, Tonemaster and Low-Pass Audio Filter are products of Lakeshore Industries, Manitowoc, Wis. — B. G.

Strays

In Milwaukee, Wis., there are two "C. W. Hammers" in one family. Carl is W9DWH and Charlotte is W9UNY.

— ... —
R. F. Burns is W0KAA.

— ... —
K4HEN lives on Duck Ave. in Key West.

— ... —
W8VHF is a Technician Class licensee.

Keying the Radiotelegraph Transmitter

Considerations for the C.W. Perfectionist

BY BYRON GOODMAN, W1DX

• Here is a résumé of many of the factors involved in obtaining a good c.w. signal. Some of the suggestions you may want to put into practice in your shack, and some of the points may seem too fine to worry about. But regardless of your reaction, it will be hard to avoid the realization that good keying of a transmitter involves slightly more than providing a key jack in the oscillator cathode circuit.

SECTION 12.133 OF THE FCC REGULATIONS SAYS "... The frequency of the emitted . . . wave shall be as constant as the state of the art permits." It also says "... spurious radiation shall not be of sufficient intensity to cause interference in receiving equipment of good engineering design including adequate selectivity characteristics, which is tuned to a frequency or frequencies outside the frequency band of emission normally required for the type of emission being employed by the amateur station."

If the FCC ever decided to enforce these regulations to the strict letter of the law, citations would be received by a large percentage of the current crop of stations. Let's be honest about the thing; in 1956 the state of the art is such that an emitted wave can be mighty doggone stable, yet many phone and code stations show f.m. and chirp that leaves them open to a citation by the Commission. Splatter and key clicks represent violations of the spurious radiation clause, and it isn't hard to find evidences of them in any of the ham bands. This article will deal with code transmitters, showing where they fail to meet the regulations and suggesting methods for improvement. The author isn't naïve enough to think that all amateurs care about the quality of their code signals, so long as they aren't cited by the FCC, and the article is intended for those hams who have some pride in their signals and would like to know what to do about it.

There are four factors that have to be considered in the keying of a transmitter. They are r.f. clicks, envelope shape, chirp and backwave.

R.F. Clicks

Whenever any circuit carrying d.c. or a.c. is closed or broken, the small or large spark (depending upon the voltage and current) generates a small amount of r.f. during the instant of make or break. This r.f. covers a frequency range of many megacycles. A typical example of this type of miniature transmitter is when a lamp or other appliance is switched off in the house; at that

instant a click may be heard in the broadcast or short-wave radio. When a transmitter is keyed, of necessity some current must be handled by the key (and relay, if one is used), and the minute spark at the contacts usually causes a click in the receiver. *This click has no effect on the transmitter, although many amateurs think it has.* Since it occurs at the same time that a click (if any) appears on the transmitter output, it is obviously impossible for one to judge the clicks on his own transmitted signal by observation within the shack unless he has first removed the effects of these r.f. clicks. Fortunately, this is usually a simple matter, involving only a small r.f. filter at the contacts of the key (and relay, if used). The effectiveness of the filter can be easily checked by interrupting the normal amount of current with the key and listening to observe if any click can

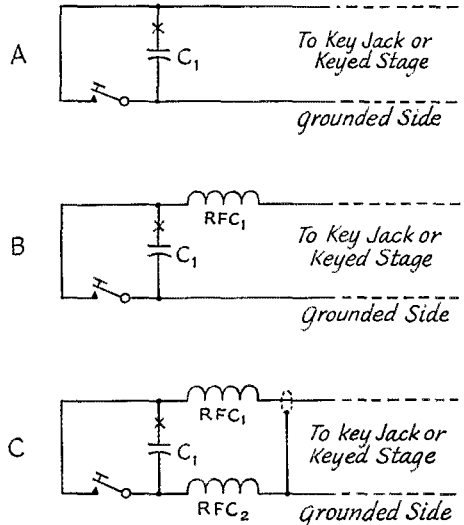


Fig. 1—Typical filter circuits to apply at the key (and relay, if used) to minimize r.f. clicks. The simplest circuit (A) is a small capacitor mounted at the key. If this proves insufficient, an r.f. choke can be added to the ungrounded lead (B) or in both leads (C). The value of C_1 is .001 to .01 $\mu\text{f.}$, RFC_1 and RFC_2 can be 0.5 to 2.5 mh. , with a current-carrying ability sufficient for the current in the keyed circuit. In difficult cases another small capacitor may be required on the other side of the r.f. choke or chokes. In all cases the r.f. filter should be mounted right at the key or relay terminals; sometimes the filter can be concealed under the key. When cathode or center-tap keying is used, the resistance of the r.f. choke or chokes will add cathode bias to the keyed stage, and in this case a high-current low-resistance choke may be required, or compensating reduction of the grid-leak bias (if it is used) may be needed. A visible spark on "make" can often be reduced by the addition of a small (10 to 100 ohms) resistor in series with C_1 (inserted at point "x"). Too high a value of resistor reduces the arc-suppressing effect on "break."

be heard. In other words, if your key normally handles, for example, 50 ma. of current, the effectiveness of the filter can be checked by keying that amount of current, without the transmitter running. The current can be obtained from your power supply through a suitable resistor (computed by Ohm's Law). If you don't care to go to this trouble, and often it isn't necessary, listen on a lower frequency band than your transmitter and see if applying an r.f. filter at the key reduces the clicks. Do this with the gain control of the receiver backed off and only a short length of wire connected to the receiver antenna terminal. This check will work if your transmitter keying is already fairly "soft," but it is not a sure-fire test like interrupting the normal amount of current with no radio transmitter running.

Envelope Shape

The key clicks that go out on the air with your signal, and which make up one of the forms of spurious radiations mentioned in the opening paragraph (the other two are harmonics and parasitic oscillations), are controlled by the shape of the envelope of the signal. The envelope is simply the outline of the oscilloscope pattern of your transmitter output, but you don't need an oscilloscope to observe the effects. Fig. 2 shows representative scope patterns that might be obtained with a given transmitter under various

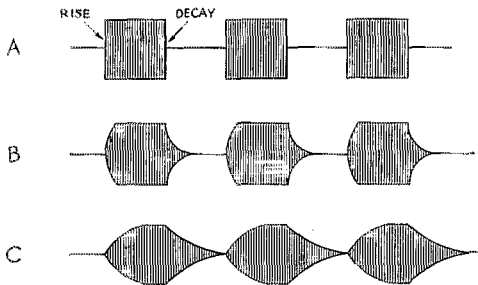


Fig. 2—Typical oscilloscope displays of a code transmitter. The rectangular-shaped dots (A) have serious key clicks extending many kc. either side of the transmitter frequency. Using proper shaping circuits increases the rise and decay times to give signals with the envelope form of B. This signal would have practically no key clicks. Carrying the shaping process too far, as in C, results in a signal that is too "soft" and is not easy to copy.

conditions. The pattern at Fig. 2A is the transmitter output with no envelope-shaping provisions. A signal like this has horrible clicks on the air, which are the inescapable result of turning the transmitter on and off too rapidly. The clicks can be reduced by providing circuits that cause the transmitter output to rise to full output and drop off to zero output relatively slowly each time the key is closed and opened. The pattern of such a transmitter might look like Fig. 2B, and it would be found that such a signal shows little if any clicks outside of the narrow receiver

range over which the code signal can be heard. If the shaping process is carried too far, and a signal like Fig. 2C is obtained, it may be found that the keying is too "soft" and, while it shows no clicks anywhere, it is not too easy or pleasant to copy under weak-signal conditions.

At the moment it is sufficient to appreciate that the *on-the-air* clicks are determined by the shaping, while the r.f. clicks caused by the spark at the key can only be heard in the station receiver and possibly a broadcast receiver in the same house or apartment.

Chirp

The frequency-stability reference in the opening paragraph refers to the "chirp" observed on many signals. This is caused by a change in frequency of the signal during a single dot or dash. Chirp is an easy thing to detect if you know how to listen for it, although it is amazing how some operators will listen to a signal and say it has no chirp when it actually has. The easiest way to detect chirp is to tune in the code signal at a low beat note and listen for any change in frequency during a dash. The lower the beat note, the easier it is to detect the frequency change. Listening to harmonics of the signal will multiply the frequency change and make it quite obvious.

The "state of the art" is such that code transmitters can be built with no chirp, and it is fortunate (for some!) that the FCC hasn't seen fit to enforce the regulation. Actually, a small amount of chirp, while noticeable, does not prevent copy even under the sharpest selectivity conditions, although it is sometimes said that high-selectivity receivers can't hold chirpy signals. This just isn't true, unless the chirp is so bad that the signal shouldn't be on the air anyway. The main reason for minimizing chirp, aside from complying with the letter of the regulations, is one of pride, since a properly-shaped chirp-free signal is a pleasure to copy and is likely to attract attention by its current rarity. Chirps cannot be seen on an oscilloscope pattern of the envelope.

Backwave

The last factor is "backwave," a signal during key-up conditions from some amplifier-keyed transmitters. It isn't a very important factor these days, since most amateurs are aware of it, although some operators listening in the shack to their own signals and hearing a backwave think that the backwave is heard on the air. It isn't necessarily so, and the best way to check is with an amateur a mile or more away. If he can't hear a backwave on your S9+ signal, you can be sure that it isn't there when your signal is weaker. Backwave is undesirable on your signal because it makes your signal a little harder to copy, even with acceptable shaping and no chirp.

Amplifier Keying

You can look at keying an amplifier either as turning it on and off with the key (and shaping

properly) or as "modulating" the carrier with the proper envelope. (The proper envelope might be something resembling Fig. 2B.) Using the latter approach, you recognize immediately that the applied modulation must have no effect on the oscillator frequency if chirp is to be avoided. In a phone transmitter this means having adequate isolating stages between modulated stage and oscillator, and it means *exactly* the same thing in a code transmitter. Many two-, three- and even four-stage transmitters are utterly incapable of completely chirp-free amplifier keying because the severe "modulation" of the output stage has an effect on the oscillator frequency and "pulls" through the several stages. This is particularly true when the oscillator stage is on the same frequency as the keyed output stage, but it can also happen when frequency multiplying is involved. Another source of reaction is the variation in oscillator supply voltage under keying conditions, although this can usually be handled by stabilizing the oscillator supply with a VR tube. If your objective is a completely chirp-free transmitter, the very first step is to make sure that keying the contemplated amplifier stage (or stages) has no effect on the oscillator frequency. This can be checked by listening on the oscillator frequency while the amplifier stage is keyed. Be sure to listen for chirp on either side of zero beat, to eliminate the possible effect of a chirpy receiver caused by line-voltage changes or pulling. If no chirp of the steadily-running oscillator can be detected, you know that the transmitter can be keyed without chirp in the stage or stages you used for the test. You have no assurance that the transmitter can be keyed in an earlier stage without chirp until you make the same test with the earlier stage. Be proud if your transmitter can be amplifier-keyed without chirp, but don't be surprised to find that it can't. Many transmitters, including some commercial designs, won't pass the test. They just don't have sufficient isolation and buffer action.

An amplifier can be keyed by any method that reduces the output to zero. Neutralized stages can be keyed in the cathode circuit, although where powers over 50 or 75 watts are involved it is often desirable to use a keying relay or vacuum tube keyer, to minimize the chances for electrical shock. Tube keying drops the supply voltages and adds cathode bias, points to be considered where maximum output is required. Blocked-grid keying is applicable to many neutralized stages, but it presents problems in high-powered amplifiers and requires a source of negative voltage. Output stages that aren't neutralized, such as many of the tetrodes and pentodes in widespread use, will usually leak a little and show some backwave regardless of how they are keyed. In a case like this it may be necessary to key two stages to eliminate backwave. They can be keyed in the cathodes, with blocked-grid keying, or in the screens. When screen keying is used, it is not always sufficient to reduce the screen voltage to zero; it may have to be pulled to some negative value to bring the key-up plate current to zero,

unless fixed negative control-grid bias is used. It should be apparent that where two stages are keyed, keying the earlier stage must have no effect on the oscillator frequency if completely chirp-free output is the goal.

Shaping of the keying is obtained in several ways. Blocked-grid and vacuum-tube keyers get suitable shaping with proper choice of resistor

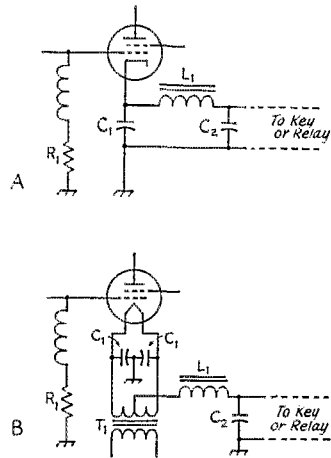


Fig. 3 — The basic cathode (A) and center-tap (B) keying circuits. In either case C_1 is the r.f. return to ground, shunted by a larger capacitor for shaping. Voltage ratings at least equal to the cut-off voltage of the tube are required. T_1 is the normal filament transformer. C_2 can be about $0.01 \mu\text{f}$.

The shaping of the signal is controlled by the values of L_1 and C_1 . Increased capacitance at C_1 will make the signal softer on break; increased inductance at L_1 will make the signal softer on make. In many cases the make will be satisfactory without any inductance.

Values at C_1 will range from 0.5 to $4 \mu\text{f}$., depending upon the tube type and operating conditions. The value of L_1 will also vary with tube type and conditions, and may range from a fraction of a henry to several henrys. When tetrodes or pentodes are keyed in this manner, a smaller value can sometimes be used at C_1 if the screen-voltage supply is fixed and not obtained from the plate supply through a dropping resistor.

Oscillators keyed in the cathode circuit cannot be softened on break indefinitely by increasing the value of C_1 because the grid-circuit time constant enters into the action.

and capacitor values, while cathode and screen-grid keying can be shaped by using inductors and capacitors. Sample circuits are shown in the illustrations, together with instructions for their adjustment. There is no "best" adjustment, since this is a matter of personal preference and what you want your signal to sound like. Most operators seem to like the make to be heavier than the break; we established this some years ago by using a group of Headquarters operators as guinea pigs and trying out the sound of a number of different envelope shapes on them. All of the circuits shown here are capable of a wide range of adjustment.

Oscillator Keying

The reader may wonder why oscillator keying hasn't been mentioned earlier, since it is widely used. The sad fact of life is that excellent oscil-

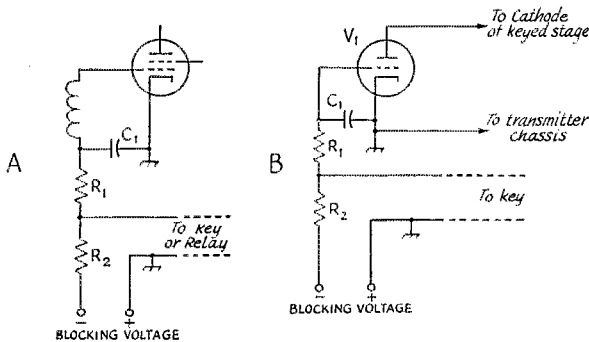


Fig. 4—The basic circuit for blocked-grid keying is shown at A. R_1 is the normal grid leak, and the blocking voltage must be at least several times the normal grid bias. The click on make can be reduced by making C_1 larger, and the click on break can be reduced by making R_2 larger. Usually the value of R_2 will be 5 to 20 times the resistance of R_1 . The power supply current requirement depends upon the value of R_2 , since closing the key circuit places R_2 across the power supply.

An allied circuit is the vacuum-tube keyer of B. The tube V_1 is connected in the cathode circuit of the stage to be keyed. The values of C_1 , R_1 and R_2 determine the keying envelope in the same way that they do for blocked-grid keying. Values to start with might be 0.47 mcgohm for R_1 , 4.7 megohm for R_2 and 0.0047 μf . for C_1 . The current drain on the power supply is very low, but the voltage must be at least several hundred volts. The 6B4-G or other low plate-resistance triode is suitable for V_1 . To increase the current-carrying ability of a tube keyer, several tubes can be connected in parallel. A vacuum-tube keyer adds cathode bias and drops the supply voltages to the keyed stage and will reduce the output of the stage.

lator keying is infinitely more difficult to obtain than is excellent amplifier keying. If the objective is no detectable chirp, it is probably impossible to obtain with oscillator keying, particularly on the higher frequencies. The reasons are simple. Any keyed-oscillator transmitter requires shaping at the oscillator, which involves changing the operating conditions of the oscillator over a significant period of time. The output of the oscillator doesn't rise to full value immediately, so the drive on the following stage is changing, which in turn may reflect a variable load on the oscillator. No oscillator has been devised that has no change in frequency over its entire operating voltage range and with a changing load. Furthermore, the shaping of the keyed-oscillator envelope usually has to be exaggerated, because the following stages will tend to sharpen up the keying and introduce clicks unless they are operated as linear amplifiers.

Acceptable oscillator keying can be obtained on the lower-frequency bands, and the methods used to key amplifiers can be used, but chirp-free clickless oscillator keying is probably not possible at the higher frequencies. Occasionally some additional shaping of the signal will be introduced on make through the use of a clamp tube (and associated time constants) in the output stage, but it is no help on break.

Break-In Keying

The usual argument for oscillator keying is that it permits break-in operation, which is true. If break-in operation is not contemplated and as near perfect keying as possible is the objective,

then keying an amplifier or two by the methods outlined earlier is the solution. For operating convenience, an automatic transmitter "turner-onner," which will turn on the power supplies and switch antenna relays and receiver muting devices, can be used. The station switches over to the complete "transmit" condition when the first dot is sent, and it holds in for a length of time dependent upon the setting of the delay. It is equivalent to voice-operated phone of the type commonly used by s.s.b. stations. It does not permit hearing the other station whenever the key is up, as does full break-in.

Full break-in with excellent keying is not easy to come by, but it is easier than many amateurs think. Many use oscillator keying and put up with a second-best signal.

Three solutions to chirp-free break-in keying have been developed. One is the "silent v.f.o.," which consists of a well-shielded oscillator and buffer stage running continuously at a low frequency. The output is keyed before it gets out of the shielded compartment, and in some applications several subsequent stages are also keyed. The system is still subject to sharpening by following stages, but it is quite satisfactory and is used in at least one commercial transmitter.

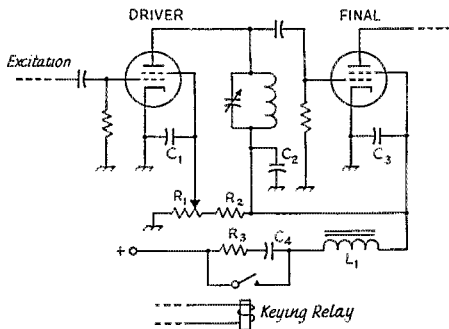


Fig. 5—When the driver stage plate voltage is roughly the same as the screen voltage of a tetrode final amplifier, combined screen and driver keying is an excellent system. The envelope shaping is determined by the values of L_1 , C_4 , and R_8 , although the r.f. bypass capacitors C_1 , C_2 and C_3 also have a slight effect. R_1 serves as an excitation control for the final amplifier, by controlling the screen voltage of the driver stage. If a triode driver is used, its plate voltage can be varied for excitation control.

The inductor L_1 will not be too critical, and the secondary of a spare filament transformer can be used if a low-inductance choke is not available. The values of C_4 and R_8 will depend upon the inductance and the voltage and current levels, but good starting values are 0.1 μf . and 50 ohms.

To minimize the possibility of electrical shock, it is recommended that a keying relay be used in this circuit, since both sides of the circuit are "hot." As in any transmitter, the signal will be chirp-free only if keying the driver stage has no effect on the oscillator frequency.

A second approach is to use a conversion exciter, in which two oscillators (one crystal-controlled, one v.f.o.) run continuously and their outputs, with suitable buffer stages intervening, are fed to a mixer stage. The mixer stage output is the sum or difference frequency of the two oscillator frequencies, which have been selected to give a sum or difference in an amateur band. When the mixer stage is turned off by keying, no output appears in the amateur band, and the effect is the same as keying an oscillator stage

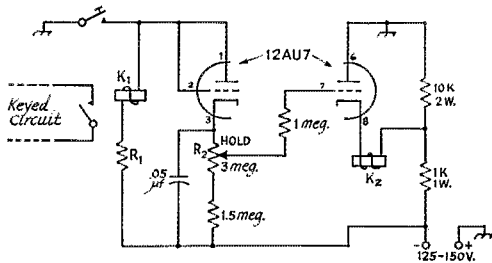


Fig. 6—Circuit for an automatic transmitter "turner-onner." This system is similar to voice-controlled break-in, in that the first character of the transmission turns on the transmitter, and the transmitter holds on for a time after the operator stops sending. The transmitter is keyed through keying relay K_1 ; R_1 is a dropping resistor that limits the relay current to two or three times its rated value (faster relay operation is obtained this way). K_2 is a sensitive relay that controls the transmitter power and the antenna relay—a 10,000-ohm Potter & Brumfield LB-5 will be satisfactory. The setting of the HOLD control, R_2 , determines the length of time K_2 will hold in after the operator stops sending.

that cannot possibly chirp. The oscillator frequencies must be selected carefully so that none of their harmonics fall within an amateur band, and sufficient selectivity must be present in stages following the mixer to insure that no spurious signals are amplified. If the mixer alone is keyed, its envelope is subject to sharpening by later stages unless they are linear amplifiers.

A third approach is to turn the oscillator on fast before a keyed amplifier stage can pass any signal and turn off the oscillator fast after the keyed amplifier stage has cut off. The principle is called "differential keying" and a number of circuits have been devised for accomplishing the action. One of the simplest can be applied to any grid-block keyed amplifier or tube-keyed stage by the addition of a triode and a VR tube, as in Fig. 7. The triode is used as a cathode follower; with the key up a negative bias is applied to the oscillator grid through the VR tube and the 10,000-ohm resistor. When the key is closed, the 6J5 cathode goes immediately to ground potential, the VR tube is extinguished and the bias is removed from the oscillator. The oscillator turns on quickly. In the meantime, the amplifier bias, the voltage to which C_1 is charged, is discharging through R_1 , the amplifier grid leak. The oscillator is turned on before the amplifier bias has been reduced to a value low enough for conduction through the tube. When the key is opened, the

oscillator continues to run until the grid of the cathode follower has reached a voltage of more than -175 volts, by which time the amplifier has stopped conducting. Using this keying system for break-in, the keying will be chirp-free if it is chirp-free with the VR tube removed from its socket, to permit the oscillator to run all of the time. If the transmitter can't pass this test, it indicates that more isolation is required between keyed stage and oscillator.

If you have come this far, it is reasonable to assume that you're interested in the keying of your rig, and you might be in search of perfection. It isn't easy to achieve. We have seen a keyed output stage that pulled the oscillator through a doubler stage and a buffer stage. We have seen rigs that chirped worse on 80 than they did on 10, attributable probably to the v.f.o. being on 80 meters. The point to all this is,

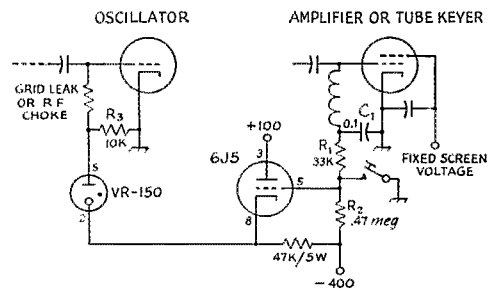


Fig. 7—When satisfactory blocked-grid or tube keying of an amplifier stage has been obtained, this VR-tube break-in circuit can be applied to the transmitter to furnish differential keying. The constants shown here are suitable for blocked-grid keying of a 6146 amplifier; with a tube keyer the 6J5 and VR tube circuitry would be the same.

With the key up, sufficient current flows through R_3 to give a voltage that will cut off the oscillator tube. When the key is closed, the cathode voltage of the 6J5 becomes close to ground potential, extinguishing the VR tube and permitting the oscillator to operate. Too much shunt capacity on the leads to the VR tube, and too large a value of grid capacitor in the oscillator, may slow down this action, and best performance will be obtained when the oscillator (turned on and off this way) sounds "clicky." The output envelope shaping is obtained in the amplifier, and it can be made softer by increasing the value of C_1 . If the keyed amplifier is a tetrode or pentode, the screen voltage should be obtained from a fixed voltage source or stiff voltage divider, not from the plate supply through a dropping resistor.

simply: Chirp on c.w., and f.m. with a.m. phone stem, from the same cause, insufficient isolation between modulated (keyed) stage and frequency-controlling stage. Phone signals get by where c.w. signals don't because few operators bother to listen for the f.m. on phone, and because the modulation of the carrier about a mean level isn't as drastic as the full-off-to-full-on modulation in code work. So let's face it; obtaining a truly satisfactory c.w. signal involves problems of the same magnitude as getting a good amateur phone signal, and they can be solved similarly by know-how and attention to detail.

Eliminating 80-Meter Novice Harmonics

How To Make a Cheap Low-Pass Filter

BY LEWIS G. McCOY, WIICP

• If you're a Novice operating in the 80-meter band, trouble in the form of an FCC "OSL" like the one shown here may be lying in wait for you — unless you've done something to make sure your transmitter harmonics are under control.

WHILE WE ALL LIKE TO GET QSL cards, none of us would really enjoy being the recipient of a "card" like the one below. Maybe you've already had the dubious pleasure of being on the receiving end of an official FCC notice. If you have, then you're certainly familiar with the cold, clammy feeling that comes over you when you find you're in trouble with the FCC.

In recent months the FCC has been sending out quite a number of official notices to Novices. The bulk of these are going to Novices who operate in the 80-meter band and have second harmonics that interfere with other services. The back of the form explains the procedure to be followed in replying to the notice, and concludes with this: "The answer shall contain a full explanation of the incident involved and shall set forth the action taken to prevent a continuation or recurrence thereof." The purpose of this article is to describe the action that needs be taken.

First, let's find out exactly what a harmonic is and how it can cause trouble. What is wanted from every transmitter is a signal in which all the output power is one frequency only, but transmitters don't happen to work that way. The desired "fundamental" output is always accompanied by outputs at frequencies that are simple multiples — 2, 3, 4, etc. — of the funda-

mental frequency. So if the fundamental frequency is, say, 3725 kc., there will also be some output on 7450 kc., on 11,175 kc., on 14,900 kc., and so on up. When these signals are delivered to the antenna and radiated, they may interfere with other radio services, since for the most part they do not fall in amateur bands.

A very common setup is one in which the antenna system is "off-center fed," using 300-ohm twinline for the feeder and a set of balun coils between the transmitter and the 300-ohm line. Unfortunately, in such a system there is nothing to keep the harmonics from reaching the antenna and being radiated. In fact, in *any* antenna system that is multiband and uses an untuned feedline, there is absolutely nothing to keep the antenna from radiating harmonics just as well as it radiates the fundamental.

Your radio world may revolve around 3700 to 3750 kc. but if you take time to tune around outside the amateur bands you'll find that the radio spectrum is crowded with other services. If you listen around 7450 kc. you'll find numerous commercial stations, and under some circumstances, depending on band conditions, it doesn't take a very strong harmonic from your station to do a good job of fouling up legitimate reception of one of these commercial stations.

Are Your Harmonics Too Strong?

How are you going to be sure that you won't interfere with one of these services? Fortunately, it isn't very difficult to find out whether you have strong harmonics. One of the best methods is to have another ham listen for them. He should be a few miles away from you, preferably, because a ham next door would be so close that he couldn't help but hear harmonics from your rig. Besides

FCC Form 703 Rev. Jan. 1952	FEDERAL COMMUNICATIONS COMMISSION	Olema, California (Station location) KN6ZZZ (Call sign) Amateur (Class of service)
OFFICIAL NOTICE OF VIOLATION		
TO: John Q. Public RFD 3 Olema, California	The facts set forth below are brought to your attention for the purpose of enlisting your cooperation in fulfilling the requirements of law and treaty.	
Date and time of irregularity	March 29, 1956 10:12 P.M., PST (Date and time (indicate time zone))	
PARTICULARS: Non-compliance with Section 12.133 of the Rules and Regulations governing the Amateur Radio Service. Radiation of second harmonic on 7415 kc. is a potential source of interference to radio services assigned this frequency.		
NOTE: <i>John Smith</i> Radio Engineer. <i>John Smith</i> Engineer in Charge.	Do NOT address your reply to an individual	Address your reply, in duplicate, to: FEDERAL COMMUNICATIONS COMMISSION Post Office Box 989 Livermore, California
March 30, 1956 (Date mailed/strict)		

(Please refer to instructions on reverse side in replying to this notice)

which, you could easily overload his receiver and that would cause harmonics to be generated in it, so his observations wouldn't be reliable. You're interested only in those harmonics that actually "get out."

If you find that your harmonics can be copied some distance away then you know you'll have to do something about getting rid of them. Don't wait for the FCC to act. If your friend hears you

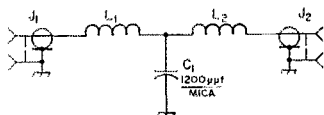


Fig. 1 — Circuit diagram of the low-pass filter.

C_1 — 1200- μ f. mica.

J_1, J_2 — RCA type phono jacks.

L_1, L_2 — 10 turns No. 18, 1-inch diam., 3 turns per inch (B & W 3014. A single length of stock is enough for both coils).

it's no doubt only a matter of time before you get an official notice from the FCC monitors.

Maybe you're in a position where you can't have a friend listen for you. Then the thing to do is to build an absorption-type wavemeter so you can do the checking yourself. *The Radio Amateur's Handbook* gives constructional details of an indicating wavemeter (Fig. 21-11 in the 1956 edition) that is sensitive enough for checking harmonics. Such an instrument is also very useful for making sure that you're tuned up on the right band and not on some harmonically-related frequency. To check for harmonics on an open-wire line, couple the wavemeter closely to the line and carefully tune it through the harmonic frequencies. If the wavemeter shows that any harmonics are present, even though just detectable, then you had better take steps to eliminate them.

Reducing Harmonic Strength

One of the best devices for attenuating harmonics is the link-coupled antenna tuner. Since several couplers that will do the job are described in the *Handbook*, in the chapter on transmission lines, we won't discuss them further here but will go on to still another method for getting good harmonic attenuation — one that doesn't require any operating adjustments. This is the use of a low-pass filter between the transmitter and feeder — not the TVI type of low-pass filter that eliminates harmonics above 30 Mc. or so but one designed to attenuate all harmonics above the band in use. In the case of 80-meter operation the filter would have a "cut-off frequency" near 5 Mc, meaning that everything above 5 Mc. is attenuated. This not only reduces the second-harmonic output but also attenuates the v.h.f. harmonics that could cause television interference. In other words, it kills two birds with one stone.

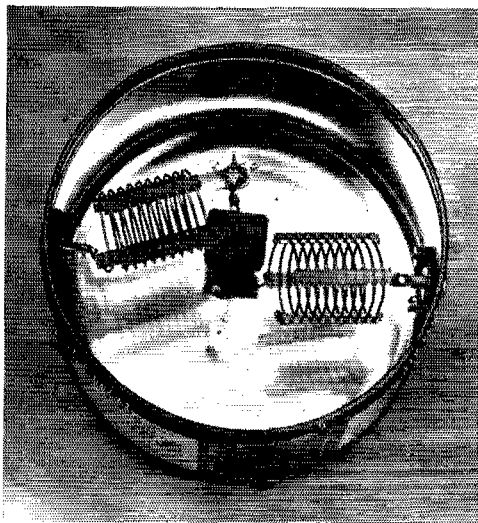
Such a filter is very simple to build and is inexpensive. The unit shown in the photograph

costs only about a dollar. The filter is designed for use in 52-ohm coax cable, and consists of just two coils and a capacitor, as shown in Fig. 1. The chassis is a coffee can which, in addition to being about the most inexpensive chassis one could use, also affords excellent shielding.

How to Use the Filter

If you use the type of antenna system mentioned earlier, the filter should be installed between the transmitter and balun coils. A short length of RG-58/U can be used to connect it to the rig, and another piece of the same type of cable can be used between the filter and the balun coils. If your system uses coax feed to the antenna then all you need do is insert the filter in the coax line near the transmitter. With a system using a coax-link antenna coupler, the filter should be installed between the rig and the antenna coupler.

In considering operation on bands other than 80, remember that the filter cut-off frequency is 5 Mc. If you wish to operate on 40 meters the filter should be removed from the line — other-



Coffee-can low-pass filter, for attenuating harmonics from the 3700-3750-ke. Novice band. The two RCA type phono jacks are mounted on opposite sides of the can approximately $1\frac{1}{2}$ inches from the bottom. L_1 and L_2 are supported by their leads, the ends of the coils being soldered to the pins on the jacks and the common connection of the coils to one lead from C_1 . The other end of C_1 is soldered to the bottom of the can. The lid should be put on the can when the filter is in use.

wise you may burn it out, and even if that doesn't happen you won't be able to put power into the antenna.

Either the link-coupled antenna coupler or the low-pass filter should be used to prevent harmonic radiation. In fact, it doesn't hurt to have both — then you can be practically certain there will be no harmonic radiation. In addition, the adjustable antenna coupler offers an excellent method for tuning a multiband antenna system.

• Technical Correspondence

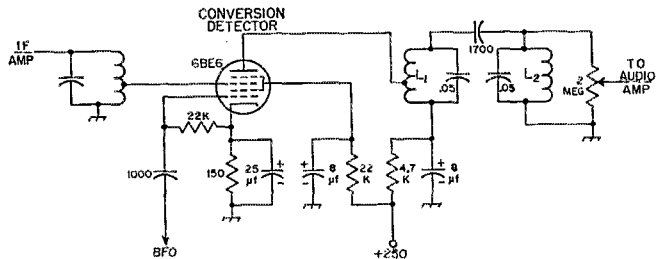
AUDIO FILTERS WITH POT-CORE INDUCTORS

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Technical Editor, *QST*:

In the April 1955 issue of *QST* I discussed the application of Ferroxcube pot cores to high selectivity i.f. amplifiers. In this article I mentioned that I had constructed various audio-frequency filters with bandwidths of about 30 cycles. I still receive requests from amateurs for circuit details. Fig. 1 shows such a filter. This filter can be built right into the circuit of my original amplifier (as shown in Fig. 4 of my article) with negligible circuit alterations. Two tuned circuits are used with slight overcoupling (i.e., $kQ = 1.24$, designed for a trough depth of 0.2 db.) for Tchebycheff behavior in the passband. The flat top greatly reduces ringing. The bandwidth is 40 cycles at 30 db. down, and 25

Fig. 1 — Circuit of the conversion detector and audio filter. This was used with a 20-kc. i.f. amplifier; if a higher-frequency i.f. is used, the 6BE6 cathode resistor should also be by-passed with a 0.1- μ f. capacitor. The 0.05- μ f. capacitors across L_1 and L_2 and the 1700- μ f. coupling capacitor should be high-quality units.



L_1, L_2 — 635 mh., $Q \approx 32$. (North Hills Electric Co., 203-18 35th Ave., Bayside 61, N. Y., No. 7001 is applicable.) L_1 tapped at $\frac{1}{4}$ total turns.

cycles flat on the top. The center frequency is 900 cycles since this frequency seems to be in more favor than the 1000 cycles as originally used. The experimental frequency response is given in Fig. 2. Because capacity coupling is used,

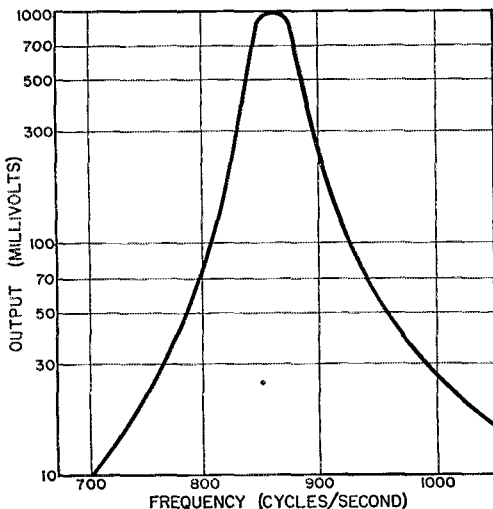


Fig. 2 — Frequency response of audio-frequency filter.

the shape of the frequency response is not quite symmetrical; the low-frequency side continues to drop, whereas the high-frequency side starts to flatten out at 40 db. down. This effect was discussed in my original article. To obtain steep skirts, shunt and series coupling circuits could be

combined, as in Fig. 3 of my article. This will give a somewhat elaborate but extremely selective filter. The coil L_m (earlier article) should be 22.5 mh.

The method of tuning was as follows: The two coils were individually tuned to the same frequency, using matched capacitors and pruning turns on the coil. This can be done quite quickly. Each was resonated at a frequency of 888 cycles. The circuits were then coupled without readjustment. Since capacity coupling is used, only one limit frequency is affected, and so the center frequency of the coupled circuit is lowered (to 862 cycles).

— John S. Belrose

PHONE QRM

572 Rincon Ave.
Livermore, Calif.

Technical Editor, *QST*:

For many years there has been no doubt that the amateur bands are crowded. Due to the modulation sidebands, this

is even worse in the phone bands. So far about the only method employed which theoretically alleviates phone crowding is s.s.b., though this is not the prime intention of most users. Unfortunately, as most everyone knows (especially those with receivers in which the a.v.c. cannot be cut off), despite all the articles on trick methods of attempting to reduce the interference, s.s.b. effectively creates more interference and splatter than several a.m. stations as a general rule.* This is much more pronounced if one happens to be close to a (local) s.s.b. station.

There is another effective method of reducing phone crowding which is not only much less costly, but also does not require complicated adjustment and balancing. Reference is made to an article by the writer in Nov. 1950 *QST* entitled "Audio Quality and Cutoff Frequencies;" also to the complete paper entitled "Narrow Band Speech Spectrum in Relation to Reduced Channel Crowding," presented at the Winter General Session of the A.I.E.E. in New York in Jan. 1953, and listed as No. 53-144, obtainable from the A.I.E.E. in New York for 60 cents to non-members or 30 cents to members. In both these papers is a curve showing the relations between top and bottom frequency limits of reproduced speech, and the relative amount of degradation as the passband is compressed or broadened. In brief, as the upper limit is lowered, the lower limit must be proportionately raised to preserve good articulation and intelligibility.

To test out the theory, a passband of only 3800 c.p.s. (total range 300 to 1900 c.p.s.), provided by an inexpensive filter and also incorporating clipping, has been used since 1953 with excellent results. In most cases, unless the other stations are notified, they never know the difference or, if anything at all, just wonder why they are apparently receiving n.b.f.m. without slope tuning effects. If one listens hard, the clipping has the normal effect of making a crystal mike sound more like a carbon type, but nothing more. In fact, some stations worked have commented on the b.c. type quality. As a matter of fact, with care the speech band can be compressed to only 1000 c.p.s. (approximately 400- to 1400-c.p.s. limits) under good conditions, with a reasonable degree of articulation. Full details on the 3800

c.p.s. pass system and filter are covered in an article by the writer in March 1955 *Radio & Television News*, entitled "Narrow Band Unit." Of course, this method could also be applied to s.s.b. and give narrower sidebands.

It is suggested that if all hams using phone were to adopt this simple and inexpensive system, it would be to the advantage of all phone-band habitués.

As a matter of interest, this proposal is up for consideration with the FCC as an alternative to forcing fixed service radiotelephone stations below 25 Mc. to the complexities and expense of s.s.b., per the FCC Docket No. 11513 of Oct. 1955.

— J. P. Neil, W6PNW

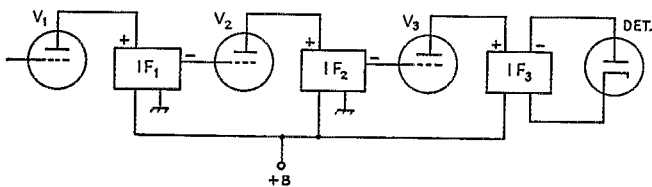
* (QST editors do not accept this statement.)

I.F. TRANSFORMER POLARITY

1937 Flowers St.
Sacramento 21, Calif.

Technical Editor, QST:

In W6MCN's article on the transistorized radio in the May issue, it was stated that the leads on one of the i.f. cans had to be reversed or the gain of the i.f. stages went to "pot." He also stated that he has run into this same problem in the past on several other i.f. strips. I have also encountered the same condition, and I believe a possible explanation is as follows:



From the figure, it will be assumed to start that the i.f. transformers are so phased during wiring that as the top of the plate winding goes positive, the grid lead goes negative. In other words, there is a phase reversal across the transformer.

Thus, as the plate of V_1 goes positive, the plate of the second detector goes negative and is in phase with the grid of V_1 . In other words, the output is in phase with the input, and there is a great possibility of oscillation in the i.f. stages if the gain of the i.f. strip is sufficient. However, if the leads to one of the i.f. windings is reversed, then the output is no longer in phase with the input or grid of V_1 ,

and the tendency for oscillation is removed. If the number of i.f. stages is reduced to two, then the i.f. gain is also reduced, thereby reducing the tendency of self-oscillation, even though the output may be in phase with the input.

In view of the above discussion, if it becomes necessary to reverse the leads on one i.f. can winding to make the i.f. stages work — brother, you're in trouble!

— E. J. Clerkin, K6CNT.

DIRECTOR-TYPE QUADS

Leslie-McCauley Clinic
211 N. Grand
Okmulgee, Oklahoma

Technical Editor, QST:

In the article in QST for January, 1955, in regard to the cubical quad antenna, I made mention of the fact I had used a director-type quad experimentally on 50 Mc. Since the article appeared I have received hundreds of letters from all over the world, many asking about the director-type quad and also about the three-element quad. A three-element quad has not been used here. Many of the fellows said they planned to build one but so far I know of no one who has done so.

After much scratching on paper and the old bald head, it was decided to try a director-type quad on 20 meters. The one described in QST was taken down and a new quad hoisted up. The new one used a director spaced eight feet from the driven element, made 5 per cent shorter than the driven element, and tuned with a stub. It was tuned by pointing the antenna toward a local station about a mile away and then varying the position of the short on the stub for maximum gain. There was a gain of several "S" units when the director was tuned properly. This seemed very encouraging, but several months' use on 20 c.w. has shown very little gain and poor over-all performance.

The front-to-back ratio is practically nonexistent and the front-to-side ratio is no better than would be expected from a dipole. In fact, the experience here would indicate that the director-type quad is little, if any, better than a good dipole. It must be realized that this was a very crude experiment and subject to error. The 50-Mc. tests would indicate that a good, efficient director-type quad could be built and would also indicate that a three-element quad is quite possible.

I would appreciate very much hearing from others who have experimented with the quad in any form.

— S. B. Leslie, jr., M.D., W5DQV

Strays

Maj. Bill Holcomb, W9SDP, now at 4775 West Ave., Washington 28, D. C., would like to get in touch with others who have experienced the "long delayed echo" phenomenon (at least several seconds).

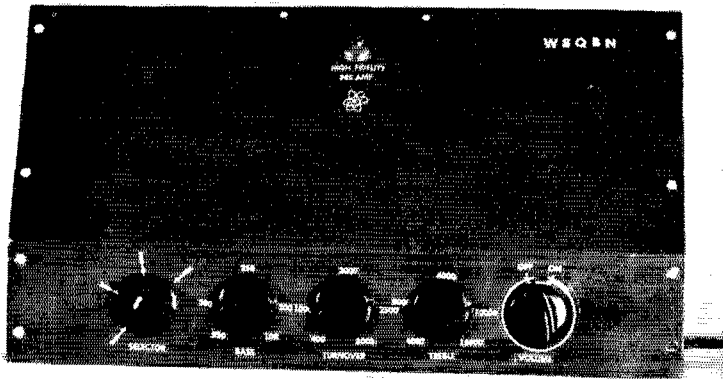
A "Global Time Conversion Simplifier" is available for \$1.00 from Daiger Associates, Chamber of Commerce Bldg., Newark, N. J. It is a chart 17 X 22 inches in size, and enables even a child to readily read off the time at almost any point on the globe.

Another device of possible interest to the DX man is a "Day and Night Calculator," available at the present time only from Wilhelm Bruns, Lindhorst, Germany. This indicator consists of a series of plastic disks covering the various months, which are to be fitted in accordance with

detailed instructions over a master map of the world. With this device you can determine how much and what part of the path between any two points is in darkness. No other propagational factors are taken into account.

Col. John Hays, of Bellevue, Nebr., seeing that his radio-controlled garage doors were being controlled by some unknown signal, put a pair of headphones across the output of the super-regen receiver on 27.255 Mc., and there was W6BPD coming through loud and clear.

W9LQE reports that an irritating case of intermittent TVI was caused by four 41-foot spans of clothes line wires fastened to two T-supports made of pipe. Grounding all wires on both ends completely cured the difficulty.



«

Although this hi-fi preamplifier can be used to good advantage in phonograph and tape-recorder work, it is used at WSQB N to restrict the voice range to a good "communications" value and to compensate for variations in microphone responses. As the text points out, the numbers on the controls no longer agree with the actual performance of the unit.

«

Wide-Range Tone Controls in Ham Phone

Applying "Hi-Fi" Circuitry to Preamp Design

BY DON MARTIN,* WSQB N

• Adding a few tone-control circuits to your audio amplifier or preamp will give you a chance to compensate for deficiencies in microphone response and also to utilize your voice for maximum communications effectiveness. The one-tube preamplifier presented here can handle the job easily, since it offers a wide range of control.

feature is that anyone can find the shortcomings in his voice (and microphone) and adjust the preamp to compensate.

The Circuit

The circuit of the preamplifier is shown in Fig. 1. Four inputs were used in this unit because I hate to get caught with microphones or other audio sources with different types of plugs on their cables, and the four inputs have different types of jacks. The selectable input isn't necessary, of course, and a more standardized station could eliminate it and save the price of three jacks, three capacitors and switch S_1 .

DURING THE CONSTRUCTION of a "hi-fi" amplifier I happened on what seems to me like a helpful device for many phone men. The need came about because my high-quality microphone (Shure 55C) didn't have enough output to drive my Viking II to 100 per cent modulation. That is not good, and some sort of preamplifier was clearly indicated. Using the hi-fi techniques, this preamplifier is different than the usual in that it incorporates three independent response controls; lows, highs, and middle range. In the flat position it can be considered a high-fidelity unit, since it is flat within 0.2 db. from 20 to 20,000 cycles. This, of course, has no place in amateur radio and is not the way it is used. By variation of the three controls it is possible to boost the usable frequencies and attenuate the undesirable to any degree over a range of 40 db. This is done without introducing any harmonic distortion and permits adjusting the rig for maximum communications "punch."

Both sections of a 12AT7 are used in the preamp. Varying the position of the arm of the 1-megohm "mid-range" control changes the response in the 500- to 5000-cycle range. The "lows" control varies the gain in the 20- to 500-cycle range, and the "highs" control takes care of the frequencies above 5000 cycles. By changing the relative settings of the controls it is possible to get practically any kind of low-, middle- or high-frequency emphasis or attenuation. Once established for a given microphone and voice, the volume level is established by the setting of the volume control in the output circuit. At WSQB N the highs and lows controls are usually set at minimum and the middle range control is set at about the mid point. This gives a nice "communications" response in the 500- to 3000-cycle range. The volume control must be set low enough to avoid overdriving a subsequent audio stage in the transmitter.

I happen to have a very high voice. I cut the highs and the very lows and boost the mid-range. It is really very effective, and a nice

Construction

While the construction ideas of others will undoubtedly differ from mine, it is suggested

* c/o Electrend Products Corporation, St. Joseph, Michigan.

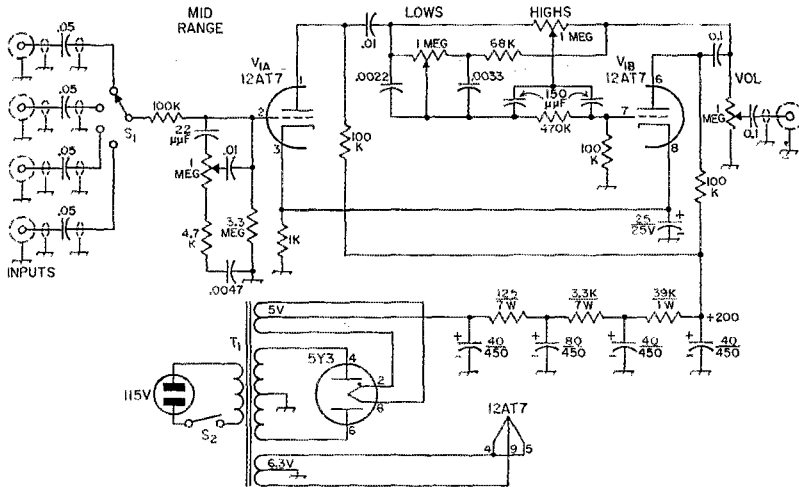


Fig. 1—Schematic diagram of the wide-range preamplifier. All resistors $\frac{1}{2}$ watt and all capacitances in μf . unless specified otherwise.

T₁— Small power transformer (Stancor PM-8401 or equivalent).

that the input and output leads be shielded to avoid the possibility of oscillation or excessive hum. A common ground bus was used instead of a chassis return, and the chassis connections in Fig. 1 represent connections to this ground bus, except at the input and output jacks. In the two versions I have built, no trouble with hum or oscillation was encountered, and the signal-to-noise ratio is excellent. You will notice from Fig. 1 that there is plenty of power-supply filtering, and this is absolutely necessary in any equipment that will pass 60 cycles and lower.

In the photograph of the front panel, the center control is labeled "turnover." This isn't an attempt to confuse the readers of *QST*; it is because the makers of decals don't furnish a label marked "mid range." The numbers around the peripheries of the three center controls are not correct any more, but they were correct with some earlier circuit values that were used. The frequencies cited earlier in the text correspond

to the ranges that can be expected with the circuit values given, but it would be worth while to calibrate any preamplifier of this type by using a signal generator.

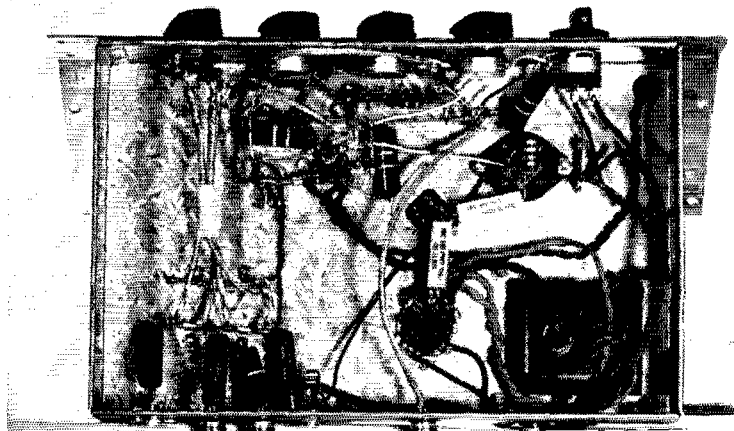
Use

A final word of warning is in order. Anyone who builds this or a similar preamplifier should not use it on the air set for maximum frequency response. Emphasizing the higher voice frequencies is not a considerate way to operate in our crowded bands, even if you do have a yen to sound less masculine than normal. From my personal standpoint, the unit has several purposes. The primary one is to *limit* the transmitted bandwidth. It is also of some aid to the older man who sounds too young, or the younger operator who sounds too old. With certain judicious variations of the tone controls, they can all sound like W2KR, W8SCS, and the few others who are gifted with wonderful communications voices!

»

A view underneath the chassis shows that shielded wire was used for the input and output circuits. A common ground bus was used instead of chassis grounds.

»



Radio Tracking of the Earth Satellite

An Opportunity for Amateur Collaboration

BY ROGER L. EASTON*

• The radio amateur, traditionally a discoverer and history-maker in the field of radio communication, will unquestionably be keen to participate in one of the most spectacular scientific experiments of this or any other age — the launching of the first man-made Earth Satellite. Amateur cooperation will not only be welcome but is actively being sought. The job is tough enough to challenge the best of us, and is probably too big to be handled on anything but a group basis. Successful participation will require hard work and long-range planning — beginning now, even though the actual launching is more than a year away.

This article describes a simplified tracking system that has been worked out for amateur use. It is not a complete technical exposition but rather a broad outline of principles, including a brief description of equipment required for a tracking installation. It gives enough of an idea of the magnitude of the undertaking to enable a group such as a radio club to decide whether it has the needed technical and other resources.

Interested groups are invited to make their intentions known to ARRL Headquarters. As the satellite program progresses, it is expected that more detailed information will become available. Amateurs have the opportunity not only to aid in tracking but also to make some real contributions in the development of suitable equipment. It's another chance to prove our worth to science.

ON JULY 29, 1955, the White House announced that the United States planned to launch small, unmanned, earth-circling satellites as part of the United States participation in the International Geophysical Year, from July 1, 1957 to December 31, 1958.

"Project Vanguard" is the name assigned to the Department of Defense part of this program. The project was undertaken by the Department of Defense at the request of the U. S. National Committee for the International Geophysical Year, established by the National Academy of Sciences, and of the National Science Foundation, which are sponsoring U. S. participation in the IGY.

Department of Defense participation is on a three-service basis, with Navy management under the Chief of Naval Research. Project Vanguard is established at the Naval Research Lab-

oratory, which has the responsibility for implementing the technical program, including the production of the three-stage rocket vehicle and the launching and radio tracking of the satellite. Astronomers will search for the satellite with optical instruments but visibility conditions will make acquisition a difficult task. Of interest to radio amateurs is the fact that the satellite will carry a 108-Mc. transmitter system that should be detectable over much of the U. S.

This article describes a simple interferometer system which can be used to detect the satellite's presence and, with some refinement, to measure its angular position. Interested amateurs around the world can perform a real service to the satellite program by building and manning satellite tracking stations. Such a station would be a large undertaking and would be more suitable for a club project than for individual effort. In addition, the backing of a university or an industrial firm would be desirable as a possible source of some of the more expensive components needed for a tracking system.

Satellite Path

The northernmost latitude over which the satellite will pass will not be known exactly until the first satellite is launched. Since it will be launched from Cape Canaveral, Florida, it will reach a latitude of at least 28.5 degrees even if fired due east. If fired away from due east the maximum latitude can only increase, the most likely value being 36 degrees. The altitude of the satellite may vary from about 200 miles to about 800 miles, so that it will be detectable from latitudes much greater than 36 degrees, especially when at its greatest altitude (apogee).

The path traced by the satellite in space will be a slowly rotating ellipse, while the path traced by the subsatellite point on the earth's surface will be approximately a sine wave. At the maximum latitudes reached by the orbit, the times of passage will be roughly 90 minutes apart, becoming earlier by about 30 minutes per day. Each station at the maximum latitude will be able to receive from as many as four consecutive passes and will then have to wait until about the same time (minus 30 minutes) on the following day.

Radio Transmitter

The transmitter will emit a 108-Mc. signal with a power output of at least 10 milliwatts for a minimum period of two weeks. This signal will be used for proving the presence of the satellite, for determining its orbit, and for directing optical equipment. Ultimately, the orbital measurements may be used to measure the shape

*Naval Research Laboratory, Washington 25, D. C.

and size of the earth, and intercontinental and interisland distances.

The satellite antenna system will probably consist of four radiators spaced equally around a great circle on a sphere so as to produce circular polarization in the plane of the radiators. When the satellite is launched the direction of polarization will be normal to the direction of travel. When the satellite has travelled 90 degrees around the earth, the radiators will be parallel to the earth's surface, if disturbing torques are negligible, and a station below would receive a circularly polarized signal. The portion of the earth's surface receiving circular polarization will be most suitably situated to receive the satellite transmissions because of the rotation of the plane of polarization through the ionosphere by the Faraday effect. This favorable situation can exist initially at two locations on the earth's surface, at approximately South Africa and Hawaii. These optimum locations will shift because of the earth's rotation and also because of the rotation of the elliptical satellite orbit resulting from the earth's equatorial bulge. The rotation of this ellipse could mean that favorable polarization for the United States will occur when the satellite has been in orbit for about two weeks, if torques acting upon the satellite do not disturb its initial orientation.

In areas where the polarization of the signal from the satellite is linear, a linearly-polarized ground antenna will receive a signal that will vary as a function of the degree of polarization. As the satellite passes through the antenna pattern, the received signal strength will vary approximately sinusoidally because the Faraday rotation is dependent on the angle between the radio path and the ionosphere. The frequency of the variation can be used to measure the total ionization content in the radio path, and the latter information can be used to correct the measured satellite position for ionospheric refraction.

Radio Tracking Systems

Several versions of tracking systems have been considered for this project. The primary system, called "Minitrack," will be used at a number of stations in the western hemisphere to obtain basic orbital data. The Minitrack system is nonambiguous and will provide satellite ephemerides¹ so that after the first few satellite orbits the future path of the satellite over the earth's surface can be predicted.

Since the Minitrack system requires a large installation, a simpler tracking system called the "Mark II Minitrack" has been devised. While the simplified system will give ambiguous data, the ambiguities can be resolved by the use of data from the Minitrack stations. By using the two systems together it will be possible to determine the position of the satellite over any ground point as accurately with the Mark II Minitrack system as with the complete system.

¹ An astronomical term meaning a table of locations of a celestial body at regular intervals of time. — Ed.

The Mark II Minitrack, like the Minitrack system, is based on the interferometer principle. This principle is well known to radio astronomers and to students of optics, but it may not be too well understood by radio amateurs so it will be described in some detail.

The interferometer principle as applied to the simplified Minitrack system is shown in Fig. 1.

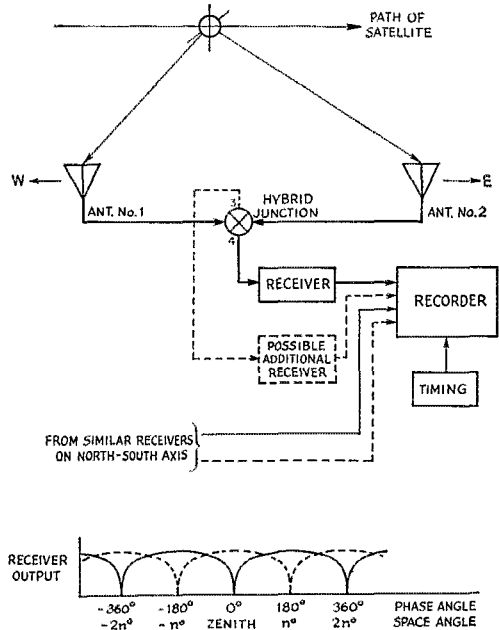


Fig. 1 — The Mark II Minitrack System.

Here two antenna arrays are separated by many wavelengths and are connected together by transmission lines. The midpoint of the transmission lines is connected to a hybrid tee and to a receiver (or receivers) which actuates a meter or recorder.

The geometry of the situation is shown in Fig. 2. We assume the satellite S is at a distance which is great compared with the separation between antennas. If we make the distance $SP = SA_1$ then A_1P will be approximately perpendicular to SA_2 since the angle A_1SP is small. The phase difference that will be read will be proportional to the distance PA_2 , and $\cos \alpha$ will equal $\frac{PA_2}{A_1A_2}$.

Now let us assume that the distance PA_2 is an integral number of wavelengths. Then the voltages from the two antennas arriving at the hybrid in Fig. 1 will be in phase and the meter will record a maximum output. If the distance PA_2 is an odd number of half waves the voltages from the two antennas will be out of phase and will cancel at the hybrid in which case the output will be at a minimum.

As the satellite travels across the antenna pattern the distance PA_2 will vary so that the receiver output will vary from a maximum to a minimum sinusoidally. The number of maxima

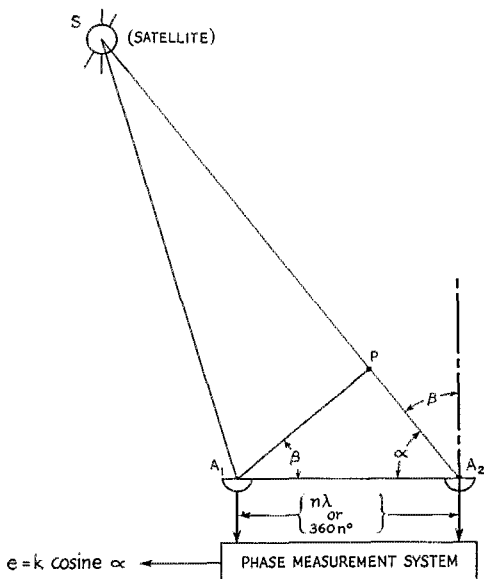


Fig. 2 — Geometry of the radio phase comparison system.

and minima can be increased by increasing the baseline distance A_1A_2 . For a 50-wavelength baseline a minimum will occur for approximately each angular degree traveled. For example, if the satellite is at 200 miles and is traveling at 25,000 feet per second, this will occur about once per second. The minimum may be made sharp and thus useful for satellite position measurements by distortion of the output.

System Requirements

Details of the hybrid tee used in Fig. 1 are shown in Fig. 3. The hybrid allows each antenna to look into a matched load and also gives two outputs. As is shown in Fig. 1, when output 3 is a maximum, output 4 is a minimum. The use of two receivers is advantageous for if a minimum is present on both simultaneously we can infer that such a minimum is not a true phase minimum but is due to a loss of signal.

For a tracking installation a large, level field will be needed. The two antennas, 500 to 1000 feet apart on an east-west line, should be level to $\frac{1}{2}$ inch and the antenna pattern area should be free of tall obstacles. To preclude excessive noise in the system, the installation should be removed from population centers, industrial installations, busy highways and other noise sources. The antenna and receiver system needed will depend on the signal strength received from the satellite, on the signal-to-noise ratio required for the system, and on the noise in the system.

Assuming a transmitted power (P_t) of 10 milliwatts, a transmitter antenna gain (G_t) of

² Since amateurs have been using considerably smaller bandwidths than this in v.h.f. scatter work, it seems as though a considerable improvement may be possible in this respect, assuming that other requirements of the Minitrack system do not preclude the use of high selectivity. — Ed.

0.5 (referred to isotropic), a receiving antenna gain (G_r) of unity, a wavelength (λ) of nine feet, and a range (R) of 1000 miles (5×10^6 feet), we can compute a theoretical signal strength from the following well-known formula:

$$P_r = \frac{P_t G_t G_r \lambda^2}{(4\pi R)^2} = \frac{(0.01) (1) (0.5) (81)}{16\pi^2 (25) 10^{12}} = 10^{-6} \text{ watts.}$$

The noise power in a perfect receiver is about 4×10^{-21} watts/cycle or 204 dBW/cycle (decibels below one watt per cycle of bandwidth). A noise figure of 4 db. and a predetection bandwidth of 10 kc. gives the noise as 160 dBW or 10^{-16} watts.

Since a predetection S/N of at least 10 db. is required, either the bandwidth must be reduced, the receiving antenna gain increased, the transmitted power increased, or the distance reduced. The predetection bandwidth can be reduced to perhaps 5 kc.²

The transmitted power and the range may be considered as fixed, leaving only the receiving antenna gain as a variable. The Minitrack antenna will cover an area of about $2.5\lambda^2$ and will provide a gain of about 50, or 17 db. These changes give a theoretical received power of 5×10^{-15} watts or $0.5 \mu\text{v}$. With a 5-kc. predetection bandwidth a predetection S/N of 20 db. is obtained.

The Minitrack antenna array consists of twelve parallel half-wave dipoles to give a narrow pattern in the east-west direction and a wide pattern in the north-south direction. The wide north-south pattern is required to cover a large region in the sky because the stations are far apart. If a north-south line of closely spaced stations could be built, the north-south antenna pattern could be reduced. With an average satellite altitude of 300 miles and the stations spaced 50 miles apart, the beamwidth could be cut to about 10 degrees. An antenna with an equal east-west beamwidth would give an antenna gain of about 300, or better than 24 db. Such an antenna would give a receiver input power of 30×10^{-15} watts or more than $1 \mu\text{v}$. across 50 ohms.

In addition to permitting larger antenna gains, a line (or lines) of several stations has further advantages. It can back up the Minitrack system for acquisition of the satellite and it would always permit near-vertical observations of each satellite orbit at some station. The vertical observation will reduce the effect of ionospheric and atmospheric refraction and thereby will make conditions favorable for the most accurate satellite position measurements, as well as reduce the range from the satellite to the ground station.

Tracking Equipment

Some components for the simplified system are identical with components for the Minitrack system and will be briefly described. Other components are different and are still being designed.

The antenna for the Minitrack may consist of 12 parallel dipoles giving a 12-degree east-west beamwidth and a 60-degree north-south beam-

width with a power gain of about 40. Its dimensions will be about 7 by 55 feet. Another promising antenna possibility for the simplified Minitrack would be the center-fed full-wave four-dipole array. It should have nearly the same gain and could easily be made rugged to minimize phase shifts due to distortion of the elements.

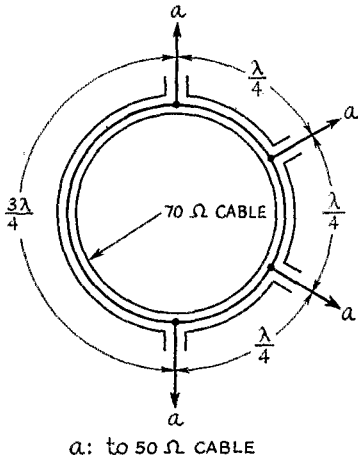


Fig. 3 — Coaxial-line hybrid junction.

The transmission line used for either system must have a low loss and be stable in phase. For the Minitrack system $7/8$ -inch air-dielectric cable will be used. This cable is suitable but the cost is high. Another type that will be tested is the similar type made with $3/8$ -inch tubing. This cable has a greater loss but is less expensive. The only inexpensive low-loss cable is the "railroad" or "ladder" type of balanced line. If it could be so placed as to be stable in phase it would be suitable.

The hybrid junction can be made in several ways. If the transmission line is coaxial, one of the most easily built types is the solid-dielectric cable (70-ohm) type shown in Fig. 3. With balanced line the type shown in Fig. 4 is feasible. Other types can be made using lumped constants. The hybrids should be made so that the crossarm isolation is at least 30 db.

A low-noise preamplifier is a necessity for either tracking system. The preamplifier built for the Minitrack system uses type GS 6299 tubes and, with some tube selection, has a noise figure of less than 3 db.

It is possible that for the simple signal-minimum detection system an ordinary communications receiver and frequency converter could be used in conjunction with the preamplifier to make a satisfactory receiving system. A special double receiver is being designed specifically for this application. It will amplify both hybrid outputs, using a common local oscillator and a combined automatic-gain-control voltage derived from the larger signal. In addition to the greater convenience afforded by this receiver a further advantage in output indication and signal-to-noise ratio can be obtained by combining the

two receiver i.f. outputs in a product detector.

While a large number of recorders that would be suitable are manufactured, all are expensive. For a single-axis system, an accurate time standard recorded with a single channel of data would have value. The position of the minimum with respect to time should be found to a few milliseconds. A pen recorder such as a Sanborn or Brush may be adequate and a string oscillograph or oscilloscope recorder using strip film run at about 3 inches per second would quite certainly be suitable.

Calibration of the tracking system appears to be a most difficult task. Evaluation of methods using transmitters in balloons, helicopters and airplanes is being made at the present time,

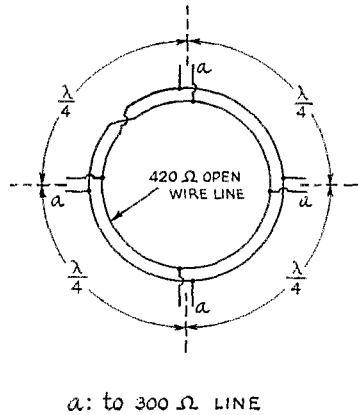


Fig. 4 — Balanced-line hybrid junction.

and consideration is being given to a plan for employing a roving calibration team trained and equipped to calibrate stations rapidly.

Conclusions

Amateurs throughout the world could make a real contribution to the scientific Earth Satellite program by building systems to receive the radio emissions from the satellite. Although considerable thought and effort has gone into the design of a tracking system which could be adopted for use by amateurs, the design has not gone very far, and much more design thought is needed. It is felt that amateurs can add much to the system that has been described, and further details will be given if the response from those interested in the project warrants — especially from those able to make a real effort to measure satellite positions accurately. In addition to the support of western hemisphere amateurs, support is sought from amateurs living in the ± 36 -degree latitude regions throughout the world.

Although this article has been written especially for radio amateurs, it should be emphasized that aid from universities, industrial firms, and laboratories would be welcomed.

(Continued on page 134)

Multiband Operation with Paralleled Dipoles

A Simple Antenna System with Coax Feed

BY H. J. BERG,* W3KPO

• The idea of connecting dipoles in parallel for multiband operation is by no means new, having been suggested at least as early as 1937,¹ and more recently by W8MOK.² However, the many who are not familiar with previous material are sure to find this revival of a multiband system fed with coax well justified.

THE INCREASED FLEXIBILITY of the modern amateur transmitter accents the need for a single antenna for multiband operation. Few have space for an antenna farm; most of us must be content with the average-sized city lot. As a result, we can erect but one antenna.

There are several well-known ways of achieving multiband operation with one antenna. It is most often accomplished by the use of tuned feeders, or a long wire fed at the end without feeders. This requires an antenna tuner. To change bands, it is necessary to change coils in the tuner, rearrange taps, and retune. On the other hand, if the single antenna is fed with a nonresonant line, its operation must be limited to the one band for which it is cut.

An antenna commonly referred to as the "300-ohm off-center-fed Windom," has gained

considerable popularity, because it is reputed to be a system that permits operation on several bands with a "flat" line. However, those who have investigated the design of this antenna have discovered that its practical operation must involve considerable compromise.³ Many more have learned by experience that there are other disadvantages. Unbalanced feeder currents result in feeder radiation. Radiation from the transmis-

sion line as well as from the antenna gives rise to variation in the radiation pattern from band to band, feed-point impedance variation and the appearance of r.f. on supposedly grounded circuits and house wiring. The last-mentioned effect has been so bad in some cases as to ruin the performance of a well-shielded v.f.o. In spite of these troubles, many have continued to use it from lack of any other choice.

For some time, the author, in common with many others, has been in search of a simple multiband system that could be fed efficiently with coax cable. Finally, an item that appeared in *Radiotron Designer's Handbook*⁴ served as a reminder of a system that was described in *QST* many years ago. The arrangement is so simple that it is surprising that more frequent use has not been made of it in recent years.

The principle of the system is shown in Fig. 1. The arrangement consists of separate dipoles for each band, all connected in parallel to a single coaxial transmission line. With one of the dipoles operating at its resonant frequency, its feed-point impedance will, of course, be suitable for matching a low-impedance line (approximately 70 ohms). The remaining lower-frequency dipoles will be at or close to harmonic resonance at the operating frequency. However, since their halves will be in phase, the impedance presented to the

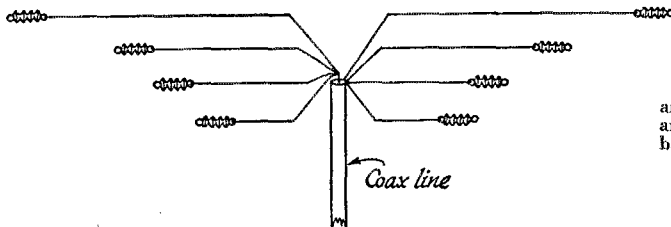


Fig. 1—Sketch showing the arrangement of parallel half-wave antennas in the coax-fed multiband antenna system.

line will be high and essentially resistive. This high impedance will be in parallel with the 70 ohms of the active dipole and therefore will have negligible effect on the line termination, and little current will flow to the longer dipoles.

The remaining higher-frequency dipoles will present an impedance consisting of resistance and capacitive reactance. However, the resulting impedance will also be high compared to the 70 ohms of the active dipole.

A departure occurs in the case of 15-meter operation. On this band, the 7-Mc. antenna will be close to resonance at its third harmonic, and its center impedance will be low — of the order of 100 ohms or so. Also, at this frequency (21 Mc.),

* 19 Herold Drive, Irwin, Penna.

¹ W9YPQ, "Hints and Kinks," *QST*, June, 1937.

² W8MOK, "Hints and Kinks," *QST*, December, 1954.

³ Wrigley, "Characteristics of Harmonic Antennas," *QST*, February, 1954.

⁴ RCA, Harrison, N. J.

the 14-Mc. dipole will show inductive reactance, while the 28-Mc. dipole will show capacitive reactance. However, the resultant is still high compared to 70 ohms. Since the 7-Mc. dipole presents a fairly-close match to the line, considerable power will be fed to it, and there is some question as to the value of including a separate dipole for the 15-meter band. The radiation pattern of the 7-Mc. dipole at its third harmonic will be essentially nondirective, although there will be fairly sharp nulls at angles of about 20 degrees with the direction of the dipole wire.

Construction

There are several ways in which the antenna elements can be suspended. W9YPQ suspended one set of elements from the one above it, using insulator-terminated wood spreaders about one foot long. In the author's installation, the elements are simply allowed to droop about two feet, one below the other. Ropes attached to the end insulators are brought back up to a common

anchoring point. The elements could also be fanned out, either vertically or horizontally, provided that the angle of fanning does not become too great. The lengths of the elements should, of course, be the same as those for dipoles for each band.

Several other local hams are using this antenna system with excellent results, and much DX has been worked. With a bandswitching transmitter we can hop from band to band as quickly as with the receiver, since there is no need to fuss around with an antenna tuner.⁵ Checks with a Millen s.w.r. bridge show that the s.w.r. never exceeds 1.5 to 1⁶ on any of the bands on which the antenna has been operated. These include 40, 20, 15 and 10 meters. Those who have space can add an 80-meter dipole, of course.

⁵ This system will, of course, respond to harmonics and submultiples of the output frequency. Therefore more than ordinary care must be used in suppressing these frequencies. — Ed.

⁶ Confirming by measurements on a similar system at A.R.R.L. Hq. — Ed.

21-Mc. Coils for the Grandfather HRO

Revamping Unused Coils for the 15-Meter Band

BY R. E. MOREN,* W4INL

THE WRITER HAS in his possession an HRO receiver of rather ancient vintage. As a matter of fact, it is Serial No. 26 and is enjoying its twentieth year of almost constant service. True, it has undergone rather extensive surgery and has an additional i.f. stage, a built-in Signal Slicer and Select-o-ject, sundry voltage regulators and a modified front end. It has, therefore, become a part of the family and a new receiver is not contemplated since it is doubtful that major improvements would be noted with the latest and certainly more expensive receivers.

With the advent of sunspot activity it was decided to investigate the 21-Mc. band and this entailed a new set of coils. Since the price tag attached to 21-Mc. coils for this receiver indicated an outlay of approximately \$50.00, this avenue of approach was abandoned in considerable haste. However, there was on hand a set of general-coverage coils in the 14/30-Mc. range which was not in use. Within four hours a set of bandspread 21-Mc. coils was in the receiver, constructed, as you may have guessed, by modifying this set of general-coverage coils.

In view of the fact that there must be hundreds of old HROs in service, the information necessary for others to make a similar modification is pre-

• If you are the owner of one of the early models of the HRO receiver and have any set of coils that can be sacrificed for the purpose, you can easily modify the coils for 21-Mc. bandspread operation, as described here by W4INL.

sented forthwith. Further, the information covered in the text and the schematics makes it sufficiently clear so that the alteration is not necessarily confined to the 14/30-Mc. coils.

A few general comments are required. In each coil, i.e., first and second r.f., mixer, and h.f. oscillator, the capacitor formerly used as a trimmer is used as a padder after modification. This necessitates the installation of a second variable capacitor on the phenolic apparatus board to be used as a trimmer. Since the National Company obviously used the same apparatus board for general-coverage and bandspread coils, space is already provided for mounting the additional capacitor. In the writer's case, a Johnson type 30M8 air trimmer was used with each coil (a total of 4). It was mounted, with the nut provided, by filing away the raised portion of phenolic adjacent to the unused mounting hole. The mounting hole was then enlarged and counter-bored from the equipment side to provide a

* 406 South Maple St., Graham, N. C.

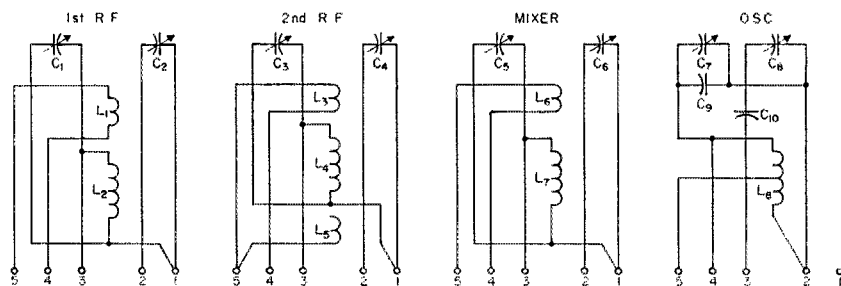


Fig. 1 — Circuits of the four plug-in sections for 21 Mc.

- C_1, C_3, C_5, C_7 — 30 μf . (Johnson 30M8).
 C_2, C_4, C_6, C_8 — Original trimmer, approx. 30 μf ., shown wired as padder.
 C_9 — 20- μf . silver mica.
 C_{10} — 0.0025- μf . mica.
 L_1 — 3 turns close-wound. (On 14/30-Mc. general-coverage coil, this is the original coil with 1 turn removed.)
 L_2 — 5 turns No. 22 enam. (On 14/30-Mc. coil, remove turns from end of coil connected to terminal 1.)

- L_3 — See text.
 L_4 — 5 turns No. 22 enam., spaced one wire diameter.
 L_5 — See text.
 L_6 — 3 turns No. 28 d.c.c. interwound with first 3 turns of L_7 at Terminal-3 end.
 L_7 — 6 turns No. 22 enam., spaced one wire diameter.
 L_8 — 6 turns No. 22 enam., spaced one wire diameter, tapped two turns from the end connected to terminal 4.

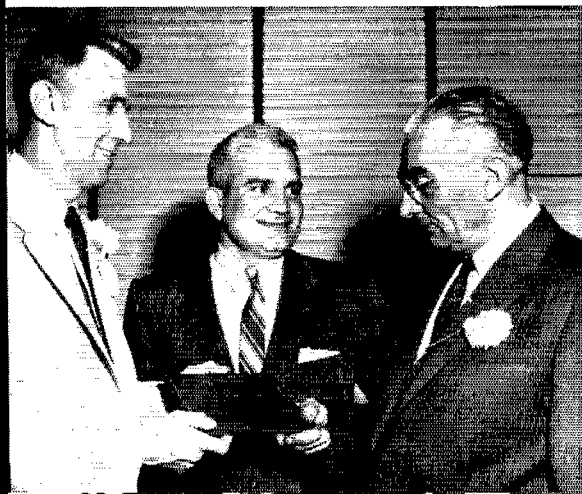
spot for the trimmer which permits adjustment from the top of the receiver. As a consequence, both trimmer and padder are accessible from the top, thus facilitating final alignment. All coils, with the exception of L_3 in the second r.f. stage, are wound on the original 1-inch-diameter forms.

Additional comments concerning the second r.f. coil are in order. The 14/30-Mc. general-coverage coils for this stage are made with the primary (L_3) wound on a $\frac{3}{8}$ -inch form which fits inside the 1-inch form used for the secondary. Both forms are mounted on an L-bracket with a single 6-32 screw. No modification of the primary is required. However, in the event this particular coil set is not being modified, 20 turns of No. 28 d.c.c. wire, scramble-wound on a $\frac{3}{8}$ -inch form, over a length of $\frac{1}{4}$ -inch will suffice for the primary. The secondary winding consists of 5 turns of the original coil produced by removing turns from the end of L_4 connected to Terminal 1 in the second-r.f. unit. L_5 is an unterminated winding used in the 14/30-Mc. coil for this stage and is

not modified. If another coil set is used for this modification, L_5 is not required.

All schematics are drawn with the components shown in the physical positions they occupy if the phenolic board of each coil is turned equipment-side up with the contacts toward the viewer. The contacts, which together with the spring fingers provide the necessary connections to the receiver proper, are numbered in the manner stamped on the coil mounting board.

Receiver alignment is straightforward and was accomplished in about 30 minutes. Optimum alignment of the old HRO used by the writer placed 21 Mc. at 90 on the receiver dial and 21.45 Mc. at 400. As is customary, the h.f. oscillator is on the high side of the received signal. Early models of the HRO were mildly guilty of oscillator pulling when either the r.f. or mixer stages were peaked. In the writer's case this situation was rectified by installing a 6BE6 mixer tube in the place of the original tube. The circuit used is the one described in Fig. 5-11B on page 83 of the ARRL Handbook, 1955 Edition.



Hank Yahnel, W2SN, was tendered a Testimonial Dinner at the Robert Treat Hotel in Newark, N. J., on May 6, by his many friends in the second call area. Here, Fred Barkalow, W2BVS, presents Hank with the plaque commemorating the culmination of his twenty-three years as W2/K2 QSL Manager, while Master of Ceremonies Bill Leonard, W2SKE, looks on approvingly.

Silent Keys

IT IS WITH DEEP REGRET that we record the passing of these amateurs:

ex-W1BZL, Albert T. Ellis, East Hampton, Conn.
 W2JV, Dr. Theodore J. Berger, Nutley, N. J.
 W3TYU, Milton W. Conner, Philadelphia, Penna.
 W4AXA, Walter C. Fogle, Lynchburg, Va.
 W5JGT, Francis A. Rudolph, San Antonio, Texas
 W5KWE, William H. Butler, Enid, Okla.
 W5WX, Albert J. Arnold, Amarillo, Texas
 W6AXN, Donald C. Strawn, South Gate, Calif.
 K6BDD, John J. Dupre, Oakland, Calif.
 W6EXH, Victor O. Kirtley, Ripon, Calif.
 W6LBK, Walter M. Bruce, Felton, Calif.
 W6NHF, ex-W9MQY, John L. Gates, Inglewood, Calif.
 W6WK, Charles B. Lang, Glendale, Calif.
 W8BXR, Frank J. Snyder, Cleveland, Ohio
 W8DGV, Charles A. Drescher, Cleveland Heights, Ohio
 W8FRY, Donald A. Hoffman, Youngstown, Ohio
 W9BE, Malcolm H. Romberg, Lombard, Ill.
 W9DXX, Alice R. Bourge, Homewood, Ill.
 W9EL, Guy E. Wilson, Springfield, Ill.
 W9PFF, John R. Beatty, Woodstock, Ill.
 W9EKP, Don P. Holmes, Gothenburg, Nebraska
 W9LGX, Laurence L. Higginbotham, Council Bluffs, Iowa
 W9SZL, John P. Stewart, Norfolk, Nebraska
 HA5BL, Gusztav Radi, Budapest, Hungary
 VE2SL, Herbert Armitage, Saint Hilaire, Ont., Canada
 VE3PD, Albert K. Edwards, Mt. Hamilton, Ont., Canada
 VP3LF, Louis Fonseca, Lacytown, Georgetown, British Guiana
 ZL3GR, Richard H. Rowe, Rangiora, New Zealand



25 Years Ago
this month

QST for July, 1931, had a technical section devoted largely to the so-called "ultra-high frequencies." James Lamb discussed developments in ultra-high frequency oscillators, showing how they could be made to work to about 200 or 300 megacycles, and urged more use of stable oscillators. Ross Hull in turn described a successful super-regen receiver for the five-meter band, while George Grammer rounded out the technical end of the issue with an article on inexpensive crystal control for the 80-, 40- and 20-meter bands. The new equipment feature 25 years ago was a review of some new six-volt tubes (types 236, 237 and 238) that looked like they'd be real good for amateur receivers.

— . . . —

Looking over the station descriptions and the technical articles shows how popular the type '10 tube was 25 years ago. And W7CT wrote in to tell how he immersed his 210 in an oil bath to keep his transmitter frequency from creeping.

— . . . —

K. B. Warner reported on the May meeting of the Board of Directors, and a photograph of the conference table showed some familiar faces that you'll also find elsewhere in this "25 years later" issue — Budlong, Segal, Handy and Reid.

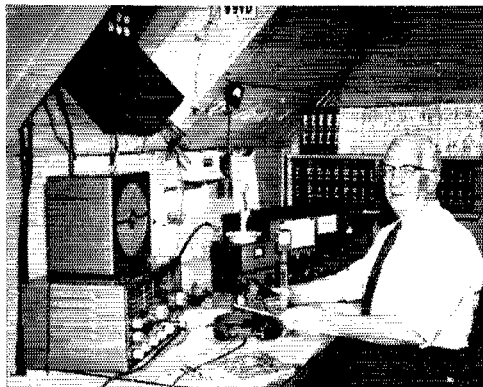
— . . . —

In the "Correspondence" section, R. A. Chipman, VE4IC, commented upon the odd coincidence of his hearing a ZL on the same day that two physicists of the Smithsonian Institute recorded a large number of sun spots.

Strays



Here we see two versions of the amateur wireless station owned and operated by Clarence N. Crapo. The picture at the left shows station "CN" operating at



Brockton, Mass., back before WW I. At the right is the present-day setup at W9VD, in Milwaukee, Wis. The old-time gear includes a "Transatlantic Tuner" covering 1000 to 20,000 meters, a "shortwave coupler" covering 200 to 2500 meters, plus such items as Clapp-Eastham headset and glass-enclosed variable condenser. "CN's" antenna was a 4-wire flat-top 65 feet long with a 30-foot ground lead. We can probably all recognize the equipment at W9VD. OM Crapo's ham experience spans some 45 years, and he has been a long-time member of the League as well as SCM of the Wisconsin section.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Which:

Occasionally out of the "How's" mailbag flutters correspondence unmistakably stamped as time-capsule material for the enlightenment of some future radio age. Extracted from one such letter are the following tabulations painstakingly prepared by VR2BC, formerly VP1GG. While these statistics are representative, their interpretation and projection should be clearly circumscribed. Hence bear in mind this somewhat awesome title:

Data On Equipment Used By United States Amateur Stations Which Communicated With VP1GG By 14- and 21-Mc. Radiotelephone From January, 1954, To July, 1955

TABLE I

Power Range (W.)	Transmitter Power Input	
	14 Mc. (%)	21 Mc. (%)
0-25	0.0	1.3
26-50	4.6	13.0
51-100	9.6	24.7
101-250	36.7	49.9
251-500	27.7	6.0
501-750	7.2	1.9
751-1000	14.2	3.2
Reports Analyzed	1398	1462

TABLE II

Type	Antennas	
	14 Mc. (%)	21 Mc. (%)
1-element rotary	0.0	1.9
2-element beam	12.0	10.3
3-element beam	48.8	27.2
4-element beam	3.5	3.3
5-element beam	1.7	*
Dipole	2.0	7.0
Doublet dipole	2.3	7.0
Folded dipole	3.2	4.5
Long-wire	3.8	13.6
Rhombic	1.7	2.2
Ground-plane	5.7	6.7
Zepp	*	1.9
Vee	2.3	1.7
Cubical quad	*	1.9
Windom	4.8	4.2
Vertical	2.8	3.3
Mobile (whip)	*	1.4
Other	5.4	1.9
Reports Analyzed	1204	1440

* Less than one per cent.

NOTE: Some of the "antenna types" specified actually are feed types. E.g., Windom and Zepp feed may be applied to long-wire antennas, dipoles, etc.

Comments by ex-VP1GG, on Table I. "With all one hears about the high-power guys, the proportion of 751-1000-watt entries was surprisingly low — nor were they confined exclusively to W6-land; hi!"

On Table II: "Antennas were a varied lot. However, a beam seemed to be a necessity for 20 meters. Fifteen meters allowed not only lower power but a wider range of wire antennas. There was evident a small but increasing tendency toward the 'shortened' beam."

* 4822 West Berteau Avenue, Chicago 41, Illinois.

What:

Our DXpeditionary season is in full swing and the tide rolls on unabated. Add to our April "maybes" these possibilities: VK6MK, W6ITH to ZC3 VQ9 VU5; ZE3JO to Zanzibar; FY7YE, PJ2AA to French and/or Dutch St. Martin; VQ5GC to VQ9; KT1UX and others to Ifni; I1DCO to San Marino; VP2VB/P (VR1B-VK9TW) to VU5 VQ9; W6NJU and friends to KC4 (Navassa); and W7FNK (FO8AI) to VK9 and/or ZM areas. And watch out for the usual LX1 PX1 3A2 and HE sleepers! Meanwhile, CE6s AB AC AD, FB8BI (Juan de Nova), VK9TW, XE4A and YV8AA developments stirred things up on

20 phone. W1APA, refugee from 7-Mc. atmospherics, collected KGs IBO 6NAA (14,259) 1200 GMT, KX6BU, SV3s WN (191) 3 of Crete, WO (196) 1, 5As 1TZ 2TP 3TY and hears KC4USA's s.s.b. (215) regularly. KC4USV (208) is another antarctican still stalked. KA3CY scored with BV1US (163), KC6UZ, KG6IG of the Volcanoes, VSs 1GP 2DO 2EE 6CW 6CY and 4X4DR (110) 1. ET2US and FP8AP are phones no longer needed by W4TFB. W8YIN's efforts are crowned by FB8ZZ (140) 14. OO5s AH AN AZ RC and GR6AI are fairly short skip for GR7CO (200). Pretty pasteboards are available from the following 14-Mc. A3 actives specified by the Newark News Radio Club and West Gulf DX Club: AP2C, CN2BD, CRs 5SP (115) 22, 6AU 6CK 9AI (100) 17-18, CT3AN, DU8 1AP 7SV, EA8 6AR 8AI 8BB 8CC 9AR, ETs 2MZ (155) 23, 2PA 2TA (140), 2US, 3LF, FB8s BC (120) 3, BR, F9RY/RC (90) 22, FG7XB (145) 4, FF8s AK (160), AP (175), BM, FL8AB, FM7W8s FN Q X, FO8s AB AD (159), AK, FUSAC (163) 7, GD3UB, HA5s AP (135) 10, KBA (115) 3, KBK (118) 3, HGR3I (195) of the Galapagos, HE9LAA (153), HI6EC, HR3HH, HZ1s AB (195), TA (159) 2, I1YAK/Trieste, IS1ANU (233) 4-5, KB6BA, newly-activated KG6IA on Ie Jima, KJ6BM (255) 12, KM6AX, KR6SA, KT1s DD (s.s.b.), UX (174) 2, WX, KX6AF (227), W2SPF/KG6, W7VND/KG6, LU9ZC, MP4s BBF (155) 3, BBL (132) 2, KDS (197) 2, OD5s AB (117) 4, AU AV (112) 4, BO (138) 4, OK3CP, OY2Z (115), SPs 2AH (175) 5, 2CC (140) 5, 5CC (145) 5, ST2s AM (260), TB (168) 1, SUIAS (123), SV8s WA (s.s.b.), WJ WM, TA3US (176) 4, UB5KBR (132) 4, UG6KAA, UO2AN (150) 5, VK1s DS IJ (116) 8, VK9s BS CS DB RH, VP8 1E1 LEK IMA 2DL 2KM 2KN 5BE/Turks 7NG 7NJ 8AK 8BQ 8BS, VQs 2AN 2DT 6LQ (122), 8CB, VRs 2AM 2CZ 3C (150), 6AC, W8s 1DU 1BV IGR 2CP 2ER 6CG, VU2HE, XZ2SS, Y12AM (160) 5, Y11RF (133), ZB1s BG (104) 6, BL BS, Zds 4BR 4BT 8SC 9AC 9AE of Gough Isle, ZK1BL, ZM6s AB AT AX (160), ZSs 2MI of Marion Isle, 3G 3Q 3S 7C, 3V8s BA AB AS (167) 5, 4S7s MG YL, 4X4s BD (162) 4, BL DR FF FK GS (155) 4, 5As 2TX 2TZ 4TX and 9S4AX (112) 4. Ready, modulators!



AP2RH of Lahore, activated and operated by G3FNF, is rolling up an outstanding DX record on 20 c.w. When Ray's line voltage is up to "normal" the 6L6-807 rig at left runs 25 watts to a fixed 2-element collinear 30 feet high. An unreconstructed Marconi CR-100 handles incoming-r.f. chores. The outbound AP2RH QSL tally is already nearing the thousand mark after very few months on the air.

20 code is its usual self, generous as ever. W3TYW reached a fast 86/71 through CR6AI, CT2BO (90) 23, DU7SV (85), EA9DF (75) 7 who is still intent on an I fmi trip. F9RY/FC, F8AJ (47), F8PAP (71), HPIEH, I1ECB/Trieste (66), LZ1KPB (41), OX3RC (28), SV8s WL WT, F85SV (83), ZB1s CH CN EB and ZC4IP

K6EC made it 125/85 via FY7YF (62) 3, JZ0PS (58) 16, McMurdo Sounder KC4USV (45) 15, KG1KK (12) 1, OD5LX (42) 3, OX3MH (15) 4, TF3KA (70) 4, VK9RM (16) 7, VO3 3CF (45) 15, 5GC (54) 15 and others

EA6AW (8) 1, F88BX (52) 14, KR6QW (56) 10, VS6DE (23) 11 and 3V8AB (22) 22 mingled with K2QQO

Good fortune at K6ENX: BV1US (50) 14, DU9JO (70) 15, KC4, KX6NC (40) 14, LZ1KDP (20) 5, MP4BBZ (45 76) 14-15, OQ5DEK (60) 15, SV8WS (15) 5, UA4KKC (25) 15, VO3 2GVW (70) 15, 5DM (40) 15, 6LQ (55) 14, VS1GX (60) 15, VS9AN (40) 15, YP1 RF (75) 14, ZD6BR (70) 15, ZS2MI (40) 16, 4S7VM (50) 15 and 4X4GZ (95) 14

GD3HQR (80) 20, EA9AP (209) 19, LZ1KRF and YJ1AA (85) 10 tickled W3YCH

It's a quick 94/59 at W6SUQ thanks to BV1, DU3DD, KB6BA (100) 9, KC6AL (80) 11, KH6AF/KW6 (20) 11, OY7ML (52) 8, VK9XK (25) 9, VS1 IHE/1HB 1HC 2FB and 2DH (20) 10-11

W6YBR is getting warm at 125/93: PZ1AH (60) 6, F88 on Amsterdam, JZ0, UB51D (20) 4, UC2KPS, VQ6, ZD6BX 15, ZS7s D (85) 16 and H (16) 15 helped

At K6HFA the standouts include an F88 BV1, LU4ZS (45) 9, KG6AGC (60) 8, VK9, VS1GY (35) 15 and ZD6RM (10) 15

K6EYT's 75-watter made it 81 with FK8AL, FQ8AY, FY7YE, KC1AR, KX6AF, LU5ZL, VP1 ISD 3AD 7NM, VR2s CV CZ and scads of others

KJ6BM (3) 15, KX6AC (78) 5, KX6AX (25) 2, VK1IJ (75) 13, VK9OQ (22) 14, VS2s CV (52) 14 and DW (37) 15, plus many aforementioned super-rarities, connected with K6DNH

Kount J.R. Kunties' pal W2HSZ peeled off AP2M, DUS IFC, 6LW, KJ6BN, KR6AF, KW6CA, MP4BAU, OY6S, UA1AK, who QSLs via RSG6, VP8s BK BS, VO4EF, VS2s 6CC, 9AS, YZ2AM (55) 15, YN1PM, ZD2ROC, ZC4JJ, 4X4BX and 4S7WP (52) 2. Bud also bagged JAs in every call area save JA7 JA9 and JA0

Log by log, now at W10DW: KJ6, W3UIF/KG6 (8) 11, W1W6W, HK55CR, W2DEC: CT3AN, GD

W2FLR: wants a certain LD4 to know it was K2DXO he worked, not OQ2DX (hll), K2BU: ACSFN (80) 22

Crete's SV9WN (9) 23, VK9 YJ1, hears YK1AK (45-65 chirp and drift) 1-3, made his total 193, K2GMF: GC2NC (40), HC1LE (10), PZ1AP, VR1 VQ5, K2KW: H1SFR (110) 3, W3FLR (65) 2, W3NCF: LX1AQ, ZD2, W3ZAL: 98 confirmed within a year, plus AP2, F88, 15RAM (65) 23, SUIIC (58) 2, Crete SV8, UB5KAA, VR1, VR3B, VS9, VU2s JA JJ MD, 4X4s, W4LDD: SP8CK, W4TFB: EL12P, FC7XB (11) 6, FK8AO, FQ8 F8 KB6, KX6BU, VK9 VQ8 VR1, W3CAN: EA9 F88, KA2OZ, KC3s ILZ 6APX, OX3KW (11), VK9, VP8BE/Turks, one VU4NV, ZD4CC, 3V8, K6JQ, AP2RH (80) 14, OY2Z, MP4BBZ (25) 13, ST2NC (62) 5, TF3AB, UAs 1AM 1KFA 9RA, VO3 3EX 4AO, XZ2OM (33) 14, YJ1s, ZDs 2BAH 9AD, 3V8FA, W6NPE: 228/222 with FB8BR/FB8, ZD3A, K6JIZ: JAs KX6, W7DU, U DU FG7 KJ6, KR6 VR1 VS1 on 50 watts, W7YU: GR9AI (50) 16, VS1HA (55) 20, TF, W2AAO, YFus, FASDA, CASAD, W8B/MX: VR1, W8NOH: VP5DC, W8YIN, K6 V82, shipboard X1NP (30) 7, W9ALL: CR4AG, FM7WP, OD5BS, VP2AD, W9PNE: SV8 VR1 VQ5 VQ6, W9NGF: FB8BR, VR2BA, ZASKM (5) 23, ZB2QO (56), K6CTY: 7 VKs, DL4ZC: AC6 AP2, F88AA 17, VS2ET 17, W6Y notes activity by AC3SO (85) 12, CE8AD (12-40) 5 of Easter Isle and ZD9AE, slated for a year's sojourn on Gough Island

No. Calif. DX Club's DXer, WGDXC DX Bulletin and Willamette Valley DX Club's DX spotlight this 14-Mc. c.w. *piece de resistance*: AP2C (43) 2, CN2AY (37) 6, CR10AA (88) 12, DUICE (150) 17, EA6AM (26) 5, EL2L, ET2s AB LB LG PA (50) 13, ET3Q (30) 3, F9s SC/FC (26) 7-8, WT/FC (42) 7, FB8s BC (95) 16, BL (70) 14, FD4BD (22) 0, FK8AE (65) 5, FQ8AX (70) 23, GD3UB (70) 2, HZ1HZ (8) 2, IS1FC (15), KC6s CT (46) 12, KU (42) 14, KR6s QC SC (30) 13-15, KTIUX (71) 0, KW6CA (8) 12, W3UIF/KG6 (94) 13, MP4KAU (20) 16, OD5LX (70) 2, OQ5QS (10), OY3C (15) 22, PZ1AA (65) 1, SV9WJ (57) 3, VP1 IFL (68) 13, 8BR (90) 0, VO3 2DT (97) 16, 3FN (50) 13, 4CG 4BF 4EO 4FI 4KP2 (20) 14, 8AG (14) 4, 8CB (90) 13, VSs IDE JE (85) 12-13, 6AE 6DI (73) 13, VU2 AL BK HW JG 2J1 KM LL, VK1GA (100) 15, YJ1AM (47) 14, YJ2s DX (3) 3, OT (90) 4, YS1O (71) 13, ZB1s HKO (38) 6, HKU (76) 6, ZC4s AH BV GT MW, ZD6EF ZK1AA (22) 4, ZS3s HP (30) 16, Q (28) 21, 3A2BI (51) 4, 4S7s GE MR NG WP (52) 2-15, 4X4s GW (55) 23, GZ (65) 15, 5A2TZ (17) 16 and 9S4CH (7) 6

Russian contacts continue available on a limited scale, as usual. This month's correspondence turned up notes on UA1s AU BI BU KBK KUA, UA3s BF EK MD WZ, UA9s CC CR DN KAB, UA9s DN KCA KJA KKB, UB5KBB, UF6s AM KPA UP2s KBC KPC and UO2AN, in addition to those reported in the text preceding.



UC2KAB, VS1GV, ZC4IP, ZD1DR and 3V8AN ready and willing

DU61V, ET2PA (60) 0, JAs ICJ 1CO 1FC SAT 9AB, KA2s KS USA, KC6AL (18) 18, KW6CA (41) 2, KX6NC (58) 13, OY2Z (59) 23, FT5TP (30) 22, UA3KBA (40) 12, VP5BE/Turks (20) 14, VP8AY (5) 20 of the Falklands, VO4RF (1) 18, VQ5CG (58) 13, VQ6LQ (31) 14, VU2HF (48) 14, WJNA/ZD4 (30) 22, 4X4s BT (26) 22, IE (62) 13, YO3 galore and 9S4AL checked in at K2QQO, but UA3CR and 4S7NG escaped

W1CTW and W6ZZ, both 15-meter specialists, maintain a close 21-Mc. countries race with 107 and 111 totals, respectively. W1CTW's being c.w.-only. Cal picked up MP4QAL, VP5/Turks, VQ5, VQ4KPB, YS1O, 4X4s 1DR and FA, while Miles busied himself with SP1KAA, SV8WS, ZB1AY and others

Here and there quickly, now, at W2HSZ: GD3FXN, OD5AV, SV1AB, VO4CC, VU2 4X4, K2ENO: GD3F FAs8 IT1, ZB1CN, K2GMF: F8As, VO2GW, W8TYW: HB1OL, PZ1RM, VP1SD, ZB1AY, K44BE: GN8AF, CT2BO, JA3BB, IT1AL, W8CAN: HB1UA, VQ2, ZP5HX 23, W5FTP: FA SP, IT1ZWS, YU3JS, W91IM: KG61G of Chichi, W6ZZS: left 7 Mc. for FB8B, VU2MD, YV5BJ, A6ENX K: SPs VU2, W0PRM: SP DU, DL4ZC: JA1V8, ZK5CG

15 phone efforts netted CR5SP (23) 3-4, EA8AC (295) 5, ET2PA (285) 22, MP4s B8W (245) 1, KAC (220) OD5AV (170) 18, ST2DB (190) 22, new Crete candidate SV6FP (233) 0, VQ6AE (180) 16, YQ3GM (230) 19, ZK1BS (230) 9, ZM6AR (225) 3-4 and 9S4AM (240) 0-1 for W91CL to make it 132 on 21-Mc. voice. ZD8SC remained aloof

Featured at W61IM: KA2s, KW6CA, VO2AV, W6PME/KG6, YN1ARM and ZP51L

JAs KAs, KG1FE, KR6AF, VO4EO and ZS9G worked W6ZZ who recently filed with NZART for WAP certification

Thirty-five watts is still the bait at V97AH, good for FB8BZ (140), Kuwait M1P4, OD6 CR5, SP5CO, SV1AD, VP3 2DL 5DC/Turks, VO3s 4FO 5CC (130), VS2DB, ZB1EB, ZP5CF, ZS9, ZSs 3C and 7C. Gus intends to move up to 28 Mc. where a 16-element curtain array is readying for action

K2HSZ's fine list almost duplicates that of W91CL, adding CRs 6AG 9AJ (240) and 4X4CK (240). Good fish!

W9NLJ tried a new homespun 2-el. spinner on EL12A. VP3s 1JH 3YG 7NG, VQ4 and ZS2: W6G6F (12), CR9, JA1CO 5, KR6MY 13, VK9DB, VP2DA 1, VS1FE and others clicked with W7PEG

Hold on tight for this one. K2GVs, scanning 15 phone, heard a carrier modulated by ZS1s B and SW working duplex (ZS1B turned out to be transmitting on 6 meters). The ZSs then were heard to contact W1VPU, via 15, of course. K2GVs then called ZS1SW with proper timing on the proper frequency and he came right back. W1VPU and K2GVs, who never can hear each other ordinarily, then QSO'd each other along the 20,000-mile path. Anything can happen on 15!

Quickies around the circuit, 21-Mc. phone luck at W1WUX: 5A3TV (205), W8TYW: VP7NK, K4DR0: H1SFR, KV4BI, VP1ML, YV5BV, ZP, W4UWC: reached 99 on 15 A3, worked EA9AR, KG6FAE, SV9WT, W8NOH: PJ2AF, VP2 ZS9, CR7CO: JA1JAG, KR6FI, VO3s 2HJ 3DQ, ZS3B, KASCV: BV1US, CR9, DU61V, VSs 2BW 6CY

NNRC choices for the choosy 15-meter phone shopper: CN2AD, CRs 6BX 7DI 9AF, CT3AN, EAs 8BQ 9AZ 9EE, ELs 2C 4A, F88s AP BM, GC4JI, HE9LAA (215), HZ1AB,

15 c.w. took the warm season harder than Brother Twenty but some of the boys just ignored the dip. W2DEC found EA8BF, HA5BO, JA1CR, LZ1KAA,

KB6BA, KG6NAA, KT1WX, KX6ZB, LX1s DC (170), SI, MP4s BBL (150), BBZ, OQ6s DR GY, VP6s 1BK 5RR/Turks 8BD, VQ6s 2DT 2FU 3DQ 4CK 4ERR 5EK (125), VS6AE, VU2RX, Y13WV, ZB1s BJ AFX, ZL6s 2JDB 4BB 4BQ 4BV, ZS3s BB S, 4X4s BD (200) and BL.

15 Novice news is keynoted by WN7CNL's rich roster: K2HGU/KW6, KG6NAB, JA1QN, JA3s AB RN JM LK, KA2KS, VK/ZLs galore and South Americans, all by way of an Adventurer and HQ-140X, WH6s BQB BkX BTE, WL7s BMZ BQZ and BRZ are Novice-to-Novice QSOs specified. — KN6OPF reached No. 45 on such as RK8AO, LA3A, OQ6S, VK9RM and VQ2GW. — Novice gallon and 3-el. Mosley helped. — WN/KN heres and theres, at WN3PHG: HP1EH, WP4EP, KANBYG: XEs, Euros, ZL3GQ, KN6OPI: Hawaiians, VKs, VR1B, WN8CGF: HK3PC, VP40M, WN8CNX: HC4MK (225), WN8DSV: Euros, including a PX1AR, WN8EEZ: CN8AF, WL7BSF, WP4ACS, WN9YZG: KV4AA, PY7AN, KN6CER: FA8RJ, Euros, PY6AC, SM8AKE/AM. — In addition to the interesting angle of the number of ARRL DXCC Countries List countries hooked by Novice DXers, we're in the market for info on which, if any, DX stations have scored WN/KN WAS. Also, who has worked the most "Novice countries" — WP4 WH6 WL7, et al — of the several active on the DXCC List?

10 phone doings carry through the hot months with considerable momentum. W4TFB's neat assortment should give you some idea: CRs 5AC 7AG, DM2AKD, EA9AC, ET2AB, FGZXB, FY7YE, GC2FZC, GD3s IBQ UB, HH7RA/m, HH6EC, H1YAK/Trieste, K61KK, TPG rarity LU5XE, LX1DC, OOs 5BK 5CJ 5FV 0BL, ST2NG, SV0WX, VP6s 1EE 2GW 2LS 3HAG, VOs 2FJ 2HJ 2JW 2KH 2C 4EO 4EU 4RF 5GC, YU1AA, ZB1ZR, ZDs 3BFC 4BR, ZE2s JJ KR, ZP5JE, ZSs 3B 9G, 4X4s BD CW and FV. A new 6-element Telrex, 22 feet high, contributed. — ET2FM (495), KT1OZ (400), MP4KAC, YUIAD and ZD6RM swelled W1EKU's 10-meter voice total to a healthy 155. Vern notes several commercial BC-type signals scattered throughout the 28-Mc. range which do not appear to be the fault of his receiver. Any other observations in this regard? — The 2E26 final at W0QHI now has 153 feathers in its plate cap. CR7BB (300), EA9AZ (150), KB6BC (270), OE6WF (380), VQ4 VQ5, ZE2JE and ZS3AH (375) are recent plumage. — Down the list, now, at K2GMV/0: VQ4 from mobile, W3ZKH: KB6, KX6AF, VP8BP, ZS9, K5FFM: KA2EB, W8FTV: 198/180 total, VP5RR/Turks, W97A: ZP9AY (11 meters), W9WFM: CR5 KB6, VR3D (700) who is ex-VE7ASL/VR3, CR7CO: CR5SP, GD3GMH, HCLFG, KR6AB. — CR6s AO BH, EA8CA, GC3s EBK KAV, GD3s ENK POC 1A, KT1UX, MP4BBW (315), OX3PP, SV0WK, VP6s IMA 7NJ, YOSGL (235), ZBs 1E 2P, 4X4BL, 5A1TA and 9S4AL (400) are in NNRC 28-Mc. A3 ledgers.

10 code slackened noticeably but W2HSZ scared up CN8AF, CRs 6A1 7AF, CT3AB, KT1UX, OQ6CP, VQ2GW, YO3RA, ZB1AY, ZE5JA and ZP9AY. — An indoor ground-plane (!) and 20 watts make Europeans come back to K2ITZ. — W4LDD and W8GZF caught GC3HFE and DM2ASO without modulating. — OA3B, PZ1BS, VP6s 1SD 3YG and a ZP raised W3TYW. — Anybody messing with our 27-Mc. DX range?

HI8FR's Bill Long makes with a phone QSO in Ciudad Trujillo during the Dominican Republic's 1956 International Fair of Peace and Brotherhood. That receiver is an RCA AR-88 and the transmitter, located five miles from the shack, a remotely-controlled RCA ET-4339. Dominican Republic QSOs, normally rare on phone and even rarer on c.w., were made extremely available through the recent heavy 14-Mc. operation schedule of HI8FR. (Photo via W2IWP)

40 code holdouts battle static in the attic right now but 7-Mc. DX is there to work. K6BYT found DU7SV, JA1 1KF 1X 3AF 3BB 8AH, KX6AF, W4IKC/KW6 and VP3YG, not to mention a bevy of ZLs. — Briefly, at K2PGP: PY7AFK on 10 watts, W4EUI: HA5KBK, OK3BG, K6DV: JA1AEA c.w.-to-s.s.b., ZK1AC (5) 8, K8OIZ: KJ6BN (5) 10, VP7NJ (72) 11, W0VBS: ZL3GU 7, heard JA8AE, DL4ZC: HE9LAB, UO2KAO. — Novice 7-Mc. comments, from KN6BXG: KV4BK, KN6OPI: WH6BTI (164) 8, WN7CNL: WH6s BMD BOK BRF BSE, BSR BTU BVS, WL7s BRD BSS, WP4ACS, WN8CNX: ZL3GQ, KV4 WH6, W3REZ: KV4, KH6BLH.

80 code, *mirabile dictu*, is still with us in midsummer! W4TFB clipped FA8BG, KH6PM, OK3EA, PJ2AJ, VP6s 3YG 9BM, YU3BC, ZL5B and 9S4AX. — WN7CNL stuck it out for WH6BTI and WL7BPI around 3714 kc.

Where:

OD5AI, secretary of Radio Amateurs of Lebanon, gives RAL's official address as P.O. Box 3245, Beirut, and names OD5BO QSL manager. We assume OD5-bound QSLs thus can be addressed either to the society or to OD5BO's QTH as follows. Other RAL officers are OD5a AH, pres.; AC, treas.; and AJ, technical advisor. — CR6CW, LARA QSL chief, announces a campaign to boost the out-bound Angola QSL quota and invites W/K complaints on the subject. — Don't hold your breaths for 9S4BX QSLs. Wis JTD and ODW relay 9S4AX's verdict that BX is BL. — Hollandia's JZ0PS accepted W7PHO's kind offer to act as QSL agent. We here re-commend all W/Ks who are assisting overseas DX with QSL chores. The very least we can do to cooperate with such volunteers is to supply clear QSO data and self-addressed envelopes when availing ourselves of their gratuitous services. — A cutie via W1WPO: W3ITW received a cablegram acknowledging his 14-Mc. c.w. QSO with VP8BR. — Now ousted out of the army, 4X4DK promises WIRDV he'll be catching up on his backlog of 3000 undispached confirmations. — From VU2SX of Bombay: "We have received a number of cards addressed to VU2XS. I have made inquiries with our licensing authorities and find that such a station does not exist. In fact, at present there is no VU station in the 'X' series." Scratch one. — From NCDXC informants: G3HSR, now serving in Germany and formerly signer of call CAR in the Nicobars, is willing to palaver concerning unreceived CAR WPOs. — Wis APA IKE JWX ODW TYQ WKW WPO YWU YYM ZDP, W2s DEC GVZ MUM, K2s BU KDW QOO, W4s LYV TFB, W5FTP, W6WLY/B, K6s ENX DNH, W8s NOH ROF YIN, W9CFT, W9QVI, DL4ZC, ISWL, NCDXC, NNRC and WGDXC avail you of these whereabouts:

GX3NR, P.O. Box 37, Montevideo, Uruguay. — EA6AW, Box 313, Palma de Mallorca, Balearic Islands. — EL2ES/MM, (QSL to LA30D). — EL2FC/MM (QSL to G3FPZ via RSGB). — ET2FM, J. Meston,

KR6QC, known back in Jersey as K2GRK, is among Okinawa's more versatile ham spirits. In addition to collecting over a thousand QSOs with some 60 countries during his first year on the island, Ski serves as OARC's activities director and handles the KR6 QSL bureau with the XYL's assistance. The KR6QC layout features a Viking I, BC-779 and SP-600 hearing aids, a ground-plane, and a QST-inspired one-element rotary for 15. KR6QC, together with KR6s LJ, PO, RN and RU, also frolic about with 10-meter scooter-mobiles. With the Okinawa storm season at hand you'll often find KR6QC alternating with KR6QW as NCS of the local typhoon-emergency net on 14,150 kc.



Box 25E, Asmara, Eritrea **FY7YE** (QSL via W5JLU) **HK4BD**, Hector Posada T., Apartado Postal 2263, Medellin, Colombia **JA6AA**, Y. Itahashi, 2-47 Sansodori, Fukuoka City, Japan **JZ3PS** (QSL via W7PHO) ex-**KA2CY** (QSL to KA3CY) **KA3CY**, Capt. E. E. Worrell, 849th AC&W Sqdn., Box 11, APO 47, San Francisco, Calif. **KB6BC**, c/o CAA, Canton Island **KB6CA**, c/o CAA, Canton Island **KC6AK** (QSL via KC6UZ) **KC6KG** (QSL via KC6UZ) **KC6RK** (QSL via KC6UZ) **KC6SJ** (QSL via KC6UZ) ex-**KH6ASP/KB6** (QSL to KB6CA) **KTIOZ**, Via 28400, U. S. Legation, Tangier Zone **KTIUZ**, C. W. Cleveland, Box L, Navy 214, FPO, New York, N. Y. **KW6CA**, c/o CAA, Wake Island **KX6BP**, J. T. Lamb, Hq. Det., 7126th AU, APO 187, San Francisco, Calif. **LU6SC**, Box 1, Chemical, La Rioja, Argentina **LZ2KRS**, Box 830, Sofia, Bulgaria **MP4BBZ** (QSL via RSGB) **OD5BO**, Abram Laddi, Box 2559, Beirut, Lebanon **OD5LJ** (QSL to W5DGV) **OH1SU**, W. Suominen, Postbox 107, Turku, Finland **OQ9BL**, Box 95, Astrida, Ruanda-Urundi, Belgian Congo **PY2BOP**, Box 22, São Paulo, Brazil **PY7VBG**, E. de O. Paula, P. O. Box 228, Fortaleza-Ceara, Brazil **PZ1AC** (QSL to PZ1RM) **PZ1AJ** (QSL to PZ1LD) **PZ1AA**, Stevanootstraat 18, Paramaribo, Surinam **SM3YF**, Box 95, Stode, Sweden **SV9WN**, A. McCormack, General Delivery, Iraklion, Crete **UA1BG** (QSL via RSGB) **UA1BU** (QSL via RSGB) **UA4KKC** (QSL via DARC) **UC2AA** (QSL to Box 547, Sofia, Bulgaria) **VK9TW** (QSL via KV4AA) **VP1SH**, P. O. Box 280, Belize, Br. Honduras **VP2LH** (QSL via VP2LA) **VP3AD**, D. A. Daly, 208 Almond St., Georgetown, Br. Guiana **VP3VN**, V. Nascimento, c/o P. O. Mabaruma, Br. Guiana **VP4KL** (QSL via VP4TT) **VP4TM**, c/o Antilles Oil Co., P. O. Box 31, San Fernando, Trinidad, B.W.I. **VP5DC** (QSL via W4NMO) **VP5FH** (QSL to W6HNX) ex-**VP6KL** (VP4KL, QSL via VP4TT) **VP8EL**, Box 182, Port Stanley, Falkland Islands **VQ1JO** (QSL to ZE3JO) **VQ4KPB**, K. P. Bailey, Box 32, Kikuyu, Kenya ex-**VS1BQ-CAR**, Sgt. J. Smith (G3HSR), Sgts. Mess, RAF, Buckeberg, Germany ex-**W2WMV/C9** (QSL to K6AVK) ex-**W4KC/KW6** (QSL to KW6CA) **W7THS/KL7**, R. G. Ehrman, Point Barrow, Alaska **W6WCR/KL7**, S. L. Foster, Point Barrow, Alaska **XE4A** (QSL to W0UQV) **Y1RFP**, Port Vila, New Hebrides **YK1AK** (QSL via YK1DF) **ZB1CH**, C. Holmes, Point de Vue Hotel, Rabat, Malta **ZB2R** (QSL via ZB2I) **ZB2T** (QSL via ZB2I) **ZD6BR**, Box 89, Zomba, Nyasaland **ZD8SC** (ex-VP5SC), Stan Crow, c/o Cable & Wireless Ltd., Ascension Island **ZE2JV**,

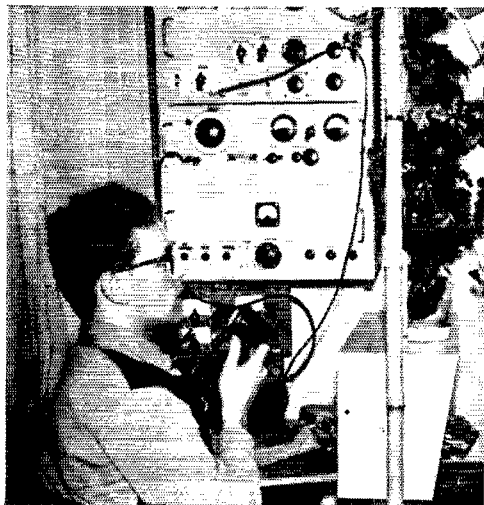
R. G. Cracknell, Box 2208, Salisbury, So. Rhodesia **ZE3JV**, D. C. Hilton, Box 2218, Salisbury, So. Rhodesia **5A2TP**, P. O. Box 372, Tripoli, Libya.

Whence:

Asia — More from BV1US, chief contemporary source of Formosa DXCC credits: "We are assigned spot frequencies in four bands, 14,050 and 21,200 kc. for c.w.; 7060, 14,163, 27,050 and 28,100 kc. for phone. We shall be in there Mondays, Wednesdays, Fridays and either Saturdays or Sundays to push the DX totals up." This from spokesman K2CLA, who is v.p. of the BV1US aggregation, K2M2M ranks as president; W5VHC, secretary-treasurer; and W8UKU, supply officer. "W8UKU got stuck with logistics 'cause he's so good at it. Hi!" K6DV hears that there are "over 5000" local broadcast stations operating inside Red China, plus some 50 SWBC jobs. With all that electronics personnel around it's amazing to hear practically no amateur activity, licit or otherwise, leaking through the bamboo curtain W1WPO notes that W8GZ of Windom fame was AP2M's first U. S. phone QSO Evidently satirizing radio societies who seek publicity by sponsoring DX awards purposely so difficult to obtain that they won't be bothered by entries, JARL's J8AA announces "availability" of 88-JA diplomas. Just collect 88JA8 QSLs for QSOs dating after July, 1952, and you're in. Or you can try for the junior version — 88JA/2 — on only 44 cards. The rules mention no special endorsement for 160 meters, however W2ATJ is intrigued by an SWL who swears he heard a Maldives VS9 calling him on 15 after Bayard threw the switch on a local QSO Popular KA2CY switched locations in favor of KA3CY, Nagoya, where he pops through to the States using a kw., SX-28, Collins and Hammarlund receivers patched onto rotaries for 15 and 20. Ev is ex-W5CTY WGDXC has AC5PN's current DX program as Saturdays and Sundays around 1330-1530 GMT, 14,045 kc. Also, G2MI claims no knowledge of the activities of one AC4LP.

Africa — "I am informing you that I have been granted the call VQ1JO on Zanzibar Island during the period 13th August to 4th September, 1956. . . . I can assure you that I have every intention of contacting as many stations as possible, in the shortest time, and will guarantee 100 per cent QSL upon my return to Southern Rhodesia. Cards will be sent by the QSL bureau of the RSSR (which, incidentally, is myself!)" Mal, old G2SO, will take along the XYL, a British B2 Mark-III transmitter-receiver good for 20 watts of 20 c.w., and hopes to erect a 150-foot wire antenna upon Zanzibar arrival. "Having booked the boat passages, the hotel, etc., I can see no reason why the trip will not take place, and so until then I'll be hoping to see you fellows from VQ1." W2DEC finds that a
(Continued on page 134)

OY7ML, although tucked tightly into a corner of a small Thorshavn dwelling, is the all-band standout among Faeroes Islands DXers. Martin's rig runs 75 watts, his receiver is a German army-surplus item, and the skywires range from long-wire types to ground-planes. OY7ML prefers code work but keeps a 25-watt modulator handy to oblige the phone gang. In the past year over 1500 OY7ML QSLs, 500 to W/K stations, have been dispatched. (Photo via W8DLZ)



XZ2KN proved a most hospitable host when K2CAH visited his Rangoon shack last December. There K2CAH, radio officer aboard S.S. *Exemplar*, was delighted to chat directly with his mother in New York via an XZ2KN-W2BDS 14-Mc. phone contact. Tara Singh receives with that RCA model and transmits with a homemade 80-watter which feeds a 34-foot-high 5-element rotary beam.



Correspondence From Members-

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

ANYWAY, IT'S FREE

1138 North Country Club Drive
Schenectady 9, New York

Editor, *QST*:

The free-lance tactics of W0GYZ (May *QST*) in trying to dump that Hawaii message makes any traffic man shudder. Next time, put it on any traffic net and it will start on the way pronto. Get a net directory, OM, and don't be the subject of ridicule among your office friends.

— Geo. W. Tracy, W2EFU

Route #5
Clarksville, Tenn.

Editor, *QST*:

This article shows several facts which are listed below.

(a) The article was not funny to most ARRL members.
(b) The page could have been used for a good technical article.

(c) If you want to move traffic, go to a net.

(d) Never brag about amateur radio traffic handling in a way to lead people to believe that amateur radio competes with commercial communications.

(e) Get familiar with the National Traffic System and become active in same — help support and make possible your claims.

(f) If you desire to work DX for any reason don't call CQ DX.

— "Slim" Wilson, W4WQT

CONELRAD COMPLIANCE

1333 Wingohocking St.
Philadelphia 40, Pa.

Editor, *QST*:

... Thanks to W1DF (p. 34, Jan. *QST*) for a good, inexpensive and compact monitor and also an interesting experiment with transistor and crystal diode.

— Thomas J. Tourish, WN3DSN

RELAYS

Box 345
Hillburn, N. Y.

Editor, *QST*:

My congrats to E. B. Blett (p. 28, May *QST*) on his excellent article on using surplus relays. I had a number of those little critters that I had salvaged from an SCR-522, and I am glad to see someone print a way to use them.

— Jon E. Avery

TWO FOR ONE

21 Summit Road
Lexington, Mass.

Editor, *QST*:

Following instructions, I built the transistorized, code-practice oscillator as per diagram on page 46 of Feb. *QST*.

It works fine both as a code oscillator and as a one-station broadcast receiver. To bring in WNAC (Boston), all I have to do is place a finger on the metal part of the key.

— Richard P. Cromwell

ENCOURAGED

8136 Wortser Avenue
No. Hollywood, Calif.

Editor, *QST*:

I was very pleased to see that so much interest exists on the subject of our Extra Class license. The various comments on my original letter (*QST*, Feb., '56) indicate a real desire on the part of most amateurs, even those who may be years getting the blue ticket, to have something to shoot for.

The few who took my suggestion for phone on 3600 kc. literally may have misunderstood. I meant that merely as an example of the type of privilege that should be granted to those who earn it.

Another answer was from one who seemed to feel that Extra Class men desired a QRM-free band. Well, who doesn't? However, mark my word, any Extra Class band would not stay QRM-free long. Once the word is out that the ticket has some meaning, the FCC will have their hands full giving the tests.

One more comment, and I'll let the rest of the gang take this matter up and, I hope, keep it going. To the guy who suggested a distinctive call sign, such as the full call, followed by /E. . . . We're not looking for glory. . . . we're just looking for a reason for having the ticket. No reason, unless you call a pretty piece of blue-lettered paper a reason, exists today.

How about it, fellows? Are we going to let this die on the vine, or will we bring some kind of advancement and incentive program back to our commercialized, plug-in hobby?

— Richard B. Blanchard, Jr., W6UYG/QYR

EDITORIAL COMMENT

111 Copeland Street
Rochester, New York

Editor, *QST*:

... I think your two editorials (March and April *QST*) show that you realize at headquarters that we have not up-lifted our hobby by letting down the barrier. We have only increased the interference by a highly transient group of hobbyists that have probably harmed ham radio more than they have helped it. Let's not ever let it get any worse.

— Joe Craggs, W2RLI

REPLIES TO W7ZFY

6322 — 32nd St., N. W.
Washington 15, D. C.

Editor, *QST*:

I would like to augment the letter from W7ZFY (May). First of all, there certainly are not enough questions on the FCC exams about operating. This results in unsavory practices on our DX bands, such as improper calling and zero-beating with rare DX not to mention the guys who simply will not bide their time in a pile-up. . . .

— Frank S. Colligan, W3RYX

Route 1 — Box 1089
Hood River, Oregon

Editor, *QST*:

My apologies to W7ZFY. The FCC exam for General is a little tougher than 2nd class phone now, and a lot tougher than it was 20 years ago. . . .

— Bob Bair, W7FKA

1530 Dupont Drive
Lemon Grove, Calif.

Editor, *QST*:

It has always been my understanding that amateur radio is a privilege granted by the Government to everyone desiring to use it; people in all walks of life. If the FCC took the same attitude as W7ZFY, then about the only people able to enjoy amateur radio would be the boys holding electrical and electronic degrees, and others in the radio field.

Many busy people in other professions and types of work who do not have the time to make an extensive study of radio would be left out in the cold, so to speak. It is a selfish attitude to say the least, and here is hoping the men in the FCC never see it that way.

— W. A. Stevens, K8JZZ

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

COMING YL GET-TOGETHERS

ARRL National Convention, San Francisco, July 6th, 7th, and 8th. You still have time to ride the train or catch a plane to get in on THE amateur radio gathering of the year. Peggy Detsch, W6PCN, and Gertie Cassady, W6FEA, and their committees are all ready to see you thru the best time you've ever had at any convention. Last month's column carried a résumé of the big doings. Plans are still popping too. We (and the word is used literally) will see you there.

Virginia — Bring the family and a full lunch basket to W4HLF's annual picnic for the YLRL 75 meter phone net on August 19th at Skyline Drive, Big Meadows. Write NCS Arlie Hager, W4HLF, Box 479, Orange, Va., for details.

— — — —

REMEMBER the AWTAR July 7th — 10th

— — — —

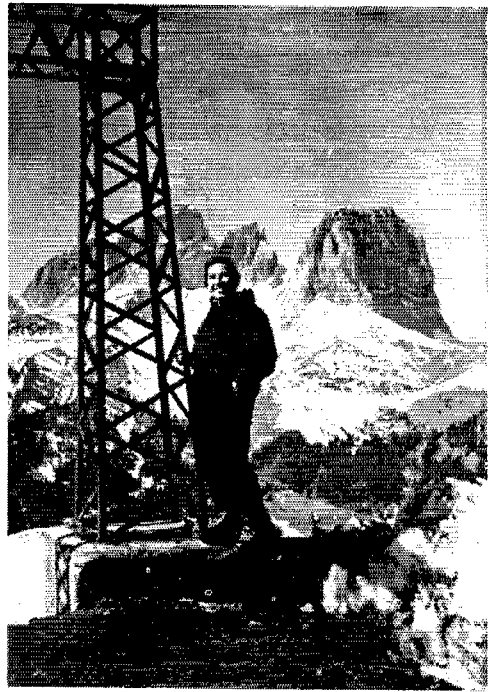
Club Doings

Los Angeles YLRC — Officers for the 1956-57 term are Pres. W6QGK; Vice Pres. W6DXI; Recording Secy. K6EJE; Corresponding Secy. W6WRT; and Treas. W6JMC.

SPARCYLs — New officers are Pres. W4BIL; Vice Pres. WN4EBQ; and Secy.-Treas. W4BAV. YLs who attended the Orlando Hamfest at Rock Springs, Fla. on April 8th were K4DQG, W4s AVA ATV BAV BIL BWR CWV HRC

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

The 50 YLs and 185 XYLs who attended the 1956 Dayton Hamvention enjoyed a well-organized round of activities planned by Women's Chairman Ruby Rhude, W8MDK and Assistant Chairman Betty Hall, WN8AXA. Interest in the experimental YL Forum was so high that a repeat next year has been promised. The forum panel members shown on the left are Mary Meyer, W9RUJ; Ruth Rickett, W8LCY, YLRL Eighth District Chairman; WN8AXA, Moderator; W8MDK, Mistress of Ceremonies; Esther Stuewe, W8ATB; Helen Smith, W8SPU; and Jeanette Ebur, W3QPQ. "Unusual Opportunity for Public Service" was the keynote talk by W3QPQ. W8ATB summarized her participation in last year's Flint tornado disaster. W8SPU discussed two meter civil defense operation, and W9RUJ commented on a variety of her amateur radio experiences. Chatting about matters YL over a cup of coffee in the photo at right are hostesses Thora Duckwitz and Kay Weigert and Dolores Senfeld, W8TXL, Butch Davidson, W8MVA, and W8ATB. Other highlights of the women's program included a luncheon, social hours, and the showing of a collection of rare lace by guest speaker Mrs. John Groff of Dayton.



Here's a refreshing picture to look at in the summertime or anytime, for that matter. Gracing the beautiful Alpine terrain is Italian YL, H6CWK. Elena uses a TB550-D on 80, 40, 20, 15 and 10 at her home in Trento. (Photo via W4TFB and W9BRD.)

PIK SDI TDK UPT WPD ZVW KN4s EAC ELJ ISB and W8ATB. W4ZVW. Ellie, hosted an informal breakfast at her Orlando home for visiting YLs. The club's Florida net has moved to 7230 kc., Monday 8:00 A.M. EST. W4BWR is NCS, with W4s BIL and CWV alternates.

LARK — Publicity Chairman W9SYX, Peggy, reminds us of the certificate offered to all amateurs who work ten members of the Klub. A list of the ten contacts, with the



time and band worked, should be sent to Gladys Jones, W9MYC, 4232 Hampton Ave., Western Springs, Ill.

YLRL — The new call and QTH of Lou Littlefield, formerly W1NCW, Custodian of the YL/WAS certificate is K4HEF, P. O. Box 5098 Ft. Lauderdale, Florida.

We regret to record the passing on May 3rd of Alice Bourke, W9DXX, of Homewood, Illinois. One of our earliest YL v.h.f. and DX operators, Alice had written a while ago that her enthusiasm for amateur radio had never waned but increased with each day.

Keeping Up With The Girls

During the summer months W6SXG, Ruth, takes over for her OM W6OWP with scheduled ARRL Code Proficiency transmissions. . . . It's now 210 countries confirmed for W6UHA, Maxine. . . . W4DEF, Beulah, is putting her new kw. rig to work on 20 s.s.b. . . . W7SYF, Mary, is a new ORS appointee. . . . From W0COK comes word of the marriage in February of CO2ZB to TG9AZ. . . . Attending the Eureka Springs, Arkansas Hamfest in April were K5BNQ, KN5s AVS DFB DKV DOT and W0s JDB and OMM. . . . W8HUX, Marvel, and W4HLF, Arlie, now have WAS-YL awards to add to their certificate collections. . . . W7s HHH SYF and ULK are conducting code training classes in their respective homes. . . . At the wedding of K6CYZ, Sister Patrice, to Brother Jerome in March, Los Angeles YLRC members K6EIA and W0s KER QQG and UHA presented the couple with a gift from the club. . . . W8OSD, Virginia, has finished assembling a vacuum tube voltmeter and is now working on a scope for herself. . . . K6AWP, Kathie, is a member of the U. S. Coast Guard Auxiliary.

1956 YL-OM Contest Results

As one enthusiastic participant summarizes the YL-OM contests, "They get better and better!" We might add they get bigger and bigger too. For this year's seventh annual affair YLRL Vice President W9YBC checked a record 348 logs (124 YL-224 OM).

Along with the logs, Gloria received the following OM observations:

- W9LNQ — "I was pleasantly surprised at the very efficient operating of the YLs."
 W1QMM — "Operating skill and ethics were outstanding. Real fun. Let's do it twice a year."
 K2DSW — "Brought up my YLCC about 60 notches so that I'm now up to about 175."
 K6OEM — "Wish I were a YL sometimes."

and YL comments:

- W4CWV/LKM — "I got every state but Mississippi."
 W6WSV — "We are certainly getting an international flavor to our contest. Heard W2MWY work YS10 and a ZL giving out his No. 6."



WISCS

W4HLF — "The OMs were just wonderful. Wish I could QSO each one again."

VE3AJR — "I heartily recommend the YL-OM contest, especially to any gal who is in need of a morale-booster. It is the one time the OMs stand in line waiting to talk to you, and it is a better cure for a sagging ego than the purchase of a new bonnet."

On to see how many gals boosted their morale and how many OMs stood in line. Here are the top winners. Congratulations to all.

YL

The YL aggregate winner (phone and c.w. scores combined) is Arlie Hager, W4HLF, with a score of 42,816.

First Place Phone	WISCS	30,622
Second Place Phone	K5BNQ	29,050
Third Place Phone	W4CWV/LKM	27,710
First Place C.W.	W4BLR	17,272
Second Place C.W.	W3YTM	15,000
Third Place C.W.	VE3AJR	14,082

OM

The OM aggregate winner is Robert Panek, K2DSW, with a score of 3,351.

First Place Phone	W9CMC	1,715
Second Place Phone	W8AJW (tie)	1,462
	W6FGJ	1,462
Third Place Phone	W6JVA	1,100
First Place C.W.	K2KDW	1,750
Second Place C.W.	W3MAX	1,725
Third Place C.W.	W9BZW	1,687
	W9GOC/SZR	1,687

SCORES

YL PHONE				W2OWL	142	19	6*	—	W5EGD	8,872	169	42*	17,141
				W3MAX/OQF	14,965	285	42*	—	W5WUX	6,550	131	40*	—
				W3VYN	12,350	260	38*	19,743	W6JZA	23,456	417	45*	—
Call	No.	Sections	Aggre-	W3MDJ	10,500	210	50	—	W6QCX	21,902	468	47*	—
	Score	Contacts	gate	W3YTM	7,650	225	34	22,650	K6EXQ	13,781	315	35*	—
				W3UTR	3,375	90	30*	8,092	K6HVC	11,015	258	34*	13,415
				W3MSU	96	11	7*	—	W6EHA	2,420	121	16*	3,005
				W4CWV/LKM	27,710	326	68*	—	W6WRT	1,460	73	16*	—
WISCS	30,622	502	61	—	—	—	—	W6QMO	1,312	150	7*	4,425	
WICEW	4,060	112	29*	—	—	—	—	W7BHZ	12,201	227	43*	—	
W1YNI	2,340	74	28*	7,152	—	—	—	W7MUT	3,607	111	26*	—	
W1RLQ	1,820	104	14*	—	—	—	—	W7CPQ	2,730	91	30	—	
W1VXC	1,211	57	17*	5,790	—	—	—	W8MBI	857	49	14*	1,107	
W1QON	975	60	13*	—	—	—	—	W8KTLZ	99	11	9	2,341	
W1VYH	224	28	8	—	—	—	—						
K2LTN	1,569	78	18*	—	—	—	—						
K2GCD	1,331	71	15*	—	—	—	—						
K2CUQ	617	38	13*	—	—	—	—						

* Low power multiplier used. A number of logs submitted for confirmation only are not shown.

W9UON	5,010	167	24*	7,530	W9LOY	926	39	19*	W8AJW	1,462	45	26*	1,722
W9LOY	3,075	123	20*	4,001	W9SYX	680	32	17*	W8UVD	468	25	15*	1,099
K9AMD	3,045	84	29*	---	W9USR	315	21	12*	W8SVL/6	55	11	4*	70
W9KSZ	860	86	8*	---	K9BFS	13,005	204	51*	W8SDD	15	4	3*	867
W9LDK	470	47	8*	---	W9KJZ	6,191	127	39*	W8UPH	7	3	2*	332
W9SYX	143	23	5*	823	W9ZWL	78	9	7*	W8RAB	1	1	1*	144
K9ACC	8,815	215	41	---	KL7AZI	1,080	36	24*	W9CMC	1,715	49	28*	---
W9SZH	8,251	223	37	---	KP4ZV	4,440	120	37	W9OMM	783	23	19*	---
K9BFS	8,027	169	38*	21,032	KZ5KA	4,320	96	36*	W9TKR	761	29	21*	2,141
W9VE	2,100	70	24*	---	VE3AJR	14,082	262	43*	W9SZR	697	31	18*	---
KG4AC	10,692	243	44	---	VE5DZ	1,534	59	26	W9VOD	297	17	14*	---
KL7ALZ	525	60	7*	---					W9GIL	212	17	10*	232
KP4ZV	5,293	121	35*	9,733					W9UTL	112	10	9*	123
KZ4VR	9,030	210	43	---					W9FTM	100	10	8*	716

OM PHONE

YL C. W.

W1RLQ	11,300	226	40*	
W1YYR	7,315	133	44*	
W1YPH	5,760	144	32*	
W1WPX	4,720	118	32*	
W1VXC	4,578	111	33*	
W1YNI	4,312	115	30*	
W1BBS	343	25	11*	
W2EBW	5,580	180	31	
W2MWY	4,488	102	44	
W2DXD	3,000	100	24*	
K2DSL	1,137	70	13*	
K2INQ	280	20	14	
W3YTM	15,000	300	50	
W3QPJ	9,897	214	37*	
W3VNN	7,393	169	35*	
W3UTR	4,717	102	37*	
W3TSC	3,936	123	32	
W3NHI	368	23	16	
W4BLR	17,272	282	49*	
W4HLF	15,936	209	61*	
W4KYI	11,160	186	48*	
W4RLG	9,327	182	41*	
W4EJQ	9,045	201	36*	
W4TLE	100	10	8*	
W4CCN	5	2	2*	
K5ADQ	11,428	223	41*	
W5EGD	8,268	147	45*	
W5KEC	6,555	138	38*	
W6QMO	3,112	83	30*	
W6PCA	2,963	79	30*	
K6HVC	2,400	64	30*	
K6BUS	1,272	53	24	
W6EHA	585	36	13*	
W6WSV	123	11	9*	
W7COX	6,732	153	44	
W7PTX	2,343	75	25*	
W7PUV	281	25	9*	
W8QOQ	13,340	232	46*	
W8UAP	6,355	164	31*	
W8KLZ	2,242	69	26*	
W8MBI	250	20	10*	
W9JUI	12,431	255	39*	
W9WZL	12,090	248	39*	
W9MLE	3,465	105	33	
W9UON	2,520	84	24*	
W9MYC	1,211	51	19*	

W1BNS	1,080	36	21*	
W1ULS	573	27	17*	
W1BFB	560	28	20	
W1FEA	96	11	7*	636
W1LQ	87	10	7*	567
W1OPZ	56	9	5*	180
K2DSW	1,292	47	22*	3,351
W2COB	945	36	21*	---
W2MCO	712	30	19*	747
K2PIC	637	34	15*	795
K2HXR	577	33	14*	1,522
W2FLD	500	25	16*	1,350
K2OPJ	375	25	12*	937
K2DEM	302	22	11*	370
K2MTL	261	19	11*	---
K2PPB	100	10	8*	---
W2BVN	96	11	7*	535
W3DDV	701	33	17*	1,226
W3VWJ	551	29	19	---
W3ZHQ	472	27	14*	1,497
W3YLL	468	25	15*	1,211
W3MDO	228	19	12	1,404
W3QLW	191	17	9*	641
W3OP	135	12	9*	935
W3UZS/4	78	9	7*	---
W3RRI	30	6	5	39
W3AXT	24	6	4	875
K4ARP	697	31	18*	1,237
W4IA	600	30	16	993
W4JUJ	585	26	18*	1,795
W4CHK	510	24	17*	1,533
W4CVO	412	22	15*	---
W4WSF	393	21	15*	796
W4DKK	350	20	14*	---
W4WRH	332	19	14*	1,146
W4WZT	64	8	8	---
W5LYM	920	40	23	---
W5ZWR	90	9	8	577
W6FGJ	1,462	45	26*	---
W6JVA	1,100	40	22*	2,278
K6DAC	945	36	21*	---
W6PAL	888	29	19*	---
W6LDY	308	22	14	---
W6DAC	212	17	10*	962
K6HBA	210	21	8*	---
K6OHM	60	8	6*	150
W6KNS	40	8	4*	---
W7SEK	787	30	21*	---
W7KOL	292	18	13*	---
W7YNO/7	260	16	13*	---

OM. C. W.

W1NLM	800	40	20	
W1AJZ	630	28	18*	
W1FEA	540	27	16*	
W1RFC	520	26	16*	
W1LQ	480	24	16*	
W1QMM	475	25	19	
W1JYH	400	25	16	
W1WMH	270	18	12*	
W1OPZ	123	11	9*	
K2DSW	2,058	61	27*	
K2KDW	1,750	50	28*	
W2SAW	1,352	52	26	
K2HXR	945	36	21*	
K2GTC	855	38	18*	
W2FLD	850	34	20*	
W2NIY	783	33	19*	
W2EMW	648	36	18	
K2OPJ	562	30	15*	
W2ICO	475	25	19	
K2EWR	472	27	14*	
K2JAE	450	25	18	
W2BVN	438	27	13*	
W2LRO	270	18	12	
K2KFJ	220	16	11*	
K2INV/VE3	187	15	10*	
K2PIC	157	14	9*	
W2CPA	140	14	8*	
K2CKW	80	8	8*	
K2DEM	68	23	12*	
W2MCO	35	7	4*	
K2JDD	15	4	3*	
W3MAX	1,725	60	23*	
W3ARK	1,530	51	24*	

W9CMC

W3YTM



W3MDO	1,176	49	24	W6DAC	750	30	20*	W9RQP	807	34	19*
W3ZHQ	1,025	41	20*	W6CLZ	110	11	8*	K9BJV/W0HAW	735	28	21*
W3CIN	900	36	20*	W6ACL	101	9	9*	W9KLD	725	29	20*
W3AXT	851	37	23	K6OHM	90	9	8*	W9ITM	616	29	17*
W3OP	800	32	20*					W9NH	520	26	20
W3YLL	742	33	18*	W7VIU/7	540	27	16*	W9ZA	488	23	17*
W3YUW	637	30	17*	W7CJZ	456	24	19	W9CHD	420	21	16*
W3BIP	580	29	16*	W7FZB	11	3	3*	W9CNF	308	19	13*
W3DDV	525	28	15*	W8AQ	920	40	23	W9YYG	243	15	13*
W3QLW	450	24	15*	W8SDD	852	31	22*	W9RKP	231	21	11
W3KQD	406	25	13*	W8UMP	675	30	18*	W9YDQ	96	11	7*
W3ZSX	345	23	12*	W8UVD	630	28	18*	W9GIL	20	4	4*
W3WEK	300	20	12*	W8UPH	325	20	13*	W9UTL	11	3	3*
W3SIJ	275	20	11*	W8KPL	323	19	17	W9YJM	1,531	49	25*
W3RYV	123	11	9*	W8AJW	260	16	13*	W9GAX	1,045	38	22*
W3RRI	9	3	3	W8EKK	210	15	14	W9ZBL	1,025	41	20*
W4JUJ	1,210	44	22*	W8YPT	192	14	11*	W9TUB	875	35	20*
W4CHK	1,023	39	21*	W8RAB	143	13	11	W9YRY	531	25	17*
W4ZQK	900	36	20*	W8BDO	112	10	9*	W9QWS	488	23	17*
W4WRH	813	31	21*	W8JWX	31	5	5*	W9SOG	488	23	17*
K4ARP	540	27	16*	W8SVL/6	15	4	3*	K9AXH	297	17	14*
W4WSF	402	23	14*	W8BMX	11	3	3*	W9AIN	110	11	8*
W4IA	393	21	15*								
W4HFU	356	19	15*	W9BZW	1,687	54	25*	CT1CO	56	8	7
W4ZPR	100	10	8*	W9GOC/SZR	1,687	54	25*	VE2CP	373	23	13*
W5ZWR	487	26	15*	W9TKR	1,380	46	24*	VE2IL	123	11	9*
W5GIF	52	7	6*	W9LNQ	1,207	42	23*	VE3AVS	320	20	16
W6JVA	1,178	41	23*	W9KA	1,050	40	21*	VE6SX	292	18	13*
				W9CXY	1,017	37	22*	VO6N	35	7	5

Awards

Aggregate YL winner W4HLF retires the large silver cup (WIBFT award), Arlie having now won it for three successive years. Aggregate OM winner K2DSW has been awarded a new silver cup for permanent possession. Gold cups have been awarded to W1SCS, K5BNQ, W4BLR, W9CMC, K2KDW, and W3MAX. Third time second place OM winner W8AJW retires a gold cup. Small silver cups have been awarded to W6FGJ and W3YTM. Seventy-three certificates have been issued to top winners and highest phone and c.w. scorers in each district.

YLRL Vice President W9YBC announces that the club would like to award all trophies on a permanent basis instead of on the progressive basis heretofore in effect. A new plan calls for smaller cups for first place c.w. and phone for both the YL and OM sections of the contest and for eventual retirement of the aggregate and second place cups.

My First YL-OM Contest

It really isn't possible to put down on paper an adequate account of the pleasure I derived from my very first YL-OM Contest. To say that I enjoyed it is the prize understatement of the year.

For weeks I looked forward to the arrival of the contest week-end. I had forewarned all friends and relatives not to come to see us at that particular time lest they think me rude and anti-social. The day before the fateful Saturday I feverishly cleaned the house, baked, and prepared foods which I knew the OM and the junior ops could manage at mealtime without disturbing me. That department was under control.

I had a few anxious moments just before the contest hour arrived, as a resistor in the final of the transmitter decided to go south. The OM managed to get that repaired in the nick of time, and I entered the skirmish at zero hour in the midst of the heavily QRMD 20-meter band. Three hours of digging OMs out of that mess was all my poor ear drums could stand without rest, so I skooted down to the 75-meter band. There I remained for the rest of the afternoon and throughout the night.

At 5:27 A.M. the grind proved too much for me, and I fell exhausted on the divan in the living room, where I caught a few winks until 7:55, at which time I fired up the rig on 20. The pickings there proved slim, so I retired to 75 for a couple of good hours.

A hurried peek at 15 meters told me the band was open, so at 10:00 A.M. I moved up there. Then the fun began. I got calls faster than I could answer them, and the needed multipliers started falling in line.

The biggest thrill of the whole contest came when I was frantically trying to sort out an OM's call from a mass of heterodynes. I was trying to make a W8 out of him when it finally dawned on me that he was saying GM8-Scotland. I nearly fell off my chair but managed to recuperate sufficiently to make the necessary exchange with a few more comments, doubtless incoherent to him. In rare state, I gave the same number to three consecutive stations. What a calm, cool, collected DX operator I am!

By then my voice was worse for the wear. For two weeks I had been fighting off a throat irritation. This endurance contest really aggravated my condition, but giving up was out of the question. I held on with the tenacity of a bulldog. Fortunately, the 15-meter band and my vocal chords both held out until 8:47 P.M.

A brief visit on 20 netted only two contacts, so back to 75 I went. However, I lost the race with my voice and the clock, for my voice left me completely, and the curfew sounded before I managed to scrape up my last three evasive states — North Dakota, South Dakota, and Wyoming.

The final tally — 415 stations, 56 sections, and one completely exhausted, voiceless gal. Despite my mute, listless state I felt a sense of deep satisfaction. It had been a strenuous grind, but I had thoroughly enjoyed every minute of it.

The finishing touch to the contest came a week later. The GM8 — bless his heart — QSLed. Now, my most prized QSL card is a wonderful souvenir and a reminder of what a wonderful time I had in my first YL-OM contest.

—Doris I. Anderson, K5BNQ

P.S. I did not enter the c.w. portion of the contest. The OM vetoed that. He said that I had made myself sick on the phone portion (which indeed I had), and he was not going to have me beating my brains out in a c.w. contest. I'll be in there next year, though, I betcha!

Preview—1956 ARRL DX Contest

High C.W. Scores

MORE BAND OPENINGS, more countries, more contacts, higher multipliers, higher scores — why even the so-called golden years of 1947-1950 were *never* like this! Logs from upwards of 90 countries mirror scores of a height previously only dreamed of. Better conditions plus more DX added up to staggering tallies in the U. S. and Canada too; 17 single-op and four multi-operator totals far surpass any W/VE efforts in the nine preceding postwar Competitions. Gad, look at the W6s! You can derive some fascinating comparisons of your own from the *claimed* scores, multipliers and QSO figures below:

Single Operator

W3DGM.....	771,840	320	804
W3LOB.....	752,247	333	761
W4CEN.....	699,720	343	680
W4KVX.....	692,874	329	702
W3MSK.....	691,650	318	725
W2WSZ.....	684,200	311	734
W3BVN.....	681,090	311	730
W2HJR1.....	661,896	317	696
W3JTK.....	595,084	306	648
W6AM*.....	586,677	307	637
W9IOP.....	511,840	280	610
W6GAL/7.....	487,720	274	594
W3EVL.....	487,613	287	567
W9FJB.....	465,908	269	578
W4OM.....	463,550	265	606
W8FGX.....	458,052	266	574
W3GES.....	445,824	258	576
W6ITA*.....	435,120	259	560
W6TTF.....	420,750	255	500
W4KFC.....	404,730	270	501
W9LNM.....	390,780	260	501
W9HUZ.....	371,952	246	504
W9APY/5.....	351,900	230	510
W2AIW.....	348,867	219	531
W6BPD.....	326,268	228	477
W1BIH.....	313,110	213	490
W1AXA.....	311,022	222	467
W4DQH.....	306,896	226	454
W4UXI.....	306,450	225	444
W4LZF.....	297,000	225	450
W9ABA.....	295,611	211	467
W6PYH.....	285,633	213	447
W6FSJ.....	281,610	210	447
W6FOZ/6.....	276,135	205	449
W9GRV.....	274,722	218	422
W2JT.....	270,630	194	465
W6VUP.....	264,576	212	416
W5CKY.....	262,080	208	420
W4BGO.....	261,579	223	391
K2DCA.....	261,356	223	392
W9GDH.....	259,896	196	442
W6KEV.....	258,795	213	405
W6LDD.....	251,006	194	403
W8UPN.....	250,308	204	409
W60YD.....	248,811	197	421
W6SWG.....	247,104	192	429
W3MFFJ.....	240,660	191	420
W1DLC.....	237,820	188	423
W8EY.....	235,128	202	388
W5GEL.....	231,240	205	376
VE4RO.....	225,990	186	405
W1AW4.....	212,940	195	364
W4MZF.....	212,493	193	367
W8RQ.....	210,924	189	372
W0DAB.....	209,808	198	372
W8DUS.....	207,968	184	378
W4LQN.....	206,973	183	377
W2EWD.....	204,522	178	383

W1JYH.....	200,220	188	355
W1ODW.....	199,406	179	372
W3EKN.....	198,975	175	380
W8ZJM.....	198,831	191	347
W1TX.....	197,904	186	356
W9JJP.....	195,978	178	367
W9VUL.....	194,805	185	351
W0NW.....	194,580	180	361
W5KC.....	192,096	174	368
W5DF.....	192,060	194	330
W2GGL.....	190,473	173	367
W6SRF.....	183,227	169	361
W1CJH.....	180,564	164	367
W6EHV.....	180,009	177	339
W6WB.....	179,595	195	307
W2AGW.....	179,247	149	401
W6SR.....	176,295	161	365
W3ZAL.....	172,044	177	324
W1KPF.....	171,150	163	350
W4PNK.....	170,940	154	370
W5ZD.....	168,642	162	347
W2EQS.....	168,388	172	327
W2ESO.....	166,496	172	324
W1ZDP.....	158,576	176	303
W1VG.....	158,099	157	337
K2QQO.....	156,519	153	341
W8YN.....	154,980	164	315
W1ME.....	154,008	184	279
W6LRU.....	152,624	162	314
W4LVV.....	152,133	157	324
W3IYE.....	151,662	161	314
W2TE.....	151,364	158	320
W7PQE.....	149,575	155	323
W3EIS.....	149,565	169	295
W2SAW.....	147,315	161	305
W1AB.....	141,900	172	275
W8PUD.....	141,375	145	327
W4MGD.....	140,896	148	318
W6JWTF.....	139,728	142	328
W2ITW.....	139,464	149	312
W1FZ.....	138,033	147	313
W6IDY.....	136,155	145	313
W9UNQ.....	134,991	159	283
W6CUQ.....	134,696	149	302
W3ADZ.....	134,532	148	303
W3CGS.....	132,561	143	309
W2HSZ.....	131,595	155	288
W7DAA.....	130,521	139	313
W9ERU.....	129,438	141	306
W8OCF.....	126,270	138	305
W2TQC.....	125,504	148	284
W8CEG.....	125,160	149	280
W2GSN.....	124,488	133	312
W6ATO.....	123,939	141	293
VE2YA.....	123,662	146	283
W9GIL.....	123,120	152	270
W1NI.....	123,088	157	262
W3EQA.....	122,430	159	261
W2CWK.....	122,157	147	277
W6ALQ.....	121,800	140	290

W3CPB.....	120,360	136	295
W6AGO.....	120,324	148	271
W5YJS.....	120,105	157	255
W4BBP.....	118,818	138	287
W9NIR.....	117,300	150	261
W0QDF.....	117,180	140	279
W0AZT.....	115,448	142	271
W9FJY.....	114,660	147	260
W2HO.....	111,150	130	285
W2AZS.....	108,882	138	263
W6KSM.....	106,896	136	262
W2UWD.....	106,860	137	260
W6MUB.....	106,038	137	258
W3ZAO.....	104,784	148	236
W1NMP.....	103,806	146	237
W2CGJ.....	100,674	141	238

XE2OK.....	400,158	94	1420
VP3YG.....	324,496	68	1595
P7YAN.....	314,163	67	1563
KP4JE.....	295,218	77	1272
CE3AG.....	285,012	78	1218
HK3FC.....	277,648	74	1253
PA9UN.....	263,340	66	1354
DL4ZC.....	235,578	71	1106
VK2GW.....	234,816	64	1223
HB9NL.....	234,240	64	1221
P2A2V.....	230,016	64	1198
VP1SD*.....	226,215	55	1371
KT1UX.....	221,055	65	1149
LU8AE.....	223,713	67	1113
KP4KD.....	210,924	62	1134
EA8BF.....	204,534	66	1033
OK1IH.....	195,286	58	1125
P2AJJ.....	191,394	62	1029
ZL1MQ.....	185,544	72	859
KR0LJ.....	166,488	56	991
DJ1BZ.....	165,999	53	1044
G5R1.....	163,392	64	851
ZB1AY.....	160,512	64	836
FA9RZ.....	144,144	56	858
EA4ED.....	143,364	52	919
EA1AB.....	136,782	51	894
ZP9AY.....	136,706	58	792
DL1JW.....	131,275	59	754
JA3AF.....	126,100	50	841
F9MS.....	125,620	55	763
E15C.....	125,595	45	1005
JA3AB.....	121,338	54	765
CT1CO.....	120,816	48	850
F8VJ.....	119,474	62	646
GW5SL.....	110,694	57	648
ZS5MP.....	109,272	58	628
ZK1BS.....	108,855	59	623
E19J.....	105,960	60	622
OK3DG.....	105,192	54	653
G2QT.....	101,807	57	598
T1BNU.....	101,664	48	711
OZ1W.....	100,271	59	639

Multiple Operator

W3ECR.....	827,676	332	331
W6RW.....	796,950	330	805
W6DFY.....	781,860	332	785
W6EEK.....	551,412	259	636
W9AVJ.....	430,458	259	554
W3GHM.....	423,612	246	574
W4KXV.....	369,255	239	515
W6GTT.....	359,352	248	483
W1ICP.....	336,384	219	512
W3KT.....	237,600	198	400
W0RSL.....	217,140	188	385
W1MX.....	153,272	161	320
W3KFK.....	138,600	140	330
W3VOS.....	138,538	162	283
W6BAX.....	115,866	123	314
W3GHD.....	115,000	125	312
W4NPT.....	111,381	137	271
K6BFC.....	102,570	130	263

Single Operator

KV4AA.....	1,028,518	106	3235
XE1A.....	966,048	116	2776
KH6LJ.....	909,792	104	2916
KP4DH.....	780,828	93	2512
VP9BM.....	597,114	98	2053
KP4DV.....	575,652	89	2196
KH6MG.....	567,336	88	2149
KH6PM.....	493,554	86	1913
KP4ZW.....	487,562	82	1897

Multiple Operator

KH6AYG.....	682,560	90	2526
XE2NF.....	531,081	89	2174
KX3AF.....	178,296	57	1046
JA1KF.....	166,992	56	1025

* W3GRF, opr. 2; W6YMD, opr. 3; W6IBD, opr. 4; W1WPR, opr. 5; W8DJN, opr. 6; W3VKD, opr.

That's believed to be a reasonably accurate picture of the global skirmish. Of course, some foreign c.w. men who were knocking off the W/VE gang by the hundreds haven't yet been heard from and their submissions may occasion some juggling of the above. Again, it must be remembered that the standings are based on unchecked reports. During the intensive checking program, adjustments will cause some scores to be raised, others lowered. Having strayed from the straight and narrow, a few entrants will wind up — *sob!* — among the disqualified. But with logs from many strange-sounding prefixes gracing the contest desk as we write, the final results are certainly worth a patient QRX! Watch *QST* for them. While you're waiting, flip to page 75 to espy a real *whopper* of a DXCC Awards list — one which already echoes the DX heyday of last February and March.



Hints and Kinks

For the Experimenter



COIL SHIELDING HINTS

THE aluminum containers used for packing 20- and 36-exposure 35-mm film make excellent shields for miniature plug-in coils. The hump in the screw cap can be pressed flat with any blunt instrument. Attach this cap to the chassis along with the coil socket. The aluminum cover may then be screwed in place over the coil making a solid installation, both electrically and mechanically. The appearance of the assembly leaves nothing to be desired.

If you are not lucky enough to have a spare packing can or two on hand, you may be able to secure a small supply from a local film concern.

— Stanley P. Guth, W7KGF

— — — —

Some of the more expensive cigars come in aluminum humidors which, when cut down to size, make fine shields for small slug-tuned inductors. The removable cap for the case is drilled or punched at the center so that it may be fastened to the chassis along with the coil. A hole should be placed in the top of the shield so that the coil may be tuned after the shield is mounted in place.

— Ernest A. Coons, W1JLN

HOMEMADE WIRE STRIPPER

AN OLD hacksaw blade, two washers, a machine screw and a nut are the only parts needed for making the simple wire stripper shown in Fig. 1.

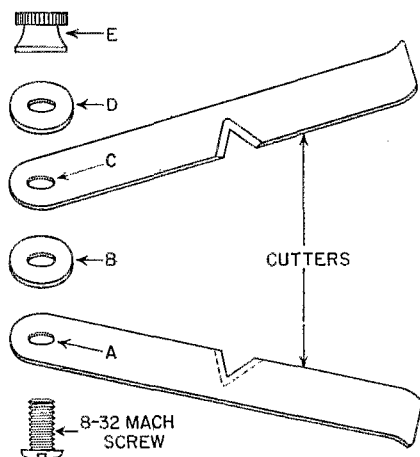


Fig. 1 — Sketch of the homemade wire stripper. The cutters are made from an old hacksaw blade. B and D are No. 8 flat washers. A, C and E are referred to in the text.

Length of the stripper cutters may suit individual taste — anything from half the length of a hacksaw blade down to one inch or so. A miniature model with 1-inch cutters is a handy tool to carry in one's pocket.

The exploded sketch of the stripper shows the various components arranged in the order of assembly. The machine screw passes through A, B, C and D and is locked in place by E. The nut illustrated is a knurled terminal removed from a dead dry cell. In the final assembly the lead end of the machine screw is soldered to the top side of the locking nut.

The cutter members are prepared with the aid of a vise, a grinding wheel and a half-round file. The blade may be cut into sections of the desired length merely by clamping it in the vise and then bending. One edge of the file is used to cut the V-shaped cutting notches. The grinding wheel is used to remove the teeth, bevel the outside edges of the cutting slots and smooth off the open ends of the cutters. The holes at the ends of the cutters are the ones already found in the hacksaw blade. Any attempt to drill new holes with an ordinary drill will be most unsuccessful.

It is not necessary to round the ends of the cutters outward as shown. However, this finishing touch may be added by applying heat and then bending with the aid of the vise.

— Billy E. Allen

MODIFYING UNDERSIZE SURPLUS PHONE JACKS

UNFORTUNATELY, many of the inexpensive surplus phone jacks have too small a bore to accommodate a standard size phone plug. An easy way to convert these cheap but undersize jacks into useful equipment is to mount them firmly in an old chassis and then redrill the bore with a $\frac{1}{4}$ -inch drill. After this simple operation, behold, a standard jack!

— Rev. Michael Windolph, W9NEL

USE FOR DISCARDED VOLTAGE REGULATORS

AMATEURS should not overlook scrapped auto voltage regulators as a source of prewound inductors. Each regulator has two or three inductors wound with No. 10, 12, or 14 wire which may be removed intact with a little care. Such coils may be put to good use in many ham applications. Parasitic suppression circuits and v.h.f. tanks are only two of the likely spots where these ready-made jobs will come in handy.

— Otto Woolley, W0SGG

PLASTIC DUST COVERS FOR HAM USE

THE Seal-Sac Co. of Fall River, Mass., manufactures a plastic cover measuring 10 inches wide, 20 inches long and 12 inches high that makes an ideal dust cover for receivers and other pieces of ham gear. This particular model sells for approximately \$3.00 at the local department stores. The Seal-Sac brand appears to be of better quality than several other makes readily available.

— Harry O. Jones

SPARE TUBE STORAGE

TO PREVENT those embarrassing hours of silence due to tube failures, almost every ham, at one time or another, makes some attempt to keep spare tubes on hand; some even striving to have on hand, at all times, a tested spare for each socket. These attempts usually run afoul of storage and inventory problems, so that a tube failure still results in a mad scramble for a spare.

One happy solution to this problem is to store the tested spare tubes in racks, mounted on the

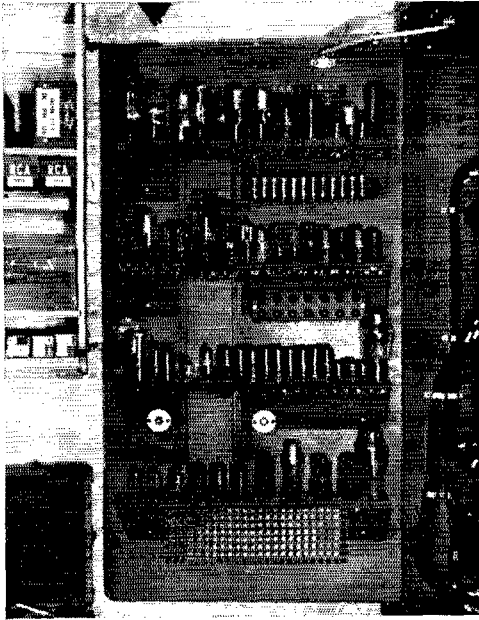


Fig. 2 — Racks for spare tubes, spare fuses, and indicator lights mounted on rear door of rack cabinet. Two tube pin straighteners are also permanently mounted here to insure availability.

back door of the rack cabinet, as shown in Fig. 2. The racks are cut from chassis bases 17 inches long and 3 inches deep, drilled for the requisite sockets, and then painted with crackle enamel to match the rack cabinet.

After sockets are inserted in the proper holes, the racks are mounted on the rack cabinet door at the approximate level of the chassis for which they hold the spare tubes, and the tubes are inserted. Small racks for spare indicator lamps and fuses are also mounted on the cabinet door, as are

straighteners for tube pins, so that they are always available when needed.

By marking each socket with the designation of the tube which it should hold, inventory is a matter of seconds, as removal of a tube immediately exposes the number of the tube to put on the want list.

— Ronald L. Ives

CORRUGATED CARDBOARD STORAGE RACK

HERE is an idea which keeps resistors and capacitors from being lost. It also comes in very handy when doing construction work.

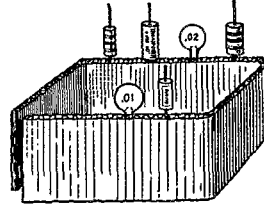


Fig. 3 — A handy storage rack for capacitors, resistors and other small components having pigtail leads.

The sketch, Fig. 3, is self-explanatory. A piece of corrugated cardboard is bent into a square with the corrugated edge up. The wire leads on the resistors and capacitors are then stuck into the corrugations to hold the parts in place.

— Bob Ellis

USING REYNOLDS "DO-IT-YOURSELF" ALUMINUM FOR SHIELDING

THE Reynolds do-it-yourself aluminum products are now available from many hardware stores. Most of the items are relatively inexpensive and some of them are ideally suited to ham-type shielding projects. Nice thing about shopping for the metal is that it is stored in "open-for-inspection" display racks — right where you can examine each piece or shape for its adaptability to a particular job. Here are three suggestions on how to use the material for shielding transmitters.

— Ed.

One form of extruded aluminum comes in five- and six-foot lengths. It is designed for those hardy souls who wish to construct their own storm sash. The strips have a groove nearly $\frac{1}{4}$ -inch deep which is intended for holding glass in place. Strips of this metal can be used for holding flat shielding plates at such places as the rear of a cabinet, the top of a box, etc.

This type of strip may be fastened to three sides of an opening. A sheet of aluminum large enough to cover the opening is then inserted, slide-door fashion, into the grooves. METEX TVI-20-S electronic weatherstripping (see page 89, *QST*, September, 1953) can be sewed on the inside of the door (the side facing in toward the cabinet) at the unclamped end to prevent r.f.

leakage. If the aluminum sheet is too thin to fit snugly inside the grooves, it is advisable to weatherstrip along all four sides of the door. Handles can be bolted in place to facilitate easy removal, and holes may be punched wherever ventilation is necessary.

— H. L. Kreh, W8TCH

The 3/4-inch aluminum angle manufactured by Reynolds may be used as corner posts for shielded chassis enclosures. But what must throw many fellows is the problem of making neat corners without special tools and with all surfaces flush.

A solution to this problem is shown in Fig. 4. It is believed to be the simplest possible. Note

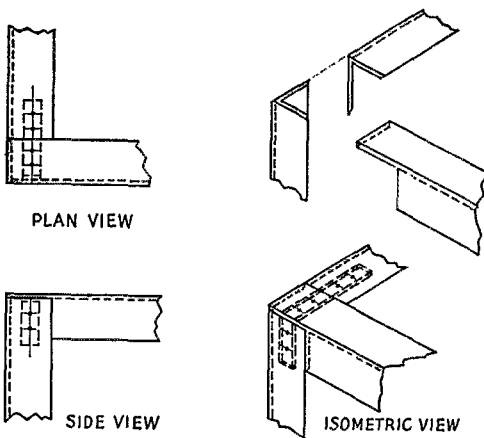


Fig. 4 — Sketches of the corner post described by W2HCP.

that only one cut is necessary other than a square end and that is just to cut away 3/4 inch of the vertical flange of the front-to-back member. A simple right angle strap underneath and suitable machine- or self-tapping screws complete the three-way joint.

— F. Landsperger and
Wendell P. Munro, W2HCP

Reynolds also offers an assortment of 36 X 36-inch sheets to work with. Plain, patterned and perforated aluminum is available in this size. Although the material is quite thin, it is rugged enough for use as the flat surface of many shielded enclosures. The perforated stock is the most expensive, selling at a local hardware store for \$2.98 per sheet. Plain aluminum sheets are \$2.49 at the same store.

— Ed.

SIMPLE KEYING MONITOR

IF THE KEYING circuit uses a low-voltage relay, and if you want a simple means of following your own fist, try hooking an ordinary buzzer in series with the line to the relay. The stunt has been used here at W4TP for about 15 years. The

buzzer requires adjustment and the tone emitted, with 6 volts a.c. applied to the sounder, is a not unpleasing T6.

— Hugh W. Holt, W4TP

ANOTHER INEXPENSIVE WIRE STRIPPER

IN THE field of inexpensive ready-made wire strippers, the Mueller No. 27 test clip just about takes the cake. This clip — the sided mesh teeth job rated at 20 amperes — sells for 11 cents (mail-order house price) and does a swell job of removing insulation from hookup wire.

— Jack Nelson, W2FW

LIGHTNING PROTECTION ON PARALLEL-WIRE LINES

LIGHTNING PROTECTION at amateur stations using parallel-wire feedlines usually consists of a grounding switch or a homemade needle gap of some kind. The first method doesn't offer any protection for those hardy operators who keep the station going during a thunderstorm, and the second method is often a jury rig that isn't too satisfactory. William R. Deal, associate League member in New Hampshire, suggests that the high-voltage protectors used on telephone lines might do the trick. He says that the Reliable 20HV and 30HV units (2000- and 3000-volt breakdown, respectively) can be purchased through telephone jobbers, and he gives the address of three such suppliers:

Telephone Repair and Supply Co., 1760 West Lunt Ave., Chicago 26, Ill.

Buckeye Telephone and Supply Co., 1250 Kinnear road, Columbus 21, Ohio

Suttle Equipment Co., Lawrenceville, Ill.

The unit shown in Fig. 5 (the 20HV) consists of three carbon electrodes mounted on a ceramic base. Leads from each electrode are

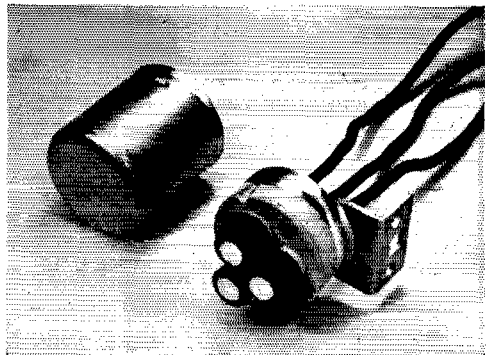


Fig. 5

brought out separately through neoprene bushings; the ground lead is 6 feet long and the others, which connect to the feedline, are 2 feet long. A mounting bracket and a protective aluminum housing are furnished with the units. Mr. Deal says the units were selling singly for a little over \$3.00 a year ago.

(Continued on page 146)

The World Above 50 Mc.

1215-1500

2300-2450

3300-3500

5650-5925

10,000-10,500

21,000-22,000

30,000-37

CONDUCTED BY EDWARD P. TILTON,* W1HDQ

THE MAGIC WORD in communications circles these days is "scatter." Results of research on the possibilities of this new medium for v.h.f. communication over long distances are now public knowledge, and there is no longer any doubt that we must revise all our estimates of the worth of frequencies above 30 Mc., in the light of recent demonstrations of scatter techniques. But what, outside of a major threat to our peace of mind, does scatter propagation hold for v.h.f. men?

Ionospheric and tropospheric scatter and their potential for the amateur were discussed by W2ALJ in March *QST*. If you have not already digested this first authoritative article on the subject, we recommend that you do so without delay. We're not going to repeat his information here, but we would like to talk a bit about practical results.

The aspect of scatter communication that appeals to the communications engineer is the very high degree of reliability it can deliver on circuits of 600 to 1300 miles or so. The scatter signal is always there; if you run enough power, and use big enough antennas and good enough receivers, you can achieve reliability running very close to 100 per cent. But such reliability is of little concern to us as hams. Much of our progress, in over half a century of hamming, has resulted from our willingness to use techniques that pay off only a small part of the time. Our highly-regarded lower bands offer nothing approaching round-the-clock reliability, and our most interesting frequencies afford long-distance communication only a few hours a day at their best. And they may be dead or nearly so for months at a time.

Their very uncertainty is what makes them exciting, for quite a few of us. Let's look at scatter from the same viewpoint—that of the opportunist who uses a medium when it can be made to work, for what it may be worth at a given moment.

We'll skip tropospheric scatter for the present. We have demonstrated that it can be used for communication over distances up to 400 miles or more, on any of our v.h.f. bands, if we use fairly high power, high-gain beams and low-noise receivers. To make the most of it we must use c.w., and we have to be content with weak signals, but we have plenty of proof that it will work within the practical framework of amateur radio.

Ionospheric scatter we've used hardly at all, but we should start! So long as we stay within the legal amateur power limit we're not likely

to see anything in amateur v.h.f. work that will approach the reliability of the famous Cedar Rapids-to-Washington circuit that has been grinding out a communications-quality signal on 49.8 Mc. for more than five years now, but we can use scatter techniques over similar distances.

On 50 Mc., and to a limited extent on 144, ionospheric scatter offers the possibility of amateur v.h.f. communication over 600 to 1300 miles, without the need for waiting for any of the familiar DX phenomena. To make the grade on 144 Mc. involves a high degree of skill and coordination of effort at both ends of the path, for the signals come through mainly in short bursts. These are reflections from meteor trails. You can



W0ZJB48	W4MS40	W8OJM43
W0BJV48	W4PNR39	W8LPD42
W0CJS48	W4IUF38	W8YLS41
W0AIG48	W4RR37	
W9ZHL48	W4BEN35	W9ZHB48
W9OCA48	W4IKK31	W9QUV48
W6OB48		W9HGE47
W0INI48	W5VY48	W9VZP47
W1HDQ48	W5SFW47	W9RQM47
W3MJD48	W5GNQ46	W9ALU47
W2IDZ48	W5ONS45	W9QKM47
WILL48	W5JTI44	W9ULA45
W0DZM48	W5ML44	W9TNS45
W0HVV48	W5PSC44	W9MPH41
W0WKB48	W5JLY43	
	W5JME43	W9QIN47
W1CLS46	W5VV42	W9NFM47
W1CGY46	W5PAL41	W9TEK47
W18N45	W5HTZ41	W9KYF47
W1DJ41	W5HLD40	W9JOL46
W1RFU41	W5FXN38	W9MVG46
W1FOS38	W5NSJ28	W9TJF44
W1SPX36	W5HFF26	W9URQ44
W1WAS23	W5ZVF24	W9JHS43
		W9PKD41
W2MEU47	W6WNN48	W9ZFW41
W2AMJ46	W6ANN45	W9CNM40
W2BYM46	W7TMI41	W9USQ40
W2RLV45	W6IWS41	W9UPI43
W2FHL45	W6CAN40	W9ORC37
W2RGV44	W6ABN35	W9PKY37
W2GYV40	W6GGG35	W9ZTW36
W2QVL38	W6WFO33	W9VIK34
K2AXQ37	W6OJF31	
W2ZUW36	K6GTG30	VEBAET44
K2JNS35		VERAIB35
W2ORA34	W7HEA47	VEIQZ34
	W7ERA47	VEIQY31
W3OJU46	W7BQX47	VEJER32
W3TIF43	W7FDJ46	VEIEF28
W3NKM41	W7DYD45	XEIGE25
W3MQU41	W7ACD45	CO6WW21
W3OTC40	W7JRG44	LU9MA11
W3KMY39	W7BOC42	
W3RUE38	W7FA42	
W3MXW38	W7TIV41	
W3LFC37	W7CAM40	
W3FPH35		
	W8N8S46	
W4FBH46	W8CMS46	
W4CFZ46	W8QDQ45	
W4EQM45	W8UZ45	
W4QN44	W8RFW45	
W4FLW43	W8SSQ45	
W4OXC41	W8LPD44	

Calls in bold face are holders of special 50-Mc. WAB certificates listed in order of award numbers. Others are based on unverified reports.

hear them at any time, if you know exactly where and when to listen for the station you're working with.

Normally they're of little value, though there is an eerie thrill to be had from listening to them pinging in at a rate of some 2 or 3 each minute. The time to bear down is during meteor showers, when bursts come often enough to overlap and produce considerable periods of readable c.w. Meteor showers are predictable in advance. The next one, and probably the best bet of the year, will peak toward the end of the second week in August.

A summary of early amateur work in this field, together with recommended methods for communicating by meteor reflections, can be found in this department in *QST* for October, 1954. This is the story of the work of W4HHK and W2UK, whose pioneering investigation of meteor-scatter on 144 Mc. won them the 1955 ARRL Merit Award. It was one of the outstanding amateur stories of recent years.

Some fine meteor-scatter work is now being done on the West Coast by W7LHL, Seattle, Wash., W6AJF, Sonoma, Calif., and W6NLZ, Long Beach. We reported the first Washington-California 2-meter QSO, by W7LHL and W6AJF, last month. Now comes the longer haul, about 1000 miles, between W7LHL and W6NLZ, first made on May 6th, at 0600 to 0725 PST. Precisely-timed transmissions and special meteor-reporting techniques (see October, 1954, *QST*) brought this about. W6NLZ reports that W7LHL peaked at S7, and though frequent repeats were needed, he was able to copy all the essential information, despite 2 S-units of line noise. Meteor signals on 144 Mc. may not last for long at a time, but they certainly are not weak!

The possibilities of ionospheric scatter on 50 Mc. are just now beginning to show. W2ALJ predicted that scatter communication should work on 50 Mc., within the legal amateur power limit. Experience is proving him right. But what may surprise many v.h.f. men is that identifiable signals are being heard over an 850-mile path with the transmitter running as low as 75 watts input!

A year ago your conductor made a few dead-band tests on 50 Mc. for W4HHK. Back came the report that the c.w. signal was easily identifiable, and audible perhaps 75 per cent of the time. This was with *Handbook*-style, 4-element arrays at both ends of the 1020-mile path, and about 350 watts power output at W1HDQ. Last fall we put up a stacked 3-over-3 array (1956 *Handbook*) and began making scatter tests each Saturday and Sunday morning. These have been heard and identified by W4GJO, Ft. Myers, Fla., W4IKK, Rome, Ga., W4LNG, Atlanta, W4OLO, Bristol, Tenn., W4RFR, Nashville, W4HHK, Collierville, and W9AAG, Woodhull, Ill. These stations range from 625 to 1200 miles distant, and their angular spread is more than 50 degrees.

Recently we've concluded each test transmission with a "CQ DX." This brought answers from W4IKK. You'd hardly call what followed

a ragchew, but Bill's signal has been heard practically every time he has called, and several contacts of sorts have been made. The clincher: W4IKK runs only 75 watts input to an 815 final! His antenna is a 3-over-3 similar to that at W1HDQ. The signal of W4IKK has been identified also by W1ELP, Lexington, Mass., W1CLS, Weston, Mass., and W2IDZ, Denville, N. J., that we know of. Scatter tests made each week end by W2FBZ, Montclair, N. J., have also netted heard reports from W4IKK and others.

The signals received on these circuits are very different from those encountered over similar distances on 144 Mc. There are meteor bursts, of course, but there is also a faint background signal that is audible nearly all the time. Only W4IKK's peaks are readable at W1HDQ, but Bill copies quite a bit of what we send to him. Phrases like "pse send 5 min for recording" "band seems normal here," "look for W2IDZ this freq.," and the like are caught by him regularly, and he has made solid copy for up to 2 minutes at a time. A communications engineer wouldn't think much of what we hear from each other, but there's enough signal every try to make it real fun to attempt the exchange of useful information. With the legal limit of power, and some skill and cooperation at both ends, ionospheric scatter will work on 50 Mc. You're missing something if you don't try it, even if you're quite a few db. below the 1-kw. level!

A late report, just as we were sending this up to the printer: W7LHL sends word that W7FEG, Seattle, worked W6NDP, Fresno, via ionospheric scatter, May 20th, 21st and 22nd. W7FEG was able to hear the W6NDP signal at all times. W7LHL, using his 96-element 2-meter array, was also able to hear the signal from W6NDP solidly, except when it was lost occasionally in high ignition noise peaks.

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

Though we're still only entering the new solar cycle, a phenomenal amount of intercontinental DX was worked this spring on 50 Mc. From latter March, through April, and even up to late May, as we write, South American contacts were made from all parts of the South. There were scattered reports of openings farther north as well. Here are specific dates and contacts not previously reported.

April 22nd: Many LUs worked from Southern California between 0730 and 1300 PST, reported by W6ABN. Early-morning reception of LUs confirmed by W6UXN.

April 23rd: LU5CK worked and LU7DDH heard by W6UOV, San Mateo, 1031 to 1100 PST.

April 25th: LU2EW worked by K5CYP, W5MJD and W5SFW, Amarillo, Texas, around 1300 CST. Two other LUs heard by W5SFW. LU8MA worked W5BXA. About this date (exact day unknown) W7BDB, Ely, Nev., is reported by W7QDJ as having worked PY2AA at 1715 MST.

April 28th: LU7AT and LU7DDG worked by W4GJO, Ft. Myers, Fla. Spanish-speaking stations and DX harmonics heard from 1449 to 1531 EST. W0CNM, Grand Junction, Colo., heard OAA, 1800 to 1900 MST, reported by W0FKY.

May 10th: K0CEB, St. Louis, Mo., worked XE1GX.

May 13th: CO2ZX worked into St. Louis area. PY2CV worked by K0CEB, reported by W0WEQ.

May 23rd: Details incomplete, but apparently widespread opening to South America from the Middle West. W0USQ, Davenport, Iowa, worked LU9MA at 1930 CST. W9AFP, West Chicago, Ill., says that several W9s also worked him about 2000 CST. W0WKB heard LU9MA at 1930, but had

antenna trouble and could not raise him. VE3ANY/W8, Livonia, Mich., also reports reception of South American signals at this time.

As was the case with every break to South America from the northern part of this country during the previous sunspot cycle, this May 23rd opening was associated with a pronounced aurora. In fact, the Midwestern stations were hearing aurora signals at the time that the South Americans were worked. W9AFP had worked W6ORE in South Dakota via the aurora in the middle of the afternoon.

The night of the 24th brought a tremendous surge of aurora that had 50-Mc. signals boiling in all the way from Maine to Minnesota, many of them readable on voice. As this information is being compiled on May 25th, we have only personal observation to go on. No monitoring of the 144-Mc. band was possible at WIHDQ, due to 144-Mc. antenna trouble, but it is assumed that the 2-meter band was at least equally active.

The disturbance that broke May 23rd and was still going on as we write was a recurrence of a record outbreak on April 26th, which produced some of the strongest signals and the most southerly DX yet reported. That session started early in the evening of the 26th and carried over through the following morning. Before it was through, DX that was definitely auroral in character had been worked on 144 Mc. from North Carolina, Tennessee, Arkansas, and Mississippi. And possibly it is more than a coincidence that 2-meter DX reported as being tropospheric was worked from Texas and California, among other places, at the same time.

The aurora was visible at least as far south as Wilmington, N. C., where W4MDA saw it around 2145 EST and began checking the 2-meter band. He caught the end of the early peak, so stayed with it to see if it would come back after midnight. It did, with a vengeance, and Frank worked W3RUE, Pittsburgh, W2AZL and W2CXY in Northern New Jersey, and W8LOF, Piqua, Ohio.

W4HHK, Collierville, Tenn., calls the April 26th-27th the best aurora in his v.h.f. experience. Paul heard his first DX at 2020 CST, and between then and 0140 the following morning, he worked W8SVI, W8PT (that's our old friend, W9PK), W2CXY, W2PAU, W2AMJ, W2AZL, W8DX and W4RUE. The contact with W2AMJ, Bergenfield, N. J., is about 980 miles, one of the longest 2-meter aurora hauls ever reported. The other W2s are only a few miles nearer. W5JTI, Jackson, Miss., nearly 200 miles directly to the south, was heard entirely by aurora reflection at times. Most signals peaked on a heading of 30 to 35 degrees east of north. True bearing to the W2s is 60 degrees east. The aurora signals of W4HHK were heard as far to the northeast as WIREZ, Fairfield, Conn., just over 1000 miles.

W2WFB, Ithaca, N. Y., logged 91 2-meter stations in 6 call areas and 17 states during the April 26th opening. W4BUZ, Greensboro, N. C., was his farthest-south contact, 500 miles.

During all the aurora turmoil there was a tropospheric opening from Texas to the north. This netted W5AJG and W5ABN, Dallas, and W5SWV, Dennison, a new state in W9FKM, Joplin, Mo. Is aurora associated with weather phenomena? Many of us have thought so for years. Coincidence: W6LSB, Hood, Calif., had a short period of the strongest signals he has ever heard from Southern California that same evening. He had just concluded a weak-signal c.w. contact with W6DNG Compton, Calif., at 2230 PST, when he heard W6DNG pounding in S7. This lasted for 3 to 4 minutes, and then the signal faded back to its customary 339. W6DNG later reported that W6LSB's 90-watt phone had been S6, though normally they work only by the use of 500 watts on c.w. This is a 350-mile path over 8500-foot mountains.

April 26th netted a new state on 50 Mc. for W7ACD, who is back in business at the same old stand, Shelley, Idaho. Louie caught W7YDZ, Ogden, Utah, via aurora, having heard very short skip on 21 and 28 Mc. He was also heard by W7LLL, Big Piney, Wyoming. This spread from W1 to W7, with the southern limit as yet unknown, makes the April 26th-27th period worth a little late reporting. There has never been anything quite like it in v.h.f. annals heretofore.

Sporadic-E skip on 50-Mc. was frequent during May, and there were enough stations operating on 6 so that few openings went unnoticed. In many areas QRM was beginning to be a real problem. This will not be helped by everyone, low-powered and high, staying in the first megacycle of the band. K6PBW, Northridge, Cal., writes that there

2-METER STANDINGS

U. S. States Areas AFles			U. S. States Areas AFles		
W1FZJ . 21	6	1120	W5FEK... 8	2	580
W1REZ . 21	6	910	W5VY... 7	3	1200
W1RFU . 19	6	1150			
W1HDQ . 19	6	1020	W6WSQ . 5	3	1280
W1AJR . 17	6	810	W6NLZ . 5	3	1000
W1IYZ . 17	6	750	W6DNG . 4	2	350
W1UIZ . 17	5	680	W6ZL... 3	2	1400
W1BCN . 16	5	650	W6AJE . 3	2	640
W1KCS . 16	5	600	W6BAZ . 3	2	320
W1AFU . 15	5	810	W6AMIU . 3	2	340
W1AMN 13	5	520	W6ORS . 3	2	200
			W6LSB . 2	2	360
W2ORI . 26	8	1000			
W2NLY . 23	7	1050	W7VMP . 6	4	1280
W2BLV . 22	7	1020	W7LEE . 5	3	1020
W2ALV . 21	7	1050	W7JU... 4	2	353
W2DWJ . 21	6	720	W7LHL . 3	2	1000
W2AMJ . 20	6	960	W7YZU . 3	2	240
K2CEH . 19	7	910	W7JUO . 2	2	140
W2UTH . 19	7	880			
W2AZE . 19	7	650	W8WXY . 28	8	1200
W2WFB . 19	6	900	W8RME . 25	8	800
W2CBB . 19	6	740	W8LPD . 25	8	750
K2IEJ . 18	6	745	W8DX... 24	8	720
W2AOC . 18	6	660	W8SRW . 23	7	850
W2KIR . 18	6	—	W8SVL . 22	8	725
W2RXG . 17	6	675	W8JWV . 22	8	710
K2JNT . 17	6	925	W8HAX . 21	8	685
W2PAU . 16	6	740	W8WRN . 20	8	670
W2PCQ . 16	5	650	W8EP... 18	7	800
W2LHI . 16	5	550	W8ZCV . 17	7	970
			W8RWV . 17	7	630
W3BGT . 28	8	740	W8PT... 16	6	610
W3RUE . 25	8	950			
W3KCA . 21	8	—			
W3GKP . 21	6	800	W9KLR . 26	8	850
W3KWL . 19	7	740	W9ZHL . 25	8	760
W3NKM . 19	8	660	W9JQC . 24	8	820
W3IBH . 19	7	650	W9EHX . 24	8	725
W3TDE . 19	6	720	W9FVJ . 23	8	850
W3BNC . 18	7	750	W9BPM . 19	6	1000
W3EPH . 18	7	—	W9GAB . 23	7	850
W3LNA . 16	7	720	W9WOK . 22	8	860
			W9TCH . 22	8	750
W4HHK . 29	9	1280	W9TED . 22	7	960
W4AO . 23	7	950	W9KPS . 21	7	660
W4WBJ . 20	8	725	W9MUD . 19	6	640
W4JCG . 19	6	660	W9LFL . 19	6	—
W4JFV . 18	7	830	W9ALU . 18	7	800
W4OLK . 18	6	720	W9JGA . 18	6	720
W4UMF . 18	6	600	W9MBL . 16	7	660
W4VLA . 17	7	820	W9DLY . 15	7	560
W4TLY . 16	7	1000	W9LFE . 15	6	780
W4HJQ . 15	7	650	W9DSP . 15	6	760
W4CLY . 15	5	720	W9DDG . 16	6	700
W4ZBU . 14	5	800			
W4WCB . 14	5	740	W9EMS . 27	8	1175
W4TCR . 14	5	720	W9GUD . 25	7	1065
W4WNL . 13	7	650	W9IHD . 25	7	870
W4IKZ . 13	6	720	W9UQP . 18	6	—
W4SOP . 13	5	680	W9ONQ . 17	6	1000
W4CPZ . 12	5	650	W9INT . 16	5	830
W4UDQ . 11	5	850	W9OAC . 14	5	725
W4MDA . 11	5	680	W9TJF . 13	4	—
W5RCI . 21	7	925	W9EDR . 26	8	915
W5JTI . 19	7	1000	W9SAB . 24	8	910
W5HEH . 15	7	830	W9EDR . 16	7	820
W5AJG . 14	5	1280	W9EBQ . 15	7	790
W5ABN . 12	5	780	W9BFB . 13	6	215
W5GNL . 10	5	1400	W9ZAC . 12	5	550
W5WV . 10	5	1180	W9HAG . 11	7	800
W5SWV . 10	3	600	W9BIQ . 11	4	800
W5MWW . 9	4	570	W9EJF . 10	1	365
W5ML... 9	3	700			

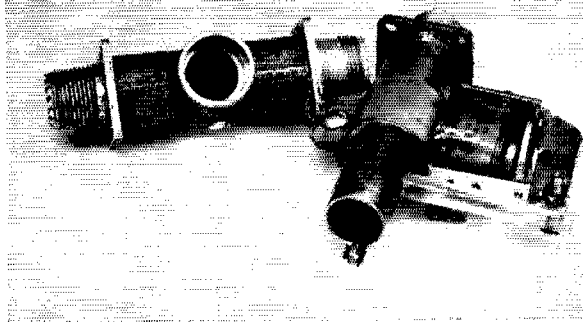
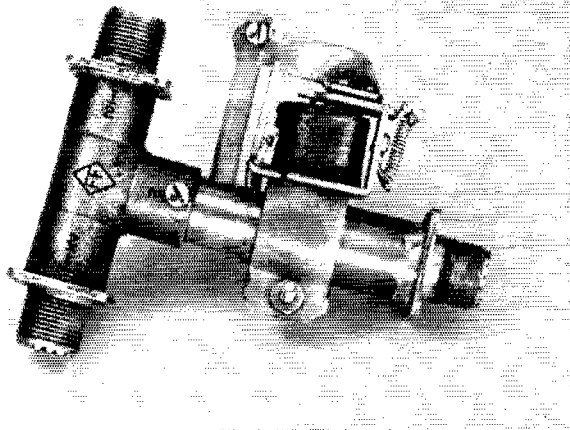
are upwards of 250 active 6-meter stations in Southern California alone, but most of the activity is below 51 Mc. Reception of DX at the low end is getting difficult, but most of the operators stick there.

This is not as senseless as it might seem, as the territory above 52 Mc. is full of TV birdies. Avoiding Channel 2 trouble is much easier at the low end, too. 52 to 54 Mc. takes on the aspect of a "guard band" for TV — and in amateur hands it probably causes less grief to TV owners than would its use by any other service.

In less densely populated areas (by v.h.f. men, at least) piling up on one frequency is advantageous. W4TKL, Huntsville, Ala., says that getting everyone in the state on 145.35 Mc. has paid off in increased activity everywhere. This works well in emergencies, too. Tornado traffic from and to the Birmingham disaster area was handled efficiently on the 145.35-Mc. channel.

W4TKE, Gainesville, says that activity is developing well throughout Florida, but stations above 145 Mc. have trouble getting attention when the band is open. He

(Continued on page 142)



Coaxial relay made by W1QVF. Cylindrical portions are standard plumber's fittings. Home-made coaxial relay partially disassembled at the right shows how the movable arm is operated by a surplus relay, through a driving rod of polystyrene.

Home-Made Coaxial Relay

SOME fellows just like to make their own gadgets. To them, making something out of parts intended for other purposes is as much a part of ham radio as talking on the air. Such a ham is W1QVF, and the device shown in the accompanying photograph is typical of his brain children: a coaxial relay made entirely of readily available parts. Its cost was a fraction of that asked for a commercial equivalent. How about time? Well, that's part of the game!

The principal components are two standard plumber's fittings, three coaxial connectors and a surplus relay. Some spare relay contacts, a bit of spring bronze or beryllium copper, pieces of copper or brass rod, a short length of polystyrene rod and some assorted small pieces of aluminum complete the parts list.

The photographs tell the story. The plumbing parts are a T fitting and a coupler used for copper pipe work. They require no machine work for this application. The fixed contacts of the relay are two screws of suitable length, with their heads filed flat, soldered to the center conductors

of the coaxial fittings. If spare relay contacts are available, they can be soldered to the screw heads to provide a more durable contact surface, but the screw heads will do, if need be.

The movable arm is a stiff rod fitted with relay contacts. The end of this rod may be seen projecting from the barrel of the relay in the disassembled view. It passes through a hole in a polystyrene rod, which is actuated by the relay mechanism. The inner end of the movable arm is slotted to take a short length of spring bronze, which is soldered to it. The other end of the spring is soldered to the inner conductor of the coaxial fitting at the antenna end of the relay.

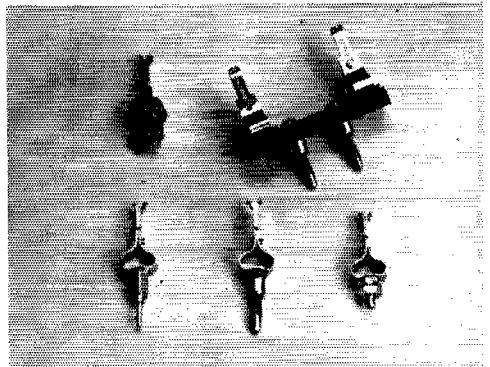
If you're the gadgeteer type, this is more than enough information to enable you to duplicate Tom's relay assembly, though if you run true to form you'll have thought of some modifications of your own, by now. If you're not, no amount of detail would convince you that an operation of this kind is preferable to spending ten dollars for a relay of the manufactured variety.

— E.P.T.

New Apparatus

Experimenters will be interested in a series of test clips that have recently been made available. The basic clip is furnished in a number of different mountings: threaded stud, banana plug, threaded stud with insulating washers, and pin plug. It is also available with a plug-in adapter consisting of two banana plugs spaced $\frac{3}{4}$ inch.

These clips stand $1\frac{1}{8}$ inches high above the arch of the spring, and a novel feature is the fact that the spring pressure can be increased by turning the hexagonal head adjacent to the bow of the spring. The Series 2 Test Clips are sold only in assortments of 19 pieces by the North Hills Electric Co., 203-18 35th Ave., Bayside 61, N. Y.



WWW-WWVH SCHEDULES

FOR the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WWVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20 and 25 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 3 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, together with digits from 1 through 9, indicating present North Atlantic path conditions and conditions to be anticipated. (See ARRL *Handbook* for details on interpretation of forecast symbols.)

The audio frequencies are interrupted at precisely two minutes before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 3 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 3 minutes. The fourth minute of each 5-minute period is silent, and voice announcements are made during the fifth minute. Each carrier is modulated by a pulse, heard as a faint clock-like tick; the pulse at the beginning of the last second of each minute is omitted.

Strays

W6NOB thinks that many California hams may now accidentally get their calls on their new automobile license plates. All 1956 California registrations bear three letters and three digits, so that a "call combination" is not too remote a possibility.

W1SSZ reports that he recently held a very pleasant QSO with W8GIN, of Weston, West Virginia, on 40 c.w. He now thinks this was a pretty potent contact as a couple of days later, when he next went on the air, the hangover produced a QSO with W8HIC, in Huntington, West Virginia. No beer can antennas were used in any of the contacts, however.

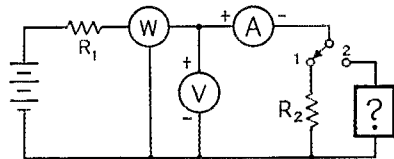
K4CHK reports that a Louisville, Kentucky, broadcasting station begins one of its newscasts with the following in Morse Code: "QST QST QST, STANDBY." K4CHK comments that this emphatically attests to the popularity of hams. (It probably also proves that some good ham works at the b.c. station.)

Quist Quiz

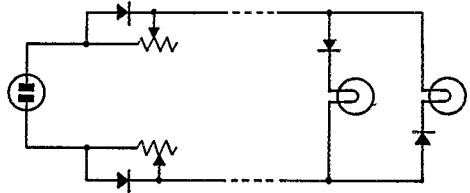
Mr. Burns Hansen, W7UKB of Salt Lake City, submits this puzzler for those who solved the May Quiz in a few minutes and for any others who are interested in this sort of thing.

The circuit is shown below. In position 1 of the switch, the d.c. wattmeter, voltmeter and ammeter show certain values. In position 2 the voltmeter and ammeter show their same values, but the wattmeter indicates a negligible amount of power. Problem: What's in the box marked with a question mark, and what is the ratio of R_1 to R_2 ? (Hint: The box contains real, not theoretical, components.)

The genius rating on this one is $9\frac{1}{2}$ minutes.



LCDR William A. Baker of Lakehurst, N. J., solved the Quist Quiz in the May issue, and built a model with an interesting variation. Instead of using the two switches, he substituted two rheostats. As a consequence, the brilliance of either lamp can be controlled independently, to add further to the mystery. The circuit is shown below. Six-watt 117-volt lamps, 75-ma. rectifiers and 5000-ohm 6-watt rheostats were used.



FEEDBACK

Ouch! In W1OLP's article "Procuring Funds for RACES Gear" in June *QST*, mention was made of a tax rate of 40¢ per thousand dollars (p. 55, left-hand column). Many readers have expressed the fervent wish that *their* tax rate could be this low. Actually, of course, it should have read "forty dollars per thousand."

ARE YOU LICENSED?

- When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All *you* have to do is send your QSL manager (see list below) a stamped-self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1 — D. W. Waterman, W1IPQ, 99 Flat Rock Rd., Easton, Conn.
 W2, K2 — E. F. Huberman, W2JIL, Box 746, GPO, Brooklyn 1, New York.
 W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Penna.
 W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
 W5, K5 — Robert Stark, W5OLG, P.O. Box 261, Grapevine, Texas.
 W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
 W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
 W8, K8 — Walter E. Musgrave, W8NGW, 1294 E. 188th St., Cleveland 10, Ohio.
 W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
 W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
 VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
 VE2 — Harry J. Mabson, VE2APH, 122 Regent Ave., Beaconsfield West, Que.
 VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
 VE4 — Len Cuff, VE4LC, 236 Rutland St., St. James, Man.
 VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
 VE6 — W. R. Savage, VE6EO, 883 10th St. N., North Lethbridge, Alta.
 VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.
 VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.
 VO — Ernest Ash, VO1A, P.O. Box 8, St. John's, Newfoundland.
 KP4 — E. W. Mayer, KP4KD, 1061, San Juan, P. R.
 KH6 — Andy H. Fuchikami, KH6BA, 2543 Namaau Dr, Honolulu, T. H.
 KL7 — Box 73, Douglas, Alaska.
 KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa, C. Z.

Strays

WN1HUR has recently been the subject of a considerable amount of conversation around the QST offices. First of all, he is the man at the Rumford Press in Concord, N. H., who handles the QST account, makes sure it gets printed on time, etc. Secondly, until recently he had never worked a station outside the borders of the U. S. So what happens? One noontime he goes home, calls CQ on 15 meters, and raises MP4KAC in Kuwait for his very first piece of DX! But when he told us about it, he had to confess that he didn't raise a G that he had heard the same noon!

— . . . —

SWITCH TO SAFETY!



Aha! Here we see W1DX (left) looking enviously at the 50 kw. final of a TV transmitter at the GE plant. While on a speaking trip to Syracuse, Goodman was given the grand tour of Electronics Park by C. G. Lloyd, manager of broadcast equipment engineering, and W2KUD, advertising and sales promotion manager.



A new French movie, soon to be released in the U. S. under the title, "Race for Life," is based on an incident in which hams secured a drug for the crew of a French trawler stricken with food poisoning. Here, in a scene from the movie, is an actor playing the part of F8YT, who was instrumental in getting the drug to the trawler. The script was written by Clouzot, author of the famous thriller "Diabolique," and is directed by the equally famous Frenchman, Cristian Jaque. (Courtesy of F93MH)

Strays

Can anyone challenge W8JMY as being the youngest to obtain an Extra Class License? His was dated just five days after his 15th birthday.

— . . . —

You'd better double-check the size of your QSL cards, as it appears that the postoffice is now cracking down on oversized cards. If cards exceed a size of 3¾ by 5¾ inches, they must be charged with 3¢ postage at the letter rate. Our thanks to W1AVS for calling our attention to the Postal Bulletin of May 3, 1956.

Saving a Life

Back Pressure—Arm Lift Method of Artificial Respiration

• Safety is a prerequisite for us all but accidents do occur, and then proper knowledge of first aid is a real asset. The American Red Cross, in advocating use of the system of artificial respiration described herewith, suggests that instruction in this art is an excellent project for radio clubs, so that their membership would become better acquainted with the mechanics of this system.

How To Do It

a) Position of the subject: Place the subject in the face-down, prone position. Bend his elbows and place the hands one upon the other. Turn his face to one side, placing the cheek upon the hands.

b) Position of the operator: (Fig. 1). Kneel on either the right or left knee at the head of the subject, facing him. Place the knee at the side of the subject's head, close to the forearm. Place the opposite foot near the elbow. If it is more comfortable, kneel on both knees, one on either side of the subject's head. Place your hands upon the flat of the subject's back in such a way that the heels lie just below a line running between the armpits. With the tips of the thumbs just touching, spread the fingers downward and outward.

c) Compression Phase: (Fig. 2). Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure exerted almost directly on the back.

d) Expansion Phase: (Fig. 3). Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Place your hands upon the subject's arms just above his elbows, and draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the subject's shoulders. Do not bend your elbows, and as you rock backward the subject's arms will be drawn toward you. Then drop the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest.

The cycle should be repeated 12 times per minute at a steady uniform rate. The compression and expansion phases should occupy about equal time, the release periods being of minimum duration.

(Continued on page 140)



Fig. 1—Position of the operator



Fig. 2—Compression phase



Fig. 3—Position for expansion phase

Happenings of the Month

160-METER CHANGES

The Coast Guard is in the process of reorganizing the Loran System of radionavigation to provide coverage to new areas, and increase the effectiveness of the system. In order to make the change smoothly and without hazard to the safety of life, it has become necessary to change amateur privileges in the 160-meter band in some respects. The new rules are actually temporary, and it is expected that they will be in force about a year, after which allocations in 160 meters should return to the normal postwar pattern.

Though the rules are effective July 9, FCC requests amateur compliance immediately on a voluntary basis, because of the safety aspects; operations under the new setup in this country started May 1.

Briefly, no operation in the 1.8-Mc. band is now permitted to amateurs in Texas (east of 99° W and south of 32° N), Louisiana, Mississippi, Alabama, Georgia, Florida, Puerto Rico, Virgin Islands, Alaska, Guam, and other territories and possessions where operation was not previously permitted in the band. In the following states, there is a power restriction of 200 watts daytime, and 50 watts night: Oklahoma,

Kansas, Missouri, Arkansas, Illinois, Indiana, Kentucky, Tennessee, Ohio, West Virginia, Virginia, North Carolina, South Carolina, and Texas (west of 99° W or north of 32° N). Other areas have no change in their allocations or privileges.

The Coast Guard authorities have kept the alterations to an absolute minimum consistent with safety of the ships and aircraft using the Loran System (which, of course, has absolute priority in the 1.8-2.0 Mc. band).

The official text of the FCC action follows:

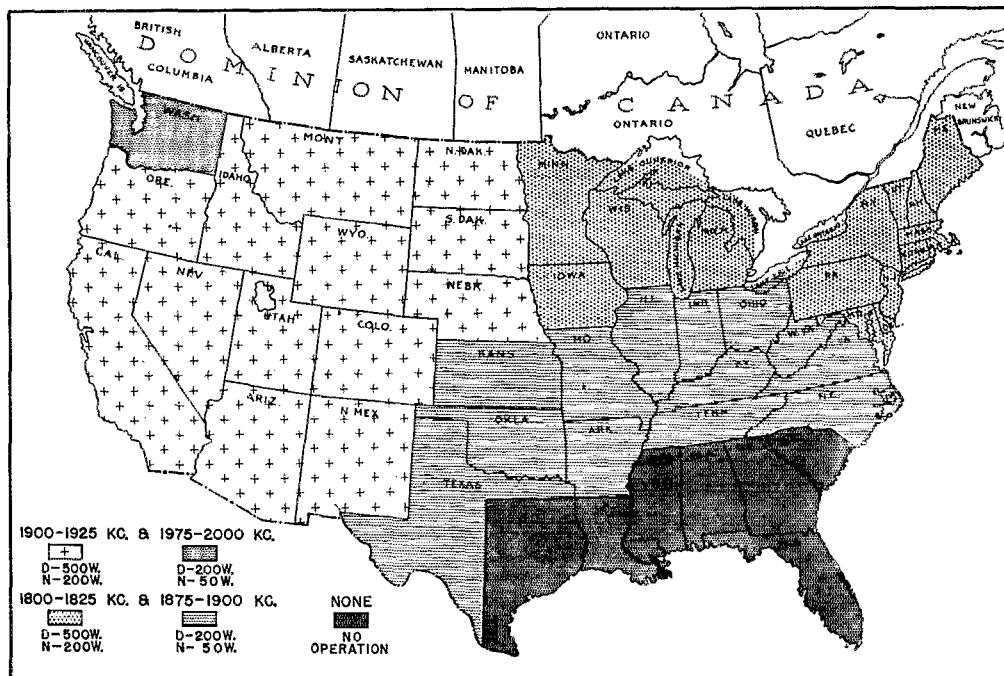
**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.**

In the Matter of

Amendment of Parts 2 and 12 of the Commission's Rules to modify the areas of permissible sharing between the Amateur Service and Loran stations in the band 1800-2000 kc.

ORDER

1. At a session of the Federal Communications Commission, held at its offices in Washington, D. C. on the 16th day of May, 1956;
2. The Commission having under consideration its proposal in the above entitled matter; and
3. IT APPEARING, that footnote NG23 to the table of frequency allocations contained in Section 2.104(a)(5)



The 160 λ Band Under the New Rules.

of the Commission's Rules and that Section 12.111(a) of the Commission's Rules stipulate that the Amateur Service may use certain portions of the band 1800-2000 kc in certain areas in accordance with the following conditions (among others):

- (1) The use of these frequencies by the amateur service shall not be a bar to the expansion of the radionavigation (Loran) service;
- (2) The amateur service shall not cause harmful interference to the radionavigation (Loran) service; and
- (3) The provisions of this footnote and section shall be considered as temporary in the sense that they shall remain subject to cancellation or revision, in whole or in part, by order of the Commission without hearing whenever the Commission shall deem such cancellation or revision to be necessary or desirable in the light of the priority within this band of the Loran system of radionavigation; and

4. IT FURTHER APPEARING, That as a means of preventing harmful interference from being caused to the maritime mobile use of 2009 kc on the west coast of Florida, and to permit the orderly expansion of Loran service in the West Indies/Caribbean area, the carrier frequency of the Gulf of Mexico Loran Chain was changed from 1950 kc to 1850 kc on May 1, 1956; and

5. IT FURTHER APPEARING, That the West Indies Loran Chain scheduled for operation later this year will also operate on 1850 kc; and

6. IT FURTHER APPEARING, That the east coast Loran chain will then be operating on 1950 kc, and the west coast, West Indies, and Gulf of Mexico Loran Chains will then be operating on 1850; and

7. IT FURTHER APPEARING, That the existing frequency sharing arrangement between the amateur service and Loran as set forth in footnote NG23 and Section 12.111(a) no longer provides the protection from interference required by a navigational aid; and

8. IT FURTHER APPEARING, That the continued use of frequencies by the amateur service in accordance with the aforementioned existing sharing arrangement may constitute a hazard to the safety of life and property through interference to the Loran system of radionavigation; and

9. IT FURTHER APPEARING, Therefore, that pursuant to the provisions of Section 4(a) of the Administrative Procedure Act, the issuance of a Notice of Proposed Rule Making in this matter, prior to an Order effecting the necessary rule changes would be contrary to the public interest; and

10. IT FURTHER APPEARING, That the public interest, convenience, and necessity will be served by the amendments herein ordered, the authority for which is contained in Section 303(e),(f),(h) and (r) of the Communications Act of 1934, as amended;

11. IT IS ORDERED, That effective July 9, 1956, Parts 2 and 12 of the Commission's Rules are amended as set forth in the Appendices hereto: Provided however that,

inasmuch as the safety of life and property at sea is involved in this matter and the Gulf Loran Chain is already in operation on 1850 kc, all amateurs are requested to comply with this Order on a voluntary basis immediately upon receipt of the information contained herein.

FEDERAL COMMUNICATIONS COMMISSION

MARY JANE MORRIS
Secretary

Attachments: Appendices I and 2

Released: May 17, 1956

NOTE: Rules changes herein will be included in Amendments 2-21 and 12-19.

APPENDIX 2

The table associated with Section 12.111(a) (4) of the Commission's Rules is amended to read as follows:

Area	Authorized bands, kc	DC plate input power in watts	
		Day	Night
Minnesota, Iowa, Wisconsin, Michigan, Pennsylvania, Maryland, Delaware, and states to the north of these including the District of Columbia	1800-1825 1875-1900	500	200
North Dakota, South Dakota, Nebraska, Colorado, New Mexico, and states to the west of these states (except State of Washington)	1900-1925 1975-2000	500	200
State of Washington	1900-1925 1975-2000	200	50
Oklahoma, Kansas, Missouri, Arkansas, Illinois, Indiana, Kentucky, Tennessee, Ohio, West Virginia, Virginia, North Carolina, South Carolina, Texas (West of 99° W or North of 32° N)	1800-1825 1875-1900	200	50
Hawaiian Islands	1900-1925 1975-2000	500	200
Texas (East of 99° W and South of 32° N), Louisiana, Mississippi, Alabama, Georgia, Florida, Puerto Rico, Virgin Islands, Alaska, Guam, and other Territories and Possessions of the U. S. not listed above.	None	No Operation	No Operation

EXAMINATION SCHEDULE

The Federal Communications Commission will give Extra and General Class amateur examinations during the second half of 1956 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified from the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9 A.M. except as noted.

- Albuquerque, N. M.: October 6.
- Amarillo, Texas: September 12.
- Anchorage, Alaska, 53 Federal Bldg.: By appointment.
- Atlanta, Georgia, 718 Atlanta National Building, 50 Whitehall St. S. W.: Tuesday and Friday at 8:30 A.M.

- Baltimore, Md., 400 McCawley Bldg.: Monday through Friday. When code test required, between 8:30 A.M. and 9:30 A.M.
- Beaumont, Texas, 329 P. O. Bldg.: By appointment.
- Birmingham, Ala.: September 6, December 5.
- Boise, Idaho: Sometime in October.
- Boston, Mass., 1600 Customhouse: Wednesday through Friday 9:00 A.M. to 10 A.M.
- Buffalo, N. Y., 328 P. O. Bldg.: Thursday.
- Butte, Mont.: Sometime in September.
- Charleston, W. Va.: Sometime in September and December.
- Chicago, Ill., 826 U. S. Courthouse: Friday.
- Cincinnati, Ohio: Sometime in August and November.
- Cleveland, Ohio: Sometime in September and December.
- Columbus, Ohio: Sometime in July and October.
- Corpus Christi, Texas: September 6, December 6.
- Dallas, Texas, 500 U. S. Terminal Annex Bldg.: Tuesday.
- Davenport, Iowa: Sometime in July and October.
- Denver, Colo., 521 New Customhouse: 1st and 2nd Thursdays, 8 A.M.
- Des Moines, Iowa: Sometime in July and October.
- Detroit, Mich., 1029 Federal Bldg.: Wednesday and Friday.

Fort Wayne, Ind.: Sometime in August and November.
 Fresno, Calif.: September 14, December 14.
 Grand Rapids, Mich.: Sometime in July and October.
 Hartford, Conn.: September 12.
 Hilo, T. H.: October 8.
 Honolulu, T. H., 502 Federal Bldg.: Monday through Friday.
 Houston, Texas, 324 U. S. Appraisers Bldg.: Tuesday and Friday.
 Indianapolis, Ind.: Sometime in August and November.
 Jackson, Miss.: September 12, December 5, 12:30 P.M.
 Jacksonville, Fla.: October 13.
 Jamestown, N. D., October 10.
 Juneau, Alaska, 6 Shattuck Bldg.: By appointment.
 Kansas City, Mo., 3100 Federal Office Bldg.: Friday, 8:30 A.M.
 Knoxville, Tenn.: September 19, December 19.
 Lihue, T. H.: October 17.
 Little Rock, Ark.: August 15, November 1, 12:30 P.M.
 Los Angeles, Calif., 539 U. S. Post Office and Courthouse: Wednesday, 9 A.M. and 1 P.M.
 Louisville, Kentucky: Sometime in November.
 Memphis, Tenn.: July 12, October 11.
 Miami, Fla., 312 Federal Bldg.: Thursday.
 Milwaukee, Wisconsin: Sometime in July and October.
 Mobile, Ala., 419 U. S. Courthouse and Customhouse: Wednesday, by appointment.
 Nashville, Tenn.: August 1, November 1.
 New Orleans, La., 608 Federal Office Building, 600 South St.: Monday through Wednesday, code tests at 8:30 A.M. and 1 P.M.
 New York, N. Y., 748 Federal Bldg., 641 Washington St.: Monday through Friday.
 Norfolk, Va., 402 Federal Bldg.: Monday through Friday except Friday only when code test required.
 Oklahoma City, Okla.: July 17, October 16.
 Omaha, Nebr.: Sometime in July and October.
 Philadelphia, Pa., 1005 New U. S. Customhouse: Monday through Friday, 8:30 A.M. to 2 P.M.
 Phoenix, Ariz.: Sometime in July and October.
 Pittsburgh, Pa.: Sometime in August and November.
 Portland, Maine: October 9.
 Portland, Ore., 507 U. S. Courthouse: Friday, 8:30 A.M. for 20- and 13-w.p.m. code tests.
 Roanoke, Va.: October 6.
 St. Louis, Mo.: Sometime in August and November.
 St. Paul, Minn., 208 Federal Courts Bldg.: Friday, 8:45 A.M.
 Salt Lake City, Utah: September 15, December 15.
 San Antonio, Texas: August 9, November 8.
 San Diego, Calif., 15-C U. S. Customhouse: By appointment.
 San Francisco, Calif., 323-A Customhouse: Friday.
 San Juan, P. R., 323 Federal Bldg.: Thursday, and Monday through Friday at 8 A.M. if no code test required.
 Savannah, Ga., 214 P. O. Bldg.: By appointment.
 Schenectady, N. Y.: September 12-13, December 5-6, 9 A.M. and 1 P.M.
 Seattle, Wash., 802 Federal Office Bldg.: Friday.
 Sioux Falls, S. D.: September 12, December 12, 10 A.M.
 Spokane, Wash.: Sometime in September.
 Syracuse, N. Y.: Sometime in July and October.
 Tallahassee, Fla.: July 14.
 Tampa, Fla., 410 P. O. Bldg.: By appointment.
 Tulsa, Okla.: August 14, November 27.
 Tucson, Ariz.: Sometime in October.
 Wailuku, T. H.: October 12.
 Washington, D. C., 104 Briggs Bldg., 22 and E Sts., N. W.: Monday through Friday, 8:30 A.M. to 5 P.M.
 Wichita, Kansas: Sometime in September.
 Williamsport, Penna.: Sometime in September and December.
 Winston, N. C.: December 1.
 Winston-Salem, N. C.: August 4, November 3.

NOTE: Only General Class and Amateur Extra Class license examinations are given at FCC offices and examining points listed above. All examinations for Novice, Technician and Conditional Class licenses are conducted by volunteer supervisors.

MINUTES OF 1956 SPECIAL MEETING OF THE BOARD OF DIRECTORS

THE AMERICAN RADIO RELAY LEAGUE, INC.

May 11-12, 1956

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in special session at the Statler Hotel, Hartford, Conn., on May 11, 1956. The meeting was called to order at 9:33 A.M. EDTST, with President Goodwin L. Dosland in the Chair and the following directors present:

P. Lanier Anderson, Jr., Roanoke Division
 James P. Born, Jr., Southeastern Division
 John H. Brabb, Great Lakes Division
 Victor Canfield, Delta Division
 George V. Cooke, Jr., Hudson Division
 Robert E. Cowan, West Gulf Division
 Gilbert L. Crossley, Atlantic Division
 R. W. Denniston, Midwest Division
 Harry M. Engwicht, Pacific Division
 Alfred M. Gowan, Dakota Division
 Walter R. Joos, Southwestern Division
 Claude M. Maer, Jr., Rocky Mountain Division
 Harry M. Matthews, Central Division
 Philip S. Rand, New England Division
 Alex Reid, Canadian Division
 R. Rex Roberts, Northwestern Division

Also in attendance as members of the Board, without vote, were Wayland M. Groves, First Vice-President; F. E. Handy, Vice-President; Percy C. Noble, Vice-President; A. L. Budlong, General Manager. Also in attendance, at the invitation of the Board as a non-participating observer, was Atlantic Division Vice-Director Charles O. Badgett. There were also present Treasurer David H. Houghton, Technical Director George Grammer, Assistant General Manager John Huntoon, Assistant Secretary Lee Aurick, General Counsel Paul M. Segal and Quayle B. Smith of his office.

2) On motion of Mr. Born, unanimously VOTED that the minutes of the 1955 special meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

3) On motion of Mr. Rand, unanimously VOTED that the minutes of the 1956 annual meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) On motion of Mr. Reid, unanimously VOTED that the annual reports of the officers to the Board of Directors are accepted and the same placed on file.

5) Without objection, ORDERED that the reports of the Finance Committee and Membership & Publications Committee be deferred for consideration later in the meeting. Mr. Brabb, as Chairman of the Planning Committee, stated that no matters had been referred to his Committee and it would, therefore, have no report at this meeting. Mr. Reid, as Chairman of the Merit Award Committee, announced that the 1955 award was to be made jointly to Paul M. Wilson, W4HHK, and Ralph E. Thomas, W2UK.

6) On motion of Mr. Gowan, unanimously VOTED that the annual reports of the directors to the Board of Directors are accepted and the same placed on file.

7) At this point, supplementary oral reports were rendered by the officers of the League.

8) Moved, by Mr. Roberts, to request of the Federal Communications Commission that it now give consideration to extending the 14-Mc. phone sub-band from 14,300 kc. to 14,350 kc. Moved, by Mr. Brabb, to amend the motion so that this privilege would be available only to holders of the Amateur Extra Class license, as an incentive. After discussion, on motion of Mr. Gowan, unanimously VOTED that the amendment be further amended to provide that the privilege be available also to Advanced Class licensees. Whereupon, the question being on the amendment as amended, the same was unanimously ADOPTED. Moved, by Mr. Denniston, to further amend the motion that the sub-band be changed to read 14,325-14,350 kilocycles; but, after discussion, the motion to amend was lost. The question thereupon being on the motion as earlier amended, the same was unanimously ADOPTED.

9) The Board was in recess from 10:38 A.M. until 10:47 A.M.

10) Moved, by Mr. Engwicht, that action be started to shorten procedure and lines of communicating complaints and/or violations in the matter of Official Observer policing

of the amateur bands, and the OOs send carbon copy of second same violation notice to the District FCC Field Office upon second or subsequent violation. But, after discussion, the yeas and nays being ordered upon request, the question was decided in the negative; whole number of votes cast, 15; necessary for adoption, 8; yeas, 2; nays, 13; all the directors except Messrs. Brabb and Engwicht voted opposed, except for Mr. Reid, who abstained. So the motion was rejected.

11) Moved, by Mr. Engwicht, the adoption of the following resolution:

WHEREAS, the United States will take part in the International Geophysical Year in 1957-58 by launching of the first artificial satellite, and WHEREAS, the optical satellite tracking program has been assigned to the Smithsonian Astrophysical Observatory, Cambridge, Mass., by the National Academy of Sciences, and WHEREAS, the Astronomical League, American Association of Variable Star Observers, the Western Amateur Astronomers and the International Astronautical Federation have been designated as collaborating agencies for satellite observations by non-professional observers, and WHEREAS, it has been proposed to enlist the aid of amateur radio operators to take part in a communications network which will be established for the transmission of observations as soon as they are made,

BE IT RESOLVED, that the members of the Pacific Division of the American Radio Relay League request the League's Board of Directors to volunteer the services of America's radio amateurs to assist in this program, and that the Board immediately launch a study of the best way in which such a program can be carried out in cooperation with the above-named societies.

But there was no second, so the motion was lost. At Mr. Maer's request, with unanimous consent, ORDERED that the minutes show the resolution was regarded as unnecessary in view of the oral report of the General Manager on plans already in progress for participation by the League and its members in such a program.

12) Moved, by Mr. Engwicht, that the ARRL recommend the origination and award of the Double-Century or 200-country DX certificate to those who presently or in the

future qualify and who apply for same, the rules to be precisely the same as for DXCC, except regarding the number of confirmed countries; but, after discussion, the motion was lost.

13) Moved, by Mr. Engwicht, that Field Day stations in all time zones, will start and end at the same time. It is further suggested that starting and ending time be 3 p.m. Central Standard Time. But there was no second, so the motion was lost.

14) Moved, by Mr. Engwicht, that the ARRL investigate a suitable incentive program to stimulate interest in the Amateur Extra Class license. This survey to take no longer than six months, and be started no later than June, 1956. Reason, that a step structure of licensing offers incentive for radio amateurs to advance themselves and the radio art. But there was no second, so the motion was lost.

15) Moved, by Mr. Engwicht, that the ARRL Board of Directors investigate having a recall procedure for all elected officials of the League; but, after discussion, the motion was rejected.

16) Moved, by Mr. Engwicht, that in view of the fact that the state of the art is going into other modes of operation, the ARRL publications should have a section for these new modes, including RTTY, and QST should carry articles on these new modes of operation; but, after discussion, the motion was rejected.

17) Moved, by Mr. Engwicht, that the Board of Directors investigate a suitable incentive program for articles in QST on radio subjects; but, after discussion, the motion was rejected.

18) Moved, by Mr. Engwicht, that ARRL be directed to once again recognize the Trunk Line type of net operation and steps be taken to bring this group of operators into the National Traffic System; but there was no second, so the motion was lost.

19) On motion of Mr. Engwicht, unanimously VOTED that the ARRL General Manager investigate the feasibility of adding to the list of supplies available to members a selection of medals, plaques, cups and other suitable trophies, to be used by radio clubs in making awards to members. Since none of the commercial suppliers of trophies have any that are particularly designed trophies suitable

The ARRL Board of Directors and League officials at a luncheon recess during the meeting in Hartford on May 11th. Seated, l. to r.: Dakota Director Gowan; West Gulf Director Cowan; Delta Director Canfield; Southwestern Director Joos; Pacific Director Engwicht; First Vice-President Groves; Northwestern Director Roberts; Midwest Director Denniston; Vice-President and Communications Manager Handy; General Counsel Segal; President Dosland; Secretary and General Manager Budlong; Asst. General Manager Huntoon; Treasurer Houghton; Canadian Director Reid; Vice-President Noble; New England Director Rand; Rocky Mountain Director Maer; Great Lakes Director Brabb; Hudson Director Cooke; standing, l. to r.: Technical Director Grammer; Counsel Quayle B. Smith; Roanoke Director Anderson; Southeastern Director Born; Central Director Matthews; Atlantic Vice-Director Badgett; Atlantic Director Crossley; Asst. Secretary Aurick.



for such amateur activities as Field Day operating contests construction contests, public service, etc.

20) On motion of Mr. Maer, unanimously VOTED that the Communications Manager be requested to determine the feasibility of transferring to the Rocky Mountain Division that part of western Nebraska situated in the mountain standard time zone and report his determination to the next meeting of the Board.

21) Moved, by Mr. Maer, that the Board now discuss generally the question of public relations and more specifically the report of the Communications Manager on the creation of a field public relations appointment. But, after discussion, on motion of Mr. Brabb, unanimously VOTED that the matter be laid on the table.

22) Moved, by Mr. Born, that the 1957 annual meeting of the Board be held in Miami, Florida; but, after discussion, the motion was rejected.

23) Moved, by Mr. Joos, to amend the Articles of Association by adding a new Article 8A to read as follows: "Upon the fixing or calling of a meeting of the Board of Directors under Article 5, any Director may, upon five days' notice to the Secretary, designate the Vice-Director to attend in his place and, for that meeting only, the Vice-Director shall hold the office of Director." But, on motion of Mr. Crossley, unanimously VOTED that the matter be laid on the table.

24) Moved, by Mr. Joos, that the Board instruct the General Manager to immediately institute a Novice department section in *QST*; but, after extended discussion, the motion was rejected.

25) During the course of the above action, the Board recessed for luncheon at 12:18 p.m., reconvening at 1:53 p.m., with all Directors and other persons hereinbefore mentioned in attendance.

26) Moved, by Mr. Joos, that the Board hereby instruct the General Manager to immediately start the study of an up-grading incentive plan for the FCC amateur license structure and report to the Directors within six months for approval (additions or deletions) before petitioning FCC accordingly. On motion of Mr. Maer, after extended discussion, VOTED to amend the motion by striking the text and substituting therefor the following: "That the General Manager be requested to make a study of the feasibility of returning amateur licensing to an incentive plan and to report to the Board at its next meeting the result of his study, together with any recommendations resulting therefrom." The question then being on the motion as amended, the same was unanimously ADOPTED.

27) Moved, by Mr. Joos, that the Board appropriate necessary funds to defray the expenses of those directors who wish to attend the 1956 National ARRL Convention. Moved, by Mr. Brabb, to amend the motion, by striking therefrom the words, "the 1956" and substituting therefor the word "any"; the vote on the amendment resulting in a tie, 8 in favor to 8 opposed, the Chair cast his vote in the negative, so the motion to amend was rejected. On motion of Mr. Roberts, unanimously VOTED that the matter be laid on the table.

28) On motion of Mr. Joos, VOTED, 9 votes in favor to 5 opposed, that the Board now review the salary of the General Manager. At this point, 2:55 p.m., the Headquarters officers and employees retired from the meeting, and the Chair appointed Quayle B. Smith to act as Secretary pro tem. The discussion was completed without formal action, and the Headquarters officers and employees thereupon returned to the meeting at 3:35 p.m.

29) Moved, by Mr. Cowan, that Article 5 of the Articles of Association be changed by eliminating from the last

paragraph thereof the words, "during the first quarter of each year at a time and place to be fixed by the President upon at least forty-days' notice," and substituting therefor the words, "at a time and place as provided in the By-Laws," so that the sentence will then read as follows: "The Board shall meet annually at a time and place as provided in the By-Laws." After extended discussion, the yeas and nays being ordered, the question was decided in the affirmative: whole number of votes cast, 16; necessary for adoption, 12; yeas, 15; nays, 1. All the directors voted in the affirmative, except Mr. Maer, who voted opposed. So the Articles of Association were amended.

30) Moved, by Mr. Cowan, that By-Law 20 be amended to read as follows: "The annual meeting of the Board of Directors shall be held at West Hartford on the second Friday in May of each year, at a place to be designated by the President and notified by the Secretary. The time and place of annual meetings may be changed provided that specific provision is made therefor by (1) majority vote of the directors at the next preceding annual meeting, or (2) majority vote by the directors in a mail vote initiated by the Executive Committee or on petition of at least five directors, such mail vote to be taken at least sixty days previous to the date proposed for the meeting." Moved, by Mr. Roberts, to amend the motion to specify the date as the first Friday and Saturday in the month of June; but there was no second, so the motion to amend was lost. The question then being on the original motion, and the yeas and nays being ordered, the question was decided in the affirmative: whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. All the directors voted in the affirmative, so the By-Law was amended.

31) On motion of Mr. Cowan, unanimously VOTED that, should the date and/or place of the annual meeting of the Board be changed in accordance with the provisions of Paragraph 20 of the By-Laws, notice thereof shall be given as soon as possible thereafter in *QST*, official bulletin and other media, for the information of all ARRL members.

32) Moved, by Mr. Cowan, that Paragraph 6 of the Rules and Regulations of the Communications Department be changed to read as follows: "The office of any Section Communications Manager may be declared vacant by the Executive Committee upon recommendation of the Communications Manager whenever it appears to be in the best interests of the membership so to do. Pursuant to such action, the Communications Manager shall thereupon appoint an Acting Section Communications Manager to serve until the next succeeding meeting of the Board of Directors, at which time the Board will review the case and, if the action of the Executive Committee is confirmed, then the Communications Manager shall cause the election of a new Section Communications Manager to be held, as provided in Paragraph 5." But, after discussion, on motion of Mr. Maer, unanimously VOTED that the matter be laid on the table.

33) On motion of Mr. Cowan, unanimously VOTED that the Section Emergency Coordinator of each Section is authorized to attend the official Annual ARRL Convention in his Division and may receive reimbursement for his actual expenses on the same basis and subject to submission and approval of his report of activities there as provided for organization trips.

34) Moved, by Mr. Cowan, that the action of the Board as reported in *QST* of July, 1952, page 38, paragraph 58, be changed to read as follows: "(3) Exceptional travel requirement. In cases where official meetings or other official contact with state or regional Civil Defense authorities makes travel for attendance in adjacent sections especially desirable, an SEC may in such case be authorized to travel exceptionally, as one of the authorized trips, but only after co-ordination with the division director and by advance permission of the ARRL Communications Manager; no reimbursement, in such special cases, however, may cover any travel to a point more than 100 miles beyond the boundary of his own section; except that this 100-mile limitation shall not apply if the trip so exceeding it is for the purpose of attending the official Annual ARRL Convention of the Division in which the SEC holds office and such attendance at his official Annual ARRL Convention as one of his organization trips is hereby authorized, subject to the same regulations with respect to prearranged meeting and subsequent reports." But, after discussion, on motion of Mr. Cooke, unanimously VOTED that the matter be laid on the table.

OFFICERS' REPORTS AVAILABLE TO MEMBERS

Each year the officers of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members, in a volume which also includes reports of the directors. The cost price is 75 cents per copy, postpaid. Address the General Manager at West Hartford, Conn.

35) Moved, by Mr. Cowan, that the maximum number of reimbursable SEC organization trips be changed from ten to five per section per year; but there was no second, so the motion was lost.

36) Moved, by Mr. Cowan, that the General Manager provide a codification of all rules and regulations concerning conventions, affiliated societies, and the Communications Department, together with Board minutes regarding travel and expense reimbursement for League officials and other regulations and restrictions, and publish same in a booklet with the Articles of Association and By-Laws, in sufficient number so that all those affected by such regulations may have a copy on request. Moved, by Mr. Maer, that the motion be amended by striking therefrom the words, "same in a booklet with the Articles of Association and By-Laws;" but the motion to amend was lost. Whereupon, the question being on the original motion, the same was unanimously ADOPTED.

37) Moved, by Mr. Crossley, that paragraph 6 of the Rules and Regulations of the Communications Department be changed to read as follows: "Where an SCM is believed by his electorate to be unsatisfactory in the performance of his duties of office, a recall petition may be filed by full ARRL members of that section. When not less than 5% of the full ARRL members of that section sign such petition and it is filed with the Executive Committee he shall be on trial for removal by the Executive Committee. Briefs by the petitioners setting forth their reasons and an answer by the accused SCM shall be the evidence upon which the Executive Committee shall judge. After a removal a new SCM election shall be held according to regulations." But there was no second, so the motion was lost.

38) On motion of Mr. Crossley, unanimously VOTED that the General Manager be instructed to file with FCC in the name of the League the request that the 125-mile circle be re-established for examinations of Novice, Technician and Conditional Class licenses.

39) The Board was in recess from 4:24 P.M. until 4:43 P.M.

40) Moved, by Mr. Crossley, to make the following addition to Article 7 of the Articles of Association, or a new Article: "The Secretary shall submit by mail, telegraph or telephone vote for determination or decision of the Board of Directors, where opinions are asked or should be filed on any pending FCC docket, legislative or Congressional act, or any legal instrument in which the League is interested when such filing is to be made in the name of the League. This may require a preliminary letter, which shall be made at the discretion of the Secretary, and informal answer by the directors before the final poll. 60% affirmative vote shall be accepted by the Executive Committee as approval."

Moved, by Mr. Brabb, that the motion be amended by striking the text and substituting therefor the following: "that Article 7 of the Articles of Association be amended by substituting the word 'shall' for 'may' in the fourth sentence thereof"; but there was no second, so the motion to amend was lost. On motion of Mr. Maer, unanimously VOTED that the matter is laid on the table.

41) Moved, by Mr. Crossley, that Article 8 of the Articles of Association, after line 10, be amended to read as follows: "vacant, the vacancy in the office of Director shall be filled by appointment of the President, the appointee to have the same eligibility requirements as the elected Director." But, with the permission of his second, Mr. Crossley withdrew the motion.

42) Moved, by Mr. Crossley, to make the following addition to Article 8 of the Articles of Association, or a new Article: "The Vice-Director having been duly elected by the electorate of the Division shall represent that Division at the Board Meeting instead of the Director when the duly-elected Director is incapacitated due to illness, accident, or injury, and the Director or his physician shall have filed with the Secretary such positive statement before the start of the Board of Directors' meeting being held on proper notice. The Vice-Director shall serve instead of the duly-elected Director and shall have all expenses paid as though the Director and shall have all rights and responsibilities of the elected Director until the normal return to his home, after which all responsibilities shall return to the elected Director. Nothing herein shall be interpreted that this temporary transfer of responsibilities shall be made at any other time or for any other reason." But there was no second, so the motion was lost.

43) Moved, by Mr. Crossley, that Article 9 of the Articles of Association be amended to read after the word "Treas-

urer," "all of whom shall be elected by the Board," But there was no second, so the motion was lost.

44) Moved, by Mr. Crossley, to make the following addition to Article 12 of the Articles of Association, or another suitable Article: "No person shall be an officer, director or vice-director of the League, unless at the time of his assuming office he is a member of the League." But, after discussion by the General Counsel, with the permission of his second, Mr. Crossley withdrew the motion.

BOARD THANKS VOLUNTEER A.R.R.L. OFFICIALS

In reviewing the work of the League for the past year the ARRL Board of Directors again found that much of our progress is due to the volunteer efforts of elected and appointed officials in the administrative and field organization of our association. By unanimous action the Board has again expressed its sincere thanks to the Vice-Directors, director assistants, SCMs, SECs and QSL Managers — an action which we know all amateurs will heartily endorse.

45) Moved, by Mr. Crossley, to amend paragraph 13 of the By-Laws to make the time of filing nominating petitions more specific so that it would read, "12 noon EST (or EDST or Division Time", and also to add that such petitions must be filed with the Secretary "at his office in West Hartford, Connecticut." But there was no second, so the motion was lost.

46) On motion of Mr. Crossley, unanimously VOTED, after discussion, that properly-worded certificates be provided for issue by the respective Director to his appointed assistant directors in their division, naming them as assistant directors for the year ending December 31, ——. These certificates to be similar in size to that of SCM, SEC and like appointments, with a suitable wording applying to the assistant director.

47) On motion of Mr. Crossley, after discussion, unanimously VOTED that properly-worded certificates be provided for the issue by the respective SCM to his appointed assistant SCM, naming him as assistant SCM for the year ending ——. To be in line with the particular SCM election date. These certificates to be similar in size to that of SCM, SEC and like appointments, with suitable wording applying to assistant SCM.

48) Moved, by Mr. Crossley, that the Board instruct the Secretary in the name of the League, to investigate and, if found feasible, to make a formal filing with FCC favoring a restriction in the 2-meter band (144-148 Mc.). That only c.w. operation be permitted in the highest 500 kc. of that band. (147.5-148 Mc.). After extended discussion, moved, by Mr. Denniston, that the motion be amended so that the lowest 100 kc. would be the exclusive c.w. band; but there was no second, so the motion to amend was lost. The question then being on the original motion, the same was rejected, 6 votes in favor to 7 opposed. On further motion of Mr. Crossley, VOTED that the subject of an exclusive c.w. allocation on the 144-Mc. band be referred to the Planning Committee for study.

49) Moved, by Mr. Crossley, that the Board instruct the Secretary in the name of the League to investigate and, if found feasible, to make a formal filing with FCC to permit the use of RTTY in the 160-meter band (or portion of it). Moved, by Mr. Maer, that the motion be amended to provide that similar privileges also be requested in the c.w. portion of the 10-meter band; but, after discussion, the motion to amend was rejected, 5 votes in favor to 7 opposed. The question then being on the original motion, the same was ADOPTED.

50) On motion of Mr. Matthews, unanimously VOTED that a 1957 National Convention be authorized under the sponsorship of the Chicago Area Radio Club Council.

51) Moved, by Mr. Matthews, that the League embark on a continuing effort, in QST, to smooth out the ill-will

between a.m. and s.s.b.; but there was no second, so the motion was lost.

52) Moved, by Mr. Matthews, that the ARRL Communications Department review Field Day rules to grant greater rewards to FD stations using amateur designed and built transmitters; but, after discussion, the motion was rejected.

53) On motion of Mr. Brabb, after discussion, unanimously VOTED that the General Manager be instructed to take such steps as necessary for the return of 160 meters to the amateur service, the same as it was prior to World War II.

54) On motion of Mr. Brabb, VOTED that greater publicity be given in *QST* to the amateur code of ethics.

55) Moved, by Mr. Brabb, that the General Manager authorize a greater expense account to the Technical Department provided the Technical Director deems it necessary; but, after discussion, during which it was explained that sufficient funds are already made available in line with Mr. Brabb's thoughts, unanimous consent being given, the motion was withdrawn.

56) Moved, by Mr. Brabb, that the General Manager investigate the feasibility of granting life membership to certain members of the League, such as those with twenty years or more continuous membership. But, after discussion, on motion of Mr. Born, unanimously VOTED that the matter be referred to the Planning Committee.

57) The Board recessed for dinner at 6:16 p.m., reconvening at 8:50 p.m., with all directors and other persons hereinbefore mentioned in attendance.

58) Moved, by Mr. Cooke, that the General Manager be instructed to investigate the feasibility of petitioning the FCC to include in the requirements under Part 12:44(c) of the Rules Governing Amateur Radio Service, titled, "Manner of Conducting Examinations," the requirements of written test examinations be the same as those of examiners conducting code tests for Conditional, Technician or Novice class license in addition to the present requirement of being at least twenty-one years of age. If the General Manager finds same to be feasible, he be further instructed to so petition the Commission. But there was no second, so the motion was lost.

59) Moved, by Mr. Cooke, that the General Manager be instructed to publish either by supplement or in an issue of *QST* as soon as practicable a ten-year index of all *QST* articles during that period. After discussion, moved by Mr. Maer that the motion be amended to provide that the League publish a reprint of the annual indices for ten years, at cost. The question being on the amendment, the same resulted in a tie vote, 7 in favor to 7 opposed, whereupon, the Chair cast the deciding vote in the negative, and the motion to amend was rejected. The question then being on the original motion, the same was unanimously rejected.

60) Moved, by Mr. Cooke, that the editor of *QST* be requested to have written and published in an early issue of *QST* an article composed of procedures on file as developed by amateurs in those states successful in obtaining favorable legislation and issuance of special amateur call-letter license plates. But, after discussion, during which the General Manager brought out that this information is already available through the League in other forms, the motion was withdrawn.

61) Moved, by Mr. Cooke, that Article 25 of the By-Laws, wherein, as a part of that Article, is listed those counties in the state of New Jersey now comprising a portion of the Hudson Division and known as the Northern New Jersey (NNJ) section, be rewritten to include the counties of Sussex, Warren, Hunderdon, and Somerset, designated at present in the Southern New Jersey (SNJ) section, Atlantic Division. Further, that the Communications Manager of the League, upon passage of this motion, take conventional measures, as required by the Rules and Regulations of the Communications Department, in establishing these four counties within the NNJ section, territorially and administratively. After discussion, the yeas and nays being ordered, the question was decided in the affirmative: whole number of votes cast, 15; necessary for adoption, 12; yeas, 15; nays, 0; all directors voted in the affirmative except Mr. Reid, who abstained. So the By-Law was amended.

62) On motion of Mr. Cooke, unanimously VOTED to adopt the following resolution:

WHEREAS, on November 7, 1955, Henry W. Yahnel, W2SN, resigned after twenty-three years of continuous

service to the American Radio Relay League and the radio amateurs in the W2 call area in the capacity of QSL Manager.

BE IT RESOLVED that the Board of Directors meeting in Hartford, Connecticut, on May 11, 1956, cognizant of such exemplary service, does hereby express its deep appreciation of his devotion, loyalty, and sacrifices for the welfare and pleasure of amateur radio.

63) On motion of Mr. Denniston, unanimously VOTED to grant affiliation to the following societies:

Mueler Brass Co. Employees "Brass Pounders" Amateur Radio Club.....	Port Huron, Mich.
Northwest St. Louis Amateur Radio Club.....	Normandy, Mo.
Bethpage Amateur Radio Club.	Bethpage, L. I., N. Y.
Mississippi Valley Radio Club.	Hamilton, Ill.

64) At this point, Mr. Denniston conveyed to the Board the best wishes for continued success of ARRL of the President and other officers of the Liga Mexicana de Radio Experimentadores; in acknowledging these good wishes, the President expressed the Board's own best wishes to the L.M.R.E.

65) Moved, by Mr. Rand, that the President appoint a National TVI Committee composed of two members of the Board and Mr. George Grammer—said committee to study the national TVI situation and make recommendations to the Executive Committee for action. After extended discussion, on motion of Mr. Maer, unanimously VOTED to amend the motion by striking the text and substituting therefor the following: "The ARRL expresses its appreciations for the fine work of the TVI committee system instituted by FCC, and to further assist in this program directs that the President appoint a committee composed of two members of the Board and Technical Director Grammer, to study the national TVI situation and make recommendations to the Executive Committee for assistance to this program." The question then being on the motion as amended, the same was unanimously ADOPTED.

66) Moved, by Mr. Rand, that the General Manager is hereby authorized to reimburse the Vice-Director and director assistants of each division for travel expenses to not more than two director-assistant meetings per year within their division. Travel vouchers to be approved by the Director and may include actual expenses, such as cost of meals, one night in a hotel and 7½ cents per mile for distance traveled. But, after discussion, on motion of Mr. Cowan, VOTED that the matter be laid on the table.

67) Moved, by Mr. Rand, that the members of the Board of Directors be allowed to travel to two informal meetings per year with the directors of neighboring divisions, and that the General Manager is hereby authorized to pay the actual travel expenses of each Director to said meetings out of the funds allocated for the administration of ARRL affairs in that division. But there was no second, so the motion was lost.

68) Moved, by Mr. Rand, that the Planning Committee study methods of encouraging amateurs to spend more of their operating time on the v.h.f. and u.h.f. bands. After discussion, on motion of Mr. Maer, unanimously VOTED that the motion be amended by striking the text and substituting therefor the following: "that the ARRL Headquarters Staff is commended for its work in the v.h.f. and u.h.f. fields, and that the Board urges the continuation of this endeavor." The question then being on the motion as amended, the same was unanimously ADOPTED.

69) On motion of Mr. Brabb, at 10:17 p.m., the Board recessed under orders to reassemble at 9:00 a.m. on the morrow. The Board reassembled at the same place on May 12, 1956, and was called to order by the Chair at 9:05 a.m., with all directors and other persons hereinbefore mentioned in attendance.

70) On motion of Mr. Rand, unanimously VOTED that an awards committee be appointed each year, and that this committee be empowered to decide which awards to make, the qualifications therefor, and the methods of obtaining candidates. Actions of this committee shall be subject to approval of the Executive Committee.

71) Moved, by Mr. Rand, that the General Manager make informal inquires of the FCC and the FCDA to ascertain the desirability of making RACES a permanent service and to find out how ARRL can help to further implement this service. But, after discussion, the motion was rejected.

72) On motion of Mr. Born, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1956 in the proper administration of ARRL affairs in their respective divisions up to amounts as follows:

Canadian Division Director.....	\$1000
Atlantic Division Director.....	1400
Central Division Director.....	1000
Dakota Division Director.....	700
Delta Division Director.....	900
Great Lakes Division Director.....	800
Hudson Division Director.....	800
Midwest Division Director.....	900
New England Division Director.....	1000
Northwestern Division Director.....	900
Pacific Division Director.....	1500
Roanoke Division Director.....	600
Rocky Mountain Division Director.....	800
Southeastern Division Director.....	1300
Southwestern Division Director.....	1200
West Gulf Division Director.....	1000

73) On motion of Mr. Engwicht, unanimously VOTED that the General Manager is hereby authorized to pay him the sum of \$194.54 for expenses incurred in the administration of the Pacific Division during the year 1955, in excess of the amount previously authorized.

74) On motion of Mr. Born, unanimously VOTED that the General Manager is hereby authorized to pay him the sum of \$55.02 for expenses incurred in the administration of the Southeastern Division during the year 1955, in excess of the amount previously authorized.

75) On motion of Mr. Crossley, unanimously VOTED that the General Manager is hereby authorized to pay him the sum of \$46.13 for expenses incurred in the administration of the Atlantic Division during the year 1955, in excess of the amount previously authorized.

76) On motion of Mr. Roberts, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1956, but not to exceed amounts as follows:

Planning Committee.....	\$2000
Finance Committee.....	1500
Merit Award Committee.....	250

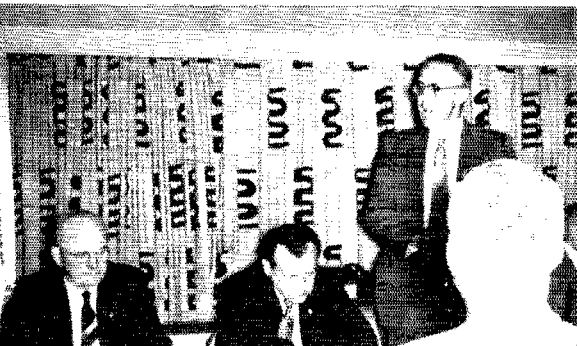
77) On motion of Mr. Born, unanimously VOTED that the number of authorized organization meetings permitted to Section Communications Manager be changed from five to ten.

78) On motion of Mr. Roberts, unanimously VOTED that, to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1956 a total amount not to exceed \$5,000, under terms prescribed by the Communications Manager following the general pattern established by the Board.

79) On motion of Mr. Born, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Co-ordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1956 a total amount not to exceed \$5,000, under terms prescribed by the Communications Manager following the general pattern established by the Board.

(Continued on page 128)

Some action shots during the 1956 Board meeting. Top: Engwicht discusses a motion, while Canfield, Joos, Roberts, Q. B. Smith of Counsel's office, and (back to camera) Maer listen. Upper center: General Mgr. Budlong makes a supplementary report; around the table are Handy, Grammer, Counsel Segal, Q. B. Smith, President Dosland, and (back to camera) Huntoon. Center: Contemplating a legal point are President Dosland, Huntoon, Houghton, Reid, Noble, Counsel Segal, Rand, and Handy. Lower center: Handy discusses as Roberts, Denniston, Grammer, and (back to camera) Houghton absorb. Bottom: Confering during recess are Maer, Crossley, Groves, Brabb, and Q. B. Smith.





Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
PHIL SIMMONS, WIZDP, Asst. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, WIYYM Asst. Comm. Mgr., Phone

How To Send Well. "My experience may entitle me to a few lines, which may be of help. . . . Telegraphing over the air is static, interference, and fading making signals difficult to receive. The heavier, the more solid, the smoother these transmitted signals of yours are the better chance they have of getting through, and the easier they are to read. *Sending well* is of prime importance to your success as a communicator. Fine transmitting is like beautiful music, and it *is* music when properly done. Note, for example, that to fall down three times on sending any word, three efforts must be made, all to accomplish but *one* thing. This puts a useless and unnecessary burden on the receiving operator. Some of the technique on the air is bungling of a beautiful art and no excuse or alibi really covers the circumstance.

Make up your mind that you cannot, you will not, you shall not fall down in transmitting code or procedures. Then you will attract the receiving operator to you, make him want to contact you, not cause him to throw the switch and run out of his shack in disgust." — *W5APA*

On the subject of fists, W7OE adds a contribution of his own: "The only way I know whether my characters are at least readable is to *listen to what I send*, to make *sure* my dots are DOTS, my dashes DASHES and my spaces correct enough so they are so recognized. . . . Some guys either have no way of monitoring their own stuff or don't recognize proper character formation. Dots too long; dashes too short; spaces questionable. Arrange a way to listen as you transmit. Examine your own fist; are you making the characters *clear, sharp* and easily distinguishable? Sure, *you* know what you're trying to say; you have a written copy in front of you or it's in your head. What about the other guy? Give him a thought and examine your *own* fist!" — *Pacific Area Net News*

OPERATION ALERT, 1956

July 20th-21st

Amateurs throughout the nation will be busily participating in Operation Alert, the nationwide civil defense annual exercise, on July 20th and 21st. We hope *you* will be one of them; if not, we hope *you* will read *this anyway because it concerns you*.

While full details of the exercise are not available at this writing (ECs will be informed as the date approaches, and we presume radio officers will of course be informed through civil defense channels), we know two things of primary concern to us: (1) that amateurs are expected to participate, both those already authorized in RACES and those planning RACES operation, and that amateurs *not* participating are expected to cooperate by avoiding use of RACES segments; (2) that a nationwide conelrad alert will be conducted in which *all* radio services will be concerned — which means that we amateurs will be expected to observe our conelrad regulations (see page 47, October 1955 *QST*), which will still on that date be on a voluntary basis.

FCC's Public Notice of last year requesting amateur cooperation in Operation Alert included "any other similar test exercise or drill held in the future," so it is effective for the coming July exercise. We think the part pertaining to amateurs should be quoted:

"Any RACES stations operating under an approved plan may be asked to participate . . . Amateur radio operators who are not included in an approved RACES plan may be asked to participate . . . on RACES frequencies . . . and their operation must be in accordance with Subpart A of Part 12 . . . *Amateurs who do not participate in this exercise are expected to cooperate by not operating on RACES frequencies during the period of the exercise.*" (Italics ours.)

If you are involved in any RACES planning, see your radio officer for details of your participation. If not, consult your EC to find out if your AREC organization plans to participate in coordination with local civil defense. See *you July 20th and 21st!*

Operator License Suspensions. Reference to Operating News of January and February *QST* indicates the several types of violations of FCC amateur service regulations for which operator license suspensions are being made. There follows the two latest:

FCC ordered (30 Aug. '55) that the Novice and Technician Class amateur operator licenses of Arnold Joseph Lipman, Los Angeles, California, be suspended for the remainder of the license term as to Novice Class and for a period of one year with respect to Technician Class, it appearing that said licensee on various occasions in the period May-July '55 and on July 13, '55 in particular, operated KN6IDN and K6IDN in the 3.8-4 Mc. frequency band using A-3 emission, a violation of Sec. 12.23; also that after changing address he, without first notifying the FCC Field Office of intended portable operation, engaged in operation in violation of Sec. 12.91 and 12.93. The order provided that the license be turned in to FCC and KN6IDN and K6IDN not be permitted to be operated by any person in this period.

The matter of this suspension was designated for a hearing before a Commission examiner in mid-January but just before date of said hearing in March, on motion of the safety and Special Radio Services Bureau, FCC granted a motion by the Hearing Examiner continuing indefinitely the pending action to dismiss the proceedings and affirm the suspension order. Such suspension order was affirmed by FCC on 4 April 1956.

FCC ordered (26 March, 1956) that the amateur operator license of Joseph T. Collins, Thiensville, Wisconsin, be suspended for a period of one year, and that the license be turned in to the office of the Commission in Washington, D. C., it appearing that the licensee (1) while operating his station W9PYM failed to properly identify said radio station by transmitting the call sign, a violation of Sec. 12.82; (2) that said licensee in this period Oct. 1-Nov. 30, '55 and particularly on Nov. 15 and 20 transmitted an unmodulated carrier in violation of Sec. 12.134; (3) failed to maintain an

accurate radio log of W9PYM, violation of Sec. 12.136; (4) failed to operate W9PYM in accordance with good engineering and good amateur practice, violation of Sec. 12.151; (5) that said licensee transmitted unidentified radio communications, a violation of Sec. 12.159, and (6) that said licensee on these occasions and dates named, engaged in the operation of his amateur radio station W9PYM and *interfered with or caused interference to radio communications or signals transmitted to or from other radio stations in violation of Sec. 12.160 of FCC rules.*

On Discourtesy in Operating. There are numerous practices that rate discussion and betterment, possibly none so abused as the directional CQ. When a CQ call is followed by indication of city, state, country, band, etc., it should under most circumstances be clearly recognized that this is a clarification to aid in getting specific replies or communications connections with the points or band segments specified. The good communicator will carefully respect all such wishes.

W6JBP writes to note the abuse of this type of indication in DX work. Others have noted their difficulties in contracting specific nets or groups, and animosity to the operators concerned, when persons *not* related to those nets responded with utter disregard for the indicator!

"I heard YV4AU calling CQ AFRICA on 14.086 Mc. Though I have not worked this country I refrained from

calling, knowing he desired Africa. When he signed, the band went haywire with U. S. stations . . . and . . . calling him. YV4AU then called QRZ AFRICA ONLY. He was again deluged with calls and did not work any station on the same approximate frequency for over an hour. It is not my purpose to put the finger on fellow hams but I have sent a copy of this letter to YV4AU to apologize for the conduct of my brother hams here in the U. S. A. Many amateurs are probably well aware that DX stations refuse to answer W stations because of this sort of thing every day."

— F. E. H.

BRIEF

Members of the Rappahannock Valley Radio Club, after due deliberation, turned down the Virginia State Prison Camp near Fredericksburg as site for Field Day operations. They decided it might not be a good spot for *getting out!*

DXCC NOTES

Announcement is hereby made of the addition of the island Nauru to the ARRL Countries List. This island is located in the west Pacific Ocean 26 miles south of the equator, longitude 167 degrees E and lies west of the Gilbert Islands. This announcement follows as a result of the operation from Nauru by G2RO and the subsequent submission of a confirmation by a DXCC member.

DXCC credit will be given for Nauru starting September 1, 1956, for creditable confirmations dated on or after November 15, 1945. This will permit foreign amateurs to start receiving credit at the same time as those in the U. S. A. Do not submit Nauru confirmations before September 1, 1956.

In the future ARRL DX Competitions, those making contact with amateur stations located on the island of Nauru may claim credit for a separate country in accordance with DXCC rules.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....266	W6SYG.....256	W8NBK.....253
W8HGW.....265	W3BBS.....254	W3JTC.....253
W6AM.....263	W3GHD.....254	W8KIA.....253
W6VFR.....259	G3PL.....254	W6DZZ.....253
W6ENV.....258	W2AGW.....254	W6SN.....252
W6MX.....258	W9NDA.....253	W7AMX.....252
PY2CK.....257		W3KT.....252

Radiotelephone

PY2CK.....249	W9RBI.....225	WINWO.....221
W1FH.....240	GM3DHD.224	W1MCW.....220
VQ4ERR.....238	W9NDA.....221	W3JNN.....220
ZS8BW.....236	W6AM.....221	W1JXC.....220
W8HGW.....231		W8GZ.....218

From April 15, to May 15, 1956, 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

VS6CG.....166	VP5DC.....105	W8HNX.....101
W1DFO.....131	W3ZAL.....103	W0LBB.....101
W4BYU.....131	K6CJQ.....103	J8A3Q.....101
W4IMI.....124	K6EWL.....103	VEIOM.....101
W6KIG.....112	W6VJW.....103	ZS6AEA.....101
W1ZZK.....111	H9YRM.....103	W1LLN.....100
W6BHG.....111	W1PWK.....102	W41A.....100
W8PHZ.....111	W3CDG.....102	W0LLU.....100
W7DZO.....110	D2AE.....102	E1SS.....100
CO2WZ.....110	VK2ZH.....102	G2AOW.....100
W9ROU.....108	W1PFA.....101	1LZFD.....100
H9B9U.....108	W4JII.....101	KP4YT.....100
W1VFE.....107	W7CFA.....101	OE8KI.....100
H9B9M.....107	W7QGF.....101	OK3HM.....100
K6BFC.....105		ZL1AJU.....100

Radiotelephone

W8JTN.....138	W0GFO.....107	W5ZUI.....102
PY4GC.....125	H98NU.....106	1LZGG.....102
PY7VG.....115	W0IOS.....105	W6CLS.....101
DL3VZ.....110	W4EEO.....103	W1DBM.....101
W4BYU.....109	DL3RM.....103	W5HJA.....100
W6QOG.....108		ZS1MQ.....100

ENDORSEMENTS

W6CUQ.....250	GM3DHD.230	W8MPW.....211
W6TIV.....232	ON4AU.....230	G2ML.....211
W7GLV.....230	W8UAS.....224	W3DLB.....210
W8BKP.....230	H9J.....224	W9ABA.....210
W8SYC.....230	CN8MM.....222	W2PRN.....204
W9FKC.....230	W7GBW.....216	W4LZF.....204

W5CEW.....200	W5UX.....160	F9IL.....140
W9EJB.....200	W6YK.....160	SM6LD.....136
W5EB.....188	VE7VC.....160	W7PEY.....135
W8KPL.....194	W41X.....154	SM5AKW.....132
ON4NC.....191	W7ESJ.....152	W1GDY.....131
W0NLY.....190	W8CED.....152	W9HQF.....131
W6EAY.....190	W3HER.....151	W1LHZ.....130
W8KML.....190	W2BOK.....150	W9QBA.....130
ZS1BK.....189	W3AFA.....150	VE1EK.....130
W8TMA.....188	W7PHO.....150	W699.....129
W1LZE.....185	W9ALI.....150	J66AO.....126
W6TXL.....184	PY4ZS.....150	W6ITH.....123
W5DMR.....182	W0IEV.....146	W1QNC.....121
W1FTX.....181	VY5AK.....146	JA1CR.....121
W9QVZ.....181	W7EB.....143	KP4WD.....121
ZS2AT.....181	W8HMI.....143	W1AW.....120
W1BIL.....179	J66AD.....143	W1WAL.....120
K2BU.....178	W3ARK.....142	W2IWC.....120
W7HQC.....178	W3VOS.....141	W3MDO.....120
K2GFO.....172	W4UXI.....141	W3S0H.....120
W1JNV.....170	G2PYT.....141	W4JBG.....120
W3WU.....170	W1JEI.....140	FA7CP.....120
W5KBU.....167	W2FBS.....140	ZD2DCP.....116
W1TYQ.....165	W2FJH.....140	OH5PE.....114
W5ABY.....165	W3AS.....140	W1PEG.....113
W3AKD.....163	W4GHP.....140	W1NL.....110
W1RV.....161	W8CQ.....140	W5ZM.....110
W8DUS.....161	11FO.....140	W6MGC.....110
W2AEB.....160		OH2UD.....110

Radiotelephone

W8BF.....210	W2AEB.....150	W7PEY.....132
CX2CO.....210	W9WHM.....150	W3VKD.....123
W3GHD.....190	ZP5CF.....150	W6ITH.....123
W8KML.....190	W5DMR.....142	W7HQC.....123
W8QJR.....186	W2JY.....141	CT1MB.....122
W8BKP.....180	W5GXP.....140	W8AJH.....120
W9VDJ.....173	W9IEV.....140	1IAJ.....117
W6GVM.....171	PY4LP.....140	W0CBM.....115
W5KBU.....160	PY4ZS.....137	SM5RY.....111
W5YLL.....160	W5EB.....133	ZS2AT.....111

W/VE/VO Call Area and Continental Leaders

W4TO.....245	VE3QD.....210	VE8AW.....181
W5ANG.....251	VE4XO.....118	VO8BP.....190
W9YXO.....250	W659Z.....140	ZS6BW.....142
VE1HG.....159	VE6VK.....140	4X4R.....218
VE2WW.....189	VE7HC.....209	ZL2GX.....251

Radiotelephone

W2BXA.....203	W8AIW.....201	V65YE.....140
W4HA.....191	VE1CR.....120	VE7AM.....140
W5BGP.....216	VE2GQ.....118	ZL1BY.....205
W7HIA.....185	VE3KF.....163	OD5AB.....170



With the AREC

We've heard quite a number of our emergency organizers voice the opinion that since "anything goes in an emergency," there is no need to consider the amateur or RACES rules in making our emergency plans. This would include such details as unlicensed operators, off-frequency operation, illegal operating and unauthorized inter-service operation, to name just a few. In short, anything that needs to be done can be done in an emergency anyway, so why not just go ahead and plan to do it?

We think there is a lot that is basically wrong with this philosophy. It is quite true that in an emergency things can be and frequently are done that would not be allowed in normal times. But these are spur-of-the-moment incidents which arise chiefly through lack of planning; that is, if the operation had been properly planned, the illegal operation made temporarily legal through necessity would not have been required. That's why we have regulations for emergency operation, that's why we have the AREC and RACES, that's why all this advance planning is necessary. We can't flout all these plans, and the regulations devised for the purpose of making the plans effective, without creating confusion and chaos should the real thing come along.

So let's stop taking refuge in the thought that "when the balloon goes up" we can do whatever we have to do to accomplish what we have to accomplish. This may be true to a certain extent, but in no event is it a good basis for planning.

At 0800 on March 8, the level of the Allegheny River at Warren, Pa., was above flood stage. W3YUL and W3NQA proceeded with hand-carried type equipment to the West Side of Warren, where the streets and U. S. Route 6 were under from 2 to 6 feet of water. Communications were established on 75 meters to coordinate dispatching of boats, trucks and workers for the evacuation of approximately 1000 persons. These stations were the only stations of any type active in this section of Warren and were in contact with Red Cross Headquarters and C.D. Control Center through W3YZR and W3ZFB. This operation was continued until 1430. W3CYU, at the C.D. Control Center, kept in constant contact with the Pennsylvania C.D. West Baker



Net on 3990 kc. Area C.D. Director Ross Webb utilized this station and net for submitting his reports to Harrisburg. Some of the operation was conducted on MARS frequencies. Other amateurs active in the operation in Warren included the following: W3s LRE OMK TOJ TY WAQ YZS PHC UZB VVJ BOZ CLB LVF, W1N3s BHH DZQ.

Eastern Wisconsin experienced a heavy snow storm on March 10, stranding almost 3000 people at Neenah. When it became apparent that they could not get home due to the heavy snow, W9WZI of Neenah contacted W9GUE and W9LEL in Green Bay. W9JCL, located in the Neenah High School gymnasium, sent messages from the students to W9GSS, located in the high school office, over an intercom. W9GSS telephoned the messages to W9WZI, who, in turn, relayed them to W9GUE and W9LEL. They telephoned the messages to the many anxious parents who were very relieved and happy to receive them. Operations started at 2208 on March 10 and ended at 0015 on March 11 on 3950 kc. — W9GSS.

While driving his mobile unit near Brunswick, Md., W3TJV came upon an accident in which a small boy was fatally injured. He immediately contacted W3OXL and W3FBR, who summoned an ambulance and the highway patrol. W3TJV remained at the scene until the highway patrol arrived, since the accident occurred at a treacherous spot in the road. Thanks to prompt action by W3TJV, authorities reached the scene promptly.

Rain, snow and freezing rain caused considerable disruption of communications facilities in South Dakota starting on April 2nd. Amateurs started handling emergency communications on the morning of the third via the South Dakota Weather Net, a regular net which had operated week days all winter under W0ZWL and K0ARF. As skip shortened, considerable relaying was necessary, mostly through W0EXX. Later, EXX assumed control of the emergency net. Operation during the two days of net operation (April 3rd & 4th) was directed by W0UUV and W0GDE, assisted by W0s ZWL VQC RMK and UAJ. Approximately 75 "formals" were handled for various agencies and persons, although a great many more than that were "informals." Traffic consisted of phone patches, weather reports, communications for Governor Foss regarding his travel plans, flight plans for a senator, and operational details for the telephone company, electric company (mostly REA), bus lines, railroads, trucking companies, Associated Press, local police departments, Corps of Engineers and broadcast stations. In addition, several death and funeral messages were handled. W0SCT reports that 70 operators representing 48 towns in 8 states (Colo., Wyo., Nebr., S. Dak., N. Dak., Iowa, Minn. & Wis.) took part in the message handling. Twenty-nine additional stations in 27 towns reported into the net to assist if needed, and help keep the frequency clear. The following list does not include those already mentioned: W0s AZR BCO BHP BQH BQS BWM CMJ DIY DM DVB EUJ FKE FLP FMW GJJ HAX HVY HWM HWS HYQ IER ILL IUK IRJ IYN KFC KSW KYN LFD LO MJJ MMQ MZJ NWM OZC PHR QEK RSP RTJ SCT SMV TAS UMX URC VHB VHP VMM WMA WRY WSS WUU YMB YQR ZMU ZRA. K0s ARE BMM BXI WBF WBW, W7PKX W7YSF W9SQM.

On Mon. April 9 the Red Cross welfare in Miami, Florida, was requested by a local hospital to contact the son of a critically ill mother, who was somewhere in Guayaquil, Ecuador, about 2000 miles southwest of Miami. Lacking an address, the Red Cross then requested the American Red Cross Amateur Communications Service (ARCACS) to attempt delivery. W4GGQ transmitted the message to K4AHW on the Dade Emergency Net, who the following



W7ZNN, located at the Spokane Valley Range in Opportunity, Wash., transmitted and received scores in the Idaho State Gallery Rifle Championship match, held in February. W7NGA was the contact at the other range in Twin Falls, Idaho. W7ZAJ assisted at W7ZNN while W7HOT and W7RSP relayed when necessary. Above is W7ZNN operating while a Rifle Assn. official looks on. Photo courtesy of Outdoor Empire.

Most of the work at the USCDARA Conference was done by committees. This *ad hoc* committee was convened to consider a special problem. Seated around the table, left to right, are: WILKF, Conn. C.D. Radio Officer and chairman of the Frequency Allocations Committee; W3YA, chairman of the Public Relations Committee (ARRL Atlantic Div. Director); W8DUA, FCDA; committee secretary; W2BGO, USCDARA Chairman; W2OUT, chairman of the SOP Committee; WINJM; W8LBM, FCDA; W2QGH, technical adviser to Frequency Allocations and V.H.F. Committees.



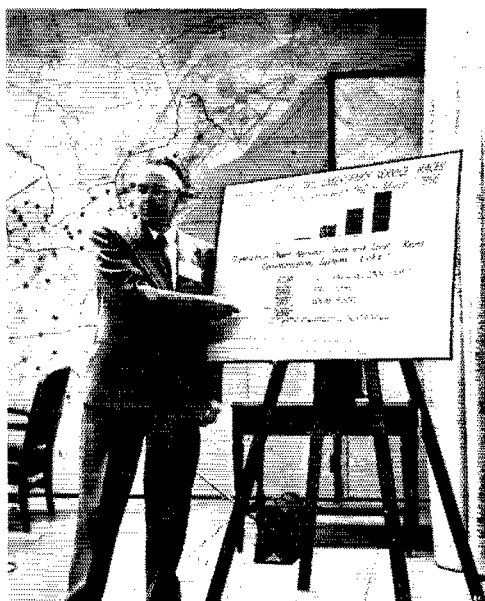
afternoon contacted HC1RT in Quito, Ecuador. HC1RT translated the message into Spanish and passed it to HC1DU who relayed it to HC2AF in Guayaquil, whose son delivered the message in person. The addressee upon receipt of the message, called the Miami Hospital via amateur radio approximately 1700 April 10th. A reply message via the original channel was received early Wednesday afternoon advising the son was departing for Miami Wednesday evening. W4GFQ stood by to assist during all the above operations. — *W4YTT, SEC Eastern Fla.*

At 1505 on April 15 a severe tornado struck five small towns near Birmingham, Ala., killing 24, injuring over 200 and rendering 1113 people homeless. The Birmingham Emergency Net (AENR) went into emergency session at 1520 on both 10 and 2 meters. The mobile control center was moved to the McDonald's Chapel area, the worst hit. Emergency traffic was handled for the Red Cross, Civil Defense, Salvation Army, National Guard, Highway Patrol and other civic groups. Welfare traffic into the area began

and GUV, with W9TIP helping to keep the frequency. Thus is the Alabama AREC organization prepared to go into action in an emergency. Over 100 other stations checked into the nets but were not called into active participation. — *W4TKL, SEC Alabama*

The Alamogordo Radio Club (N. M.) was involved in emergency operation from April 27th to April 29th during the Lincoln National Forest fire at a fire camp near Sacramento Village, N. M. The first amateur on the scene was W5ZU from Roswell, operating mobile. Later W5PCC took over and on Friday night, April 27, mobile W5s DVA ICT NT and K5ANZ arrived at the site after which a fixed station was set up under call of W51GC. The main points of communication were from the first camp and Holloman A.F.B. to the military amateur station there. Traffic concerned Air Force personnel fighting the fire and the handling of weather reports. Communication was maintained until Air Force troops were recalled Sunday afternoon after the fire was well under control.

Eighteen SECs submitted monthly reports for March activities, representing 4924 AREC members. This is an increase in number of reports but a decrease in number of AREC members from last year. Sections reported: W. N. Y., San Joaquin Valley, Wash., E. Fla., Mo., NYC-LI, Colo., Nebr., Minn., E. Pa., N. Tex., N. Mex., Ore., Santa Barbara, Mont., Wis., Santa Clara Valley, Ala.



At the USCDARA Conference in Battle Creek, Mich., April 5-6, J. A. MacGregor, W8DUA, of FCDA, presents a chart showing RACES progress from 1952 to 1956.

about 2000 on six meters. Stations working with AENR included: W4s ASW AVX AZE DFE DTT EDR ERW EWB FSW GET GFW HVH KNW KRL NQK NZZ OLG PXN RKS RTI SX TRM WLM WJX YEG YXX YYH ZSJ ZRZ, K4s AJZ AMQ, W4s GLO GXL.

The Alabama Emergency Net (AENP) went into emergency session at 1518, handling emergency traffic until 2130 when welfare traffic was accepted. The net closed at 2341. NCS were W4s HKK TKL RLG and K4s ACO AOZ. Other participating stations: W4s CRY DTT EVD GLR MI SX UHA WJX.

The Alabama Teen Age Net (AENT) went into special session at 1830 to handle welfare traffic. The load was so heavy a second frequency was activated, and traffic was handled until 2330. Active stations included W4s AZC DXB

RACES News

FCDA has announced the dates for "Operation Alert, 1956" as July 20th-21st. We hope to make detailed information available, as we did last year, to all ECs. This is notice to all others interested that the nationwide civil defense test will take place a month later than last year, and that amateurs in RACES, as well as those planning for RACES, will be participating. A separate heading elsewhere on these pages will give what details we have at this writing. Your EC or radio officer will be able to give you further details as the date approaches.



Three new states — Iowa, New Hampshire and Montana — have had their RACES plans approved by FCC. This makes exactly 40 states now authorized for RACES, leaving only eight to go. Of those eight, several have RACES plans under way and should be authorized shortly; in some of them, local RACES plans have already been approved. We're looking forward to the day, perhaps not too far distant, when all 48 states will be RACES authorized and local authorizations can be made on a planned statewide basis.

The states can be further tied together in regional RACES plans, and this is gradually being accomplished. FCDA Regions 4 and 6 already have approved RACES plans on file, and Region 5 is in the advanced planning stages. The picture is increasingly one of nationwide communications organization — through amateur radio.

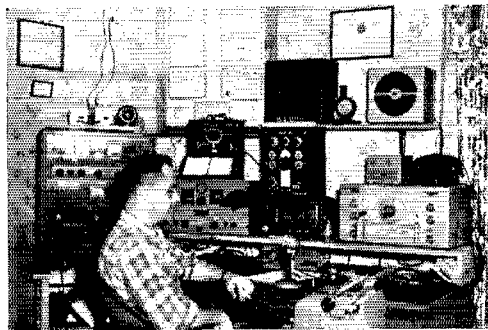
A.R.R.L. ACTIVITIES CALENDAR

June 23rd-24th: ARRL Field Day
July 7th: CP Qualifying Run — W6OWP
July 18th: CP Qualifying Run — W1AW
July 21st-22nd: CD QSO Party (c.w.)
July 28th-29th: CD QSO Party (phone)
Aug. 3rd: CP Qualifying Run — W6OWP
Aug. 16th: CP Qualifying Run — W1AW
Sept. 1st: CP Qualifying Run — W6OWP
Sept. 13th: Frequency Measuring Test
Sept. 14th: CP Qualifying Run — W1AW
Sept. 15th-16th: V.H.F. QSO Party
Oct. 5th: CP Qualifying Run — W6OWP
Oct. 13th-14th: Simulated Emergency Test
Oct. 15th: CP Qualifying Run — W1AW
Oct. 20th-21st: CD QSO Party (c.w.)
Oct. 27th-28th: CD QSO Party (phone)
Nov. 3rd: CP Qualifying Run — W6OWP
Nov. 10th-11th, 17th-18th: Sweepstakes
Nov. 13th: CP Qualifying Run — W1AW

MEET THE SCMs

Robert L. Scott, who has just announced his resignation as SCM of Vermont because of the pressure of other duties, was licensed in 1948 with the call W1RNA.

A participant in various QSO Parties and in CD and LO Parties, Bob was section award winner in the '51, '52, and '53 Sweepstakes and holds W-VT #3 and WANE #29 certificates. He still maintains his Official Relay Station, Official Phone Station, Official Observer, and Official Bulletin Station appointments and is one of New England's Assistant Directors. He also is District Radio Officer in the Vermont Civil Defense Division. Public Service awards have been issued to him for emergency work during the 1950 North-



eastern Hurricane, the 1952 Vermont Snowstorm, and the Worcester Tornado and he has been awarded an Edison Radio Award hurricane citation and one from the Armed Forces Club of Boston. Until a year or so ago W1RNA was a member of the Deepsea Dragnet, the Seagull Net, TCPN, the Vermont Phone Net, and the Vermont C.W. Net and served as alternate director, director, and Net Control about five nights a week on TCPN.

W1RNA's transmitters are a Globe King 400A, a TBS-50C, and an SCR-522; receivers include an HRO-7, a Super Pro 200, and an SCR-522; and the antennas are a 120-ft. center-fed with 52-ohm coax, a long wire, and a three-element vertical 2-meter beam. For emergency work there is a BC-654A transmitter and receiver and an HRO-7 with a 6-volt power supply. While the 80-meter band is preferred, Bob also works 20-meter c.w. and phone and 10-meter phone, in addition to 2 meters for local ragchews.

When he is not working as Deputy Collector of Customs for the U. S. Customs Service at St. Albans, Vt., or helping the XYL, W1VEP, raise three jr. operators, Bob occupies himself with stamp collecting, swimming, fishing, baseball, football, boxing, and wrestling.

W1AW SUMMER SCHEDULE

(All times given are Eastern Daylight Saving Time)

Operating-Visiting Hours:

Monday through Friday: 1300-0100 (following day).

Saturday: 1900-0230 (Sunday). Sunday: 1500-2230.

Exception: W1AW will be closed from 0100 July 4th to 1300 July 5th in observance of Independence Day.

A mimeographed local map showing how to get from main highways (or from H.Q. office) to W1AW 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:

C.w.: 1885, 3555, 7080, 14,100, 21,010, 50,900, 145,600 kc.

Phone: 1885, 3945, 7255, 14,280, 21,330, 50,900, 145,600 kc.

Times:

Sunday through Friday, 2000 by c.w., 2100 by phone.

Monday through Saturday, 2330 by phone, 2400 by c.w.

General Operation: Use the chart below for determining times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0100 each day will fall in the evening of the previous day in western time zones.

Code-Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and at 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies. Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On July 18th and August 16th, instead of the regular code practice, W1AW will transmit a certificate qualifying run.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on July 18th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7080, 14,100, 21,010, 50,900 and 145,600 kc. The next qualifying run from W6OWP only will be transmitted on July 7th at 2100 PDST on 3590 and 7128 kc.

Any person may 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 EDST. Approximately 10 minutes' practice is given at each speed. References 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 get sending practice, hook up your own key and buzzer and attempt to send in unison with W1AW.

Date Subject of Practice Text from May QST

July 3rd: . . . All-Transistor Communications Receiver, p. 11

July 6th: Radio Astronomy, p. 17

July 9th: Reception with Product Detectors, p. 20

July 12th: A Transistor Code-Practice Set, p. 24

July 18th: A Dual Quad for 15 and 10, p. 26

July 20th: Using Those Surplus Relays, p. 28

July 24th: 2nd ARRL Sweepstakes Results, p. 42

July 26th: The Great Flood — West Coast Version, p. 50

APRIL CD PARTIES

Rewarded with top-notch conditions, ARRL appointees and officials had a splendid time pounding brass April 14th and 15th. Official Observer W6YMD's dazzling 251,181-pointer is shaded in modern party history only by W6MUR's 271,953 back in October, 1954, and scores of above 100,000 came from all around the field organization.

Those primed for microphone work the following week end found the bands in quite the opposite shape. V.h.f. was alive with aurora. The attending flutter on 75- and 40-phone signals discouraged many from CD activity and scores nosedived. This is not to detract from the results of W2AEE,

W3TMZ and K6BWD, whose totals were accumulated under downright dismal conditions.

The highest claimed scores are shown below. Figures after each call indicate score, number of contacts and number of ARRL sections worked. Final and complete results will appear in the July CD Bulletin.

C.W.

W6YMD.....	251,181-443-63	K6OIZ.....	58,770-176-55
W4KFC.....	194,240-699-64	K2FDH.....	55,960-301-56
W1EOB.....	193,095-608-63	W3TMZ.....	53,050-302-55
K2QOQ.....	192,340-607-62	W7UJL.....	50,223-172-51
W6BIE.....	176,415-340-57	W7VII/7.....	79,305-170-51
K6OJZ.....	157,780-587-60	W2AXT.....	78,650-279-55
W1JYH.....	156,465-506-61	W2AZS.....	77,000-280-55
W3JNQ.....	154,025-500-61	K2AFQ.....	76,725-335-45
W3VOS.....	146,010-466-62	W6CMN.....	74,360-148-55
K6BWD.....	139,240-260-59	W4WHK.....	73,980-269-54
W6JVA.....	137,380-254-55	V7EKL.....	72,000-160-50
W4PNK.....	134,560-464-58	W3GJY/3.....	68,970-255-57
W9WWT.....	133,900-283-58	K3040.....	67,880-134-55
W9KLD.....	117,705-407-57	W8SWZ.....	67,310-251-53
W2AEE ¹	114,260-388-58	K4BAI.....	66,515-249-53
K6DDO.....	112,689-218-57	W1AW3.....	64,530-232-54
K6BIE.....	112,290-216-57	K2BHQ.....	63,750-230-50
W9NKL.....	110,715-357-61	W6NDU.....	63,448-158-44
W3NFI.....	109,480-384-56	W6UUV.....	60,912-141-48
W8GBF.....	106,720-361-58	W0RLQ.....	60,420-207-57
W6YHM.....	104,940-212-55	W1JTD.....	59,885-196-59
W7JLU.....	104,390-207-55	W2DXL.....	58,000-226-50
V16NXX.....	104,076-196-59	W9WLY.....	57,840-238-48
W9YDR.....	99,300-231-60	W9NDW.....	56,220-212-52
W7GHT.....	98,838-212-51	VE2YU.....	53,900-216-49
K2CPR.....	98,325-338-57	W1NXX.....	53,295-202-51
W9GOC ²	97,350-325-59	W9CXY.....	52,275-198-51
K2GHS.....	96,67-326-58	VE3PAM.....	51,275-205-50
W3KLA.....	95,040-352-54	W2EEN.....	51,205-205-49
W2CWK.....	93,240-227-56	W2KEL.....	51,040-225-44
K2DSW.....	92,400-330-55	VE2DR.....	50,600-224-44
W3WZL.....	92,220-342-53		

PHONE

W2AEE ¹	16,490-97-34	W1FZ.....	7980-71-21
W3TMZ.....	14,460-85-34	W4JUJ.....	6930-69-21
K6BWD.....	11,648-44-28	W4RLG.....	6555-52-23
W2VCZ.....	11,060-76-28	W1JYH.....	5750-53-19
W8NOH.....	10,995-72-27	W3EAN.....	5600-52-20
W1NYN.....	8,125-65-25		

¹ Multiple operator ² W9SZR, opr. ³ W1QIS, opr.

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.m. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

TRAFFIC TOPICS

Funny thing how many ORS show up in the quarterly CD Parties that one scarcely hears of at other times. Good operators, too — operators we could use in the traffic nets. On the other hand, there seem to be a good many ORS who never get into the CD Parties at all, who do handle plenty of traffic and get into networks regularly. Which are you — a contest ORS or a traffic-handling ORS? Or both?

We want to make it clear that participation in CD parties is a privilege, not a duty, of appointment. Appointees who are unable or disinclined to participate in CD parties need not feel that by not doing so they are lacking fulfillment of their appointment qualifications. By the same token, participation in CD Parties alone is not sufficient reason to hold an ORS appointment. ORS is a traffic-handling appointment. If you don't handle traffic or get into

some traffic net regularly, you don't deserve to be ORS, whether you run up a big score in the CD Party every three months or not. The same goes for other appointments, of course — but ORS by far outnumber other appointees in CD Parties.

Now we're not saying you should avoid participation in CD parties! They're a lot of fun and we recommend them. Just let's keep them in their proper perspective as an appointment privilege.

Transcontinental Phone Net reports the following traffic totals for April: 1st Call Area — 765; 2nd Call Area — 894; 4th, 9th and 10.h Call Areas — 464; Total — 2123. The North Texas — Oklahoma Traffic Net reports 30 sessions, 730 stations, for a traffic total of 396.

National Traffic System. The grapevine has it that there are a lot of traffic men, many of them participating in NTS, who do not know what NTS really is nor how it is designed to work. If you are one of these, we'd like very much to hear from you, because we have a little publication which happens to be labeled "CD-24" and is entitled "The ARRL National Traffic System." True, it has no pictures, no jokes, and, we suppose, presents a somewhat formidable pedagogical appearance. But we'd like you to know what NTS is and what it's trying to do — even if you don't agree with it. That's your privilege. Before you disagree with something, however, make sure you know exactly what it is you're disagreeing with. Many of us are inclined to agree with Joe just because he's a swell guy.

April reports:

Net	Ses-	Traffic	Rate	Aver-	Repre-
	sions			age	sentation (%)
1RN	25	374	0.63	15.0	92*
2RN	25	263	0.69	9.5	98.6*
3RN	63	378	1.43	5.8	77.8
4RN	21	100	0.25	5.0	59.2*
RN6	55	434	0.37	7.8	56.6
RN7	50	236	—	4.7	34.4
9RN	30	652	1.24	21.7	98.3*
TEN	67	1214	—	18.1	65.7
TRN	33	57	—	1.7	81.8
KAN	24	873	—	36.4	95.8
CAN	21	654	1.01	31.0	100
PAN	28	1055	0.87	37.6	100
Sections	541***	3320		6.1	
TCC Eastern	39**	557			
TCC Central		1087			
TCC Pacific	104**	1375			

Summary	983	12629	3RN	9.8	—
Record	983	12629	1.57	17.8	100%

* Regional net representation based on one session per night. ** TCC functions reported, not included as net sessions. *** Sections nets reported: MSN & Minn. Phone (Minn.); Iowa phone; S. Dak. Emerg. Phone; AENB, AENP & AENT (Ala.); NCN (Calif.); WVN (W. Va.); Tenn. CW & Tenn. 160 CW; KYN (Ky.); NTX (N. Tex.); CN (Conn.); GSN (Ga.) IFN (Ind.); QKS, QKS SS & QKN (Kans.).

Have you noticed that more nets are making over 1.00 in the "Rate" column? This is an indication that our NTS nets are learning to handle traffic faster at regional and area level. We assume of course that this increase in speed is accomplished at no sacrifice in efficiency or accuracy. The "rate" is the number of message handled per minute during that net session of the month when the most traffic was handled. Some nets do not report duration of this net session, so it's not always possible to compute their "rate."

"Rate" does not apply to section-level nets. We prefer that they take their time. At regional, area and TCC level proficiency increases and there is a need for better efficiency (efficiency = accuracy + speed). This month three nets made better than 1.00 in the "rate" column. This is something to be proud of, providing accuracy is the same or better. We cannot calculate accuracy; we leave it to each net manager to see to it that his net puts accuracy before speed and operates on the basis of accuracy plus speed (i.e., efficiency) rather than speed minus accuracy (i.e., inefficiency).

Regional and Area Net notes: Conn. and W. Mass. were represented in every 1RN session. W2NAK has earned his 2RN certificate. W3UE reports 3RN now holding sessions at 1830, 1945 and 2130 EST Monday thru Friday. W4BVF

reports for 4RN, although he has moved out of the region. Still no RN5 Manager appointed at this writing; any volunteers? RN6 certificates have been issued to W6s RNY FNE RFW TDO and K6ASX; W6ZJR reports a tie-in with civil defense for statewide (Calif.) coverage. RN7 still needs representation from Wyoming, Montana, Saskatchewan, Alberta and Alaska. W9DGA has been awarded a 9RN certificate. Most TEN traffic is handled in the early session, at 1700 CST. TRN welcomes VE3BIA as a new representative from Ontario.

Transcontinental Corps: Eastern Area TCC reports were received (at W8UPB) from the following: W1AW, W1EMG, W1NJM, W2AEE, W2ZRC, W3COK; Central Area TCC reporters included W9CXY, W9DO, W8BDR, W8DQL, W8KJZ, W8LGG, W8SCA. W8KQD lists the following participating in Pacific Area TCC: W6s ADB BPT GJP JPW RFW VZT YHM, W7s DXV FRU, K7NBK, W8s KHQ KQD TUT and K8WBB (last but a heck of a long way from least). Frequencies used for TCC are 3670, 3650, 3665, 3675, 7080 and 7145. During the summer, it is hoped to make more use of 20 meters (14,130 kc.), especially for the backward jump from J to D (Pacific to Eastern). TCC continues its excellent work in clearing inter-area traffic.

KC4USA AND KC4USV ACTIVE

The times these Antarctic stations are working both the east and west coasts has ranged from 0200 to 0800 GMT daily, according to a late report from K4GFR. Garrett and Montgomery (Monty) at KC4USV, McMurdo Sound, have contacted numerous W's using 14,050 to 14,070 kc. c.w. and some voice operation has been on 14,210 kc.

Little America V, KC4USA, has but four radiomen at the base. There has been much phone operation, according to field reports, but K4GFR believes the 14,330-kc. c.w. sked has been curtailed due to personnel shortages. Outstanding message service has been provided the boys in Antarctica by individuals and nets (TCRN for one) and arrangements through a Syracuse club. Cooperation of all amateurs is requested by the Staff Communications Officer to facilitate traffic handling, by giving it priority over general-contact work.

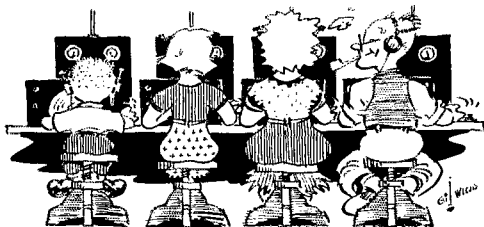
There are reportedly 93 men wintering over at McMurdo Sound and 73 at Little America, so here's an important amateur traffic job to be done.

TRAINING AID NOTES

Our Training Aids section announces the addition of a new film entitled *Sound Waves*, (F-33). The film explains sound origination, the emanation of sound waves, compression and rarefaction, cycles, wavelength and amplitude, and the speed of sound through air, water and metal. This film should prove enjoyable and educational to the Novice and Old Timer alike. The 16-mm. sound film is in black and white and runs about 25 minutes. It is available to any ARRL-affiliated club. When requesting this film, please give a month's notification prior to the desired show date.

TA-21, a complete and up-to-date listing of all aids available to ARRL-affiliated clubs, has just been revised. Club officers will find this new list more useful, since it now carries a short review of the subject matter of many films. Other information includes: a complete listing of slide collections and film strips, information on obtaining non-Training Aid films, recorders and keyers, tapes for code practice, and a complete run-down on quizzes for general usage. A radiogram or short note to the Communications Department will send your TA-21 on its way.

HAM FAMILY



BRIEFS

(To all ARRL members in the N.N.J. and S.N.J. Sections)

Pursuant to Board action transferring Sussex, Warren, Hunterdon and Somerset counties of New Jersey from the Atlantic to the Hudson Division, effective as of this date of publication there is announced a resectionalizing to include these four counties in the Northern New Jersey Section, Hudson Division.

The following New Jersey counties constitute the Northern New Jersey Section: Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union and Warren.

The following New Jersey counties constitute the Southern New Jersey Section: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer and Salem.

— F. E. Handy, Communications Manager

A WAS certificate was issued to W8TZO March 7th for QSLs confirming contacts with amateurs in the 48 state capital cities.

Members of the newly-formed Radio Amateur Teletypists Society are meeting the second Monday of each month in the Minneapolis-St. Paul area. Club officers for 1956 are W8BP, W8HZR, and W8LFI (nicknamed *Quick Brown Fox*, *Lazy Dog*, and *RY*, respectively). Demonstrations of installation, maintenance and use of such TTY equipment as the Model 14, 15 and 26 machines, have been on the program recently. Anyone interested in attending is invited to get in touch with one of the above officers for details.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for April traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W7PCY	22	793	759	34	1608
W7IA	52	689	654	81	1426
W2KKB	66	639	425	236	1366
W3WVQ	103	518	608	65	1292
W2KLV	18	518	472	190	1241
W8SCA	13	578	570	7	1162
W8CPL	8	560	516	44	1128
W8BDR	49	550	502	3	1103
W9DO	19	465	413	71	968
W7VAZ	42	385	345	40	812
W9NZZ	168	242	0	240	650
W4PFC	4	321	300	5	630
W8IAR	23	290	307	6	626
K8FDX	70	302	200	22	604
W8GYH	358	123	90	29	600
W3CUL	62	271	226	33	592
K6WAY	37	231	263	8	539
W9SHR	11	271	240	16	538
W8CB	5	459	198	57	622
W3WZL	27	347	219	25	618
W3UE	15	239	208	48	510
W4PJO	3	253	241	12	509
W7APP	0	255	246	5	506
W8KQD	51	248	203	2	504
K4AFA	3	250	245	5	503
Late Reports:					
W8OHL (Mar.)	4	501	500	1	1006
W7FRU (Mar.)	3	354	300	52	709
W7AFF (Mar.)	5	306	300	6	617

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W6YDK	24	77	600	677	1378
K8WBB	102	389	341	22	854
K8FEL	7	312	307	2	628
K7WAT	177	244	222	40	583

BPL for 100 or more originations-plus deliveries:

W5PEC	427	W3BUD	132	W4YAA	105
W3PQT	192	W8PHA	123	W8NLY	102
W8YOY	183	W8NOH	122	W3VXX	101
K8NCEO	164	VE5CW	118	Late Reports:	
W6USY	162	W9KTX	113	KZ5GB (Mar.)	131
K2DEM	151	K4BBR	112	W8PHA (Mar.)	109
W3ZSX	140	W1WSN	106	W7AIV (Mar.)	103
W8TVR	134	W4DDY	105		

More-Than-One-Operator Stations

W1ECV	269	W9ZPU	9 113	Late Reports:	
				K6LTA (Mar.)	136
				K4FDX (Mar.)	121

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W1RMG, W8EVC, W6GQY, W8LJW.

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.

Let's Get The Story Straight

IN THE OLD DAYS of radio the quality of the best laboratory equipment was actually quite poor. The Federal Communications Commission recognized this state of affairs when it adopted rating transmitters by their d.c. plate input power. Old laboratory equipment is now relegated to museums, and in the same category fall some measurement procedures for transmitters.

IAM SURE that all of us are aware that the only power which provides a QSO is r.f. output power delivered to an antenna. For good and valid reasons, it is necessary that the FCC adhere to its current input ratings for amateur transmitters and certain commercial units. However, as purchasers and users of transmitters, let us consider all facts necessary to compare transmitters properly.

CONSIDER, for a moment, two transmitters each advertised as having plate inputs of 500 watts. A quick rule-of-thumb would indicate that each of these units produces an out-power of 350 watts, but this isn't necessarily true.

ONE DESIGNER may spend considerable time optimizing all tube and circuit parameters and thus achieve 70% efficiency, while the second may not be aware of all the required engineering facts and thus achieve only 55% efficiency. For c.w. operation these differences are not of major importance, but on a.m. and s.s.b. output power ratings can become of considerable importance when the balance of the story is investigated.

VOICE FREQUENCIES are complex waves and, therefore, a voice transmitter should be rated when modulated with a complex wave and not a sine wave. As most modulators, mixers, converters or amplifiers are to some degree non-linear, distortion products are bound to be present in the output of the transmitter.

ANY HUM or noise common to any of the stages will also be present in the output.

THUS, it can be seen that to compare any transmitters properly, additional information is needed. To evaluate a transmitter fully the following is required: Plate input and r.f. power output into a resistive load under the various modes of operation, i.e., c.w., a.m. and s.s.b. Hum and noise must be indicated on c.w. as well as voice operation. On voice operation the distortion levels should be indicated and, in addition, the carrier suppression and unwanted side band suppression measured across the output load should be given when dealing with s.s.b.

S.S.B. r.f. power output data without distortion product levels is meaningless.

GOOD LABORATORY equipment has been available for some time and all the foregoing data can be measured with a fairly high degree of accuracy.

BEFORE QUOTING performance characteristics in your air discussions, be sure you have carefully made your measurements with good equipment, or carefully read the manufacturer's data.

— Cy Read, W9AA

Birchfield, Jr.

W. J. Halligan W9AC

for **hallicrafters**

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, Clarence Snyder, W3PYF — SEC: NNT, RM: AXA, PAM: TEJ, EPA nets: 3850, 3610 kc. The EPA C.W. Net will disband during the summer months but will resume in September. The Pennsylvania Phone Net will continue throughout the summer months and ORSs who wish to continue handling traffic can call in on 3850 kc. at 1800 EDT daily Mon. through Friday. GOW announces that KGN has been appointed Assistant EC for the Gettysburg Area. SOC and YUW are new OOs. ZSX, only 12 years old, made BPL and was appointed ORS during April. The Philadelphia Wireless Assn. reports new officers are YHU, pres.; JWC, vice-pres.; QEZ, rec. secy.; YXU, corr. secy.; NIX, treas.; and ZSJ, mem. director. The club has a 2-meter transceiver project in progress. WBE now is stationed in Brooklyn. CL has a new 20-meter vertical. CUL is back from Florida. BNR is now in Army MARS. YGX made WAC. DHJ is going s.s.b. YAZ reports that Monroe County is going 6 meters for c.d. VBI is the new president of the Lancaster Radio Transmitting Society. PYY got an OTC certificate. DGM has moved to Oak Ridge, Tenn. VVS has a new mobile. The following Novices have lost the "N": ZJD, FJH, and FJV. New officers of the Delaware-Lehigh Amateur RC are NNT, pres.; NE, vice-pres.; GZR, secy.; and RUY, treas. KJJ has a new Globe King final. The AN Net will continue to operate throughout the summer on the EPA frequency and time. EXQ has a new Globe Scout. New officers of the Short Skip Radio Club of Philadelphia: ZLM, pres.; YLL, vice-pres.; ZDX, treas.; LLN, rec. secy.; WN3CZG, corr. secy.; DVB, act. chairman. DJH was speaker at the Carbon County ARC banquet and at the Delaware-Lehigh ARC dinners. WN3GOT and WN3GMN are a father-son combine in Bethlehem. The big picnic of the Pennsylvania Phone Net, the Eastern Pennsylvania C.W. Net, and the Anthracite Net will be held in Hershey on Aug. 13th. Registration is \$1.00 per call. Mail registration immediately to UWP. YVX made BPL this month, as did the perennial CUL. ZBE is now on s.s.b. running 300 watts to 837s. The East Able Fox C.D. Net is now handling Radiological fallout traffic every Sun. morning. Traffic: (Apr.) W3CUL 592, ZSX 422, TEJ 270, BFF 163, OGD 126, YVX 125, YAZ 121, OQ 100, DHJ 78, AXA 71, LXQ 65, BHC 59, NOK 48, ZRQ 48, BNR 37, ELI 25, ZOM 23, ZLX 20, WUE 13, CNO 9, ADE 7, QLZ 6, PVE 5, YGX 5, BES 2, NQB 2, SMC 2, AMC 1, GCW 1. (Mar.) W3ZSX 318.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, John W. Gore, W3PRL — The CSRC and WRC sponsored a Facsimile Demonstration Apr. 6th at the West Hyattsville Building and Loan Association Auditorium which was quite informative and enjoyed by all. The CARC sponsored a visitation to WAAM-TV studios and transmitter on Apr. 23rd. This trip was conducted by the chief engineer, Mr. Wolf, and included every nook and corner and all equipment, and was most interesting and informative. WAG and OSR discussed "Nets and their Operations" at the first March meeting of the WRC; at the 2nd March meeting, BWT displayed his 1914 spark transmitter, which is still in operating condition. The QCWA held its April meeting at WTOP Broadcast House on Apr. 7th. JTV/M, while driving near Brunswick, Md., came upon an accident where a young boy had been struck by an auto. He immediately contacted OXL and FBR in Hagerstown, who notified the Maryland State Police and they dispatched police and ambulance to the scene of the accident. OXL has a new 813 rig and a new 75-meter vertical (top hat and all) and tests have been very successful. The AEA code classes ended the first week in April with 9 Novice exams being given. There were two father-son combinations, Charles B. and Charles R. Cowan and H. N. and Ronald Taylor. DEK took his General Class exam in April. GIN and GIP are new Novices in the Hagerstown Area. EQK made the headlines in the Baltimore papers as

a result of working KC4USA on Mar. 19th. Operators are "Red" and "Mac." He was advised that USV was on the air in April from McMurdo and USF and USB will be on in October or November. ZSR now has a Heathkit VFO and shortly will have a new receiver. WZL advises that the Andrews Electronic Assn. has been issued the call K3FBX. MSN is trying for WAS on 20 meters with a 20A s.s.b. exciter on c.w. using drooping dipole center 20 ft. high. So far he has 33 states. BUD received a QSL from OD5LX to complete WAC. UE advises the Third Regional Net will operate through the summer on 3500 kc. at 1930/2045/2230 Daylight Time. CVE reports that the TCRN now has a direct relay into Little America. PQT set up a portable station located at the Boy Scout Campore. This meeting happened to be for the Boy Scouts of the Southern Maryland District in camp at the Patuxent Naval Air Base from Apr. 27th to 30th and was set up to give them an opportunity to see the AREC in operation and to use its facilities to send messages back home. Demonstrations and talks describing amateur radio to the campers was scheduled as a part of the program. Calvert County families of the Scouts were advised that they could also send radiograms to their sons in camp by telephoning the two AREC stations in their county. WG or Elwood Ponner, ZME has received his appointment as ORS. QCB has received his Gonset Converter and AF-67 so is all set for mobile operation. ZGN is operating portable from school on 40 and 20-meter c.w. and phone with DX-35 and S-38D. HKS reports a trial on his new all-hand antenna in the April CD party. The Md. Emergency Phone Net will hold its Annual Picnic on July 22nd from 10 A.M. to 6 P.M. at Braddock Heights Park just outside of Frederick, Md. In accordance with procedure of the past two years, the SCM has received a Proclamation from the Governor designating the week June 18-23 as "Amateur Radio Week" in Maryland and in accordance also with past Proclamations, this week coincides with Field Day. Traffic: (Apr.) W3WZL 518, UE 510, WV 306, CVE 276, BUD 252, PQT 217, K3WBJ 182, W3UCR 95, ZGN 69, PRL 63, RV 58, PKC 50, ZSR 28, RV1/3 27, PQ 3, BKE 2, HKS 1, OYX 1. (Mar.) W3ZSR 18.

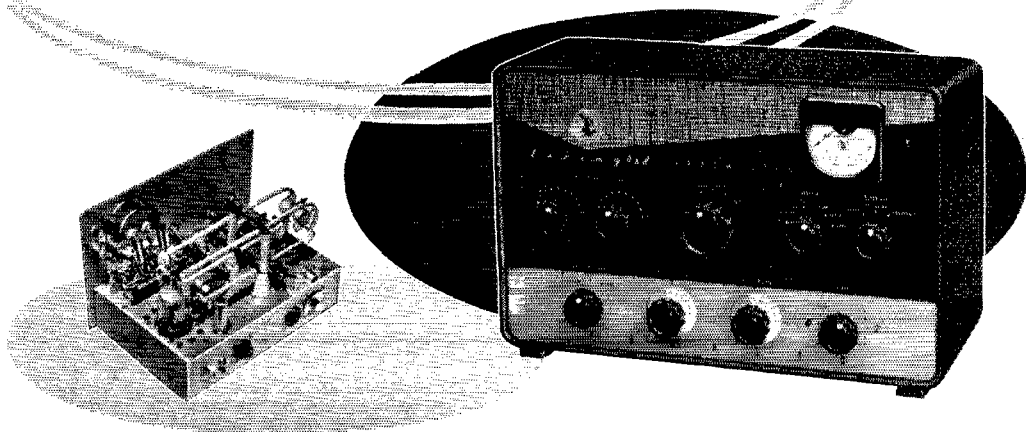
SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — SEC: ZVW, PAM: ZI, BZJ, Pennington, ex-Northern N. J. traffic-handler, has received his ORS ticket in this section. Old-Timers Nite, sponsored by the DVRA, was a big success. 3HYO, K2MJE, and K2OOK are now SURA members. K2KTS expects a new beam soon. K2HPV and KN2SBO are active in the Pennsgrove Area. RG, transistor DXer, has worked nearly a thousand miles on one-quarter watt. LS, Pleasantville Official Observer, reports nearly one hundred discrepancies in April. HDW received an EAN certificate for his QNI in that net. Ed has a new kit transmitter. HAZ, Trenton, received the WFJS certificate and has applied for WCZ-25. YRW, Delaware Valley 2-Meter Net manager, continues to do a fine job. VX, YRW, and ZNB are proud owners of new equipment. K2JGU reports a very fine c.d. drill in Gloucester County with both fixed and mobile rigs doing a fine job. Service personnel, present at the drill, were impressed with the speed and accuracy demonstrated. As a result of our visit to the Southern Counties Radio Club meeting we hope to have an active EC in Atlantic County in the near future. SVV, Trenton, is now EC for Mercer County and expects to appoint assistants to help him coordinate the facilities in that area. RUX, Cumberland County EC, reports there were several drills and hidden transmitter hunts in preparation for the May Day c.d. drill. Those participating were BBG, DFL, GMI, BMC, RUX, SUH, WHD, K2BET, LTZ, and KN2MVB. Their fine work and cooperation with local officials is a good example of coordinated effort. SUG, Hunterdon County EC, acknowledges the help of PKE and WBE in the effort to establish a RACES headquarters station in that County. Twenty activity reports were received this month — at all-time high. Keep up the fine work. Traffic: W2HDW 257, YRW 233, RG 122, K2BIQ 75, EWR 73, OOK 36, W221 32, K2JGU 28, HPS 8, W2SUG 8, HAZ 2.

WESTERN NEW YORK — SCM, Edward Graf, W2SJV — Officers of the KBT are K2DVD, pres.; K2CZO, vice-pres.; K2CLJ, secy.; UGB, treas. K2KXE has been appointed OO. VEY renewed as EC for Wayne County as did CYD for Onondago County. K2ITN has been appointed OBS. K2ITG was issued a Net certificate. OE and his XYL are on a trip to Bermuda for a vacation. Atlantic Division Director 3YA was appointed Public Relations Chairman of the USCDARS. GIG received a 15-w.p.m. Code Proficiency certificate. BKC built an FB crystal frequency standard. K2MVS dropped the "N" from his call and has a Globe King 500A and HRO-60, and a quarter-wave vertical antenna. UVF is on 20-meter s.s.b. and has a

(Continued on page 88)

NEW for VHF!

the Viking "6N2"



150 watts CW input . . . 100 watts AM phone!

This compact new VHF transmitter offers instant band-switching coverage of both 6 and 2 meters. Completely shielded and TVI suppressed, the "6N2" may be used with the Viking "Ranger," Viking I, Viking II, or similar power supply-modulator combinations capable of at least 6.3 VAC at 3.5 amp., 300 VDC at 70 ma., 300 to 750 VDC at 200 ma. and 30 or more watts of audio. Power input is rated at 150 watts CW and 100 watts AM phone . . . cathode keying results in excellent waveform.

The Viking "6N2" may be operated by external VFO or built-in crystal control. 8 to 9 mc. crystals are used in a pentode oscillator, which doubles in the plate circuit. This avoids tricky overtone circuits, eliminates critical adjustment and prevents frequency output which is not harmonically related to the fundamental of the crystal. VFO operation may be obtained by simply plugging in an external VFO with an 8-9 mc output and turning the VFO/Crystal switch to the VFO position. Provision for zeroing the VFO is also provided.

The final amplifier uses a type 5894 dual tetrode in a push-pull circuit . . . final tank is a dual band device and requires no switching when changing bands. High efficiency is obtained by the use of silver plated balanced tank circuits with parallel lines for maximum efficiency on 2 meters.

TUBE LINE-UP

6U8 (Pentode Section) — Crystal — Oscillator — Doubler	
6U8 (Triode Section) — Tripler	5894 Final Amplifier
6360 Tripler-Driver	6AQ5 Clamper

The Viking "6N2" is available completely wired and tested or as an easy-to-assemble kit. All tuning controls are located on the front panel . . . all circuits are metered for easy tune-up. Cabinet is finished in attractive maroon and grey with green nomenclature. Complete kit includes assembly instructions, photographs, diagrams, and step-by-step wiring directions. Wiring, all necessary hardware furnished — no drilling or metal work necessary. Dimensions: 13½" x 8¾" x 8½". Shipping Weight: 14 pounds.

Cat. No. 240-201. Viking "6N2"
Kit with tubes, less crystals, key
and microphone.

\$99.50
Amateur Net

Cat. No. 240-202-2. Viking "6N2" wired and tested with
tubes, less crystals, key and microphone.

\$129.50 Amateur Net

NOTE: Scheduled for August delivery — price subject to
revision at time of delivery.



E. F. Johnson Company

2832 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

Engineers Wanted

For unusual engineering and technical
employment opportunities . . . write to
our engineering department.

Capacitors • Inductors • Knobs • Dials • Sockets • Insulators • Plugs • Jacks • Pilot Lights

Another outstanding new Viking transmitter . . .

The "FIVE HUNDRED"

**500 WATTS PHONE and SSB* . . .
600 WATTS CW!**

*VFO
and Exciter
gang tuned*



*P.E.P. Input with Auxiliary SSB Exciter

The Viking "Five Hundred" is a complete 500 watt transmitter for the 80 through 10 meter amateur bands. All exciter stages are ganged to the VFO tuning . . . unit is designed throughout for outstanding operating convenience and flexibility. The "Five Hundred" consists of two compact units: an RF unit small enough to place on your operating desk beside your receiver; and a power supply/modulator unit so compact it may be placed in most any convenient location. All operating controls are located on the front panel of the RF unit within easy reach of the operator.

The Viking "Five Hundred" has been designed for either crystal or VFO control. Instant bandswitching, the "Five Hundred" is effectively TVI suppressed and filtered . . . contains a Pi-L network output circuit, with silver plated final tank coil, capable of loading virtually any

antenna system. Safety and protective features include: a tamper-proof, key-operated main switch; cabinet interlocks; excitation and bias failure protection; fused filament and plate supplies; and high voltage time delay.

Other Features: Built-in VFO is temperature compensated and extremely stable; high gain audio circuit with push-to-talk control; timed sequence keying which applies wave shaping to the keyed amplifier stages for perfect "make" and "break" on your keyed signal; low level audio clipping.

The Viking "Five Hundred" is available completely wired and tested or as an easy-to-assemble kit. The RF unit is housed in an 18 gauge steel cabinet, finished in attractive maroon and grey with green nomenclature. Power supply cabinet is finished in maroon enamel. Dimensions: RF unit — 11 $\frac{1}{2}$ " x 21 $\frac{1}{2}$ " x 17 $\frac{1}{2}$ ". Power Supply — 10 $\frac{1}{2}$ " x 20 $\frac{1}{2}$ " x 15 $\frac{1}{2}$ "; Total Shipping Wt.: 200 lbs.

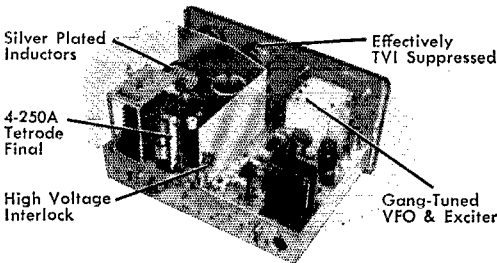
Cat. No. 240-500. Viking "Five Hundred" Kit complete with tubes, less crystals, key and microphone. **\$649⁵⁰**

Amateur Net

Cat. No. 240-500-2. Viking "Five Hundred" wired and tested w. 1 tubes, less crystals, key and microphone.

\$799.50 Amateur Net

NOTE: Scheduled for September delivery — prices subject to revision at time of delivery.



E. F. Johnson Company

2830 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

Capacitors • Inductors • Knobs • Dials • Sockets • Insulators • Plugs • Jacks • Pilot Lights

See your distributor

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.

275 watts SSB* and CW... 200 watts AM!

VIKING "VALIANT"

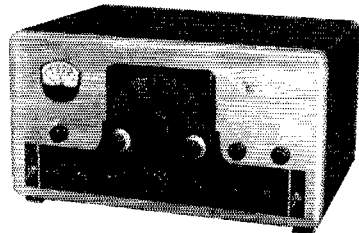
This compact transmitter gives you outstanding flexibility and performance . . . power to punch through terrific QRM! The "Valiant" may be operated by built-in VFO or crystal control . . . VFO is temperature compensated and extremely stable — operates in the 1.75 to 2.0 mc. and 7.0 to 7.45 mc. ranges. High efficiency pi-network tank circuit matches antenna loads from 50 to 600 ohms . . . tunes out large amounts of reactance . . . final tank coil is silver plated. Other features: Complete TVI suppression; timed sequence keying; high gain push-to-talk audio system; low level audio clipping; built-in low pass audio filter; self contained power supplies; and single knob mode switching.

The "Valiant" is available completely wired and tested or as an easy-to-assemble kit. Dimensions: 11 $\frac{5}{8}$ " x 21 $\frac{1}{8}$ " x 17 $\frac{3}{8}$ ". Complete with tubes, less crystals, key and mike.

Cat. No. 240-104. Viking "Valiant" Kit . . . **\$349.50**
Amateur Net

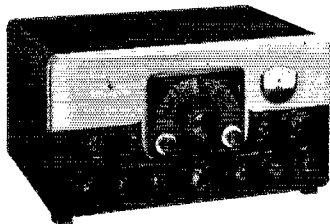
Cat. No. 240-104-2. Viking "Valiant"
wired and tested . . . **\$439.50** Amateur Net

*P.E.P. input with auxiliary SSB exciter



90 watts P.E.P. input SSB! AM and CW at the flip of a switch!

VIKING "PACEMAKER"



Designed for the amateur who wants more than just a single sideband exciter, the exciting new Viking "Pacemaker" has the power to put it in the transmitter class with unmatched flexibility of operation and control. Completely self-contained and effectively TVI suppressed — bandswitching on 80, 40, 20, 15 and 10 meters. Extremely stable built-in VFO operates in 3 to 4 mc. region. "Foolproof" voice controlled operation — VOX and anti-trip controls easily adjusted. Pi-network output circuit will load virtually any antenna system . . . plenty of power here, too, to drive conventional or grounded grid amplifiers up to a full kilowatt.

Handsome maroon and grey cabinet . . . 11 $\frac{5}{8}$ " x 21 $\frac{1}{8}$ " x 17 $\frac{3}{8}$ ". Supplied as a completely wired and tested unit only — all tubes and crystals furnished, less key and mike.

Cat. No. 240-301-2. Viking "Pacemaker" **\$495.00**
wired and tested . . . Amateur Net

JOHNSON AUDIO AMPLIFIER

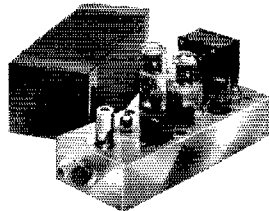
Self-contained 10-watt speech amplifier with power supply

The Viking Audio Amplifier is designed for driving high powered modulators, such as found in the Viking Kilowatt. Completely self-contained, with speech clipping and filtering incorporated for higher average modulated carrier power while maintaining maximum intelligibility.

Three inputs are provided: a high gain, high impedance input for use with crystal or dynamic microphones; a high impedance input requiring approximately 85 mv for use with a remote microphone amplifier or low level speech system; an unbalanced 680 ohm input for use with a phone patch or 500-600 ohm line.

Output transformer feeds a 500 ohm line or modulator grids directly. Audio filter limits frequency range to 3500 cycles, and an adjustable clipper provides up to 20 db clipping. Control circuit for push-to-talk operation, if used, is routed through from microphone input to output connectors.

Available wired and tested or as a complete kit with tubes. Dimensions: 8"x5 $\frac{3}{8}$ "x13 $\frac{7}{8}$ ".



Cat. No. 250-33. Viking
Audio Amplifier Kit . . . **\$73.50**
Amateur Net

Cat. No. 250-33-2. Viking audio amplifier
wired & tested . . . **\$99.50** Amateur Net



E. F. Johnson Company

2833 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

Capacitors • Inductors • Knobs • Dials • Sockets • Insulators • Plugs • Jacks • Pilot Lights

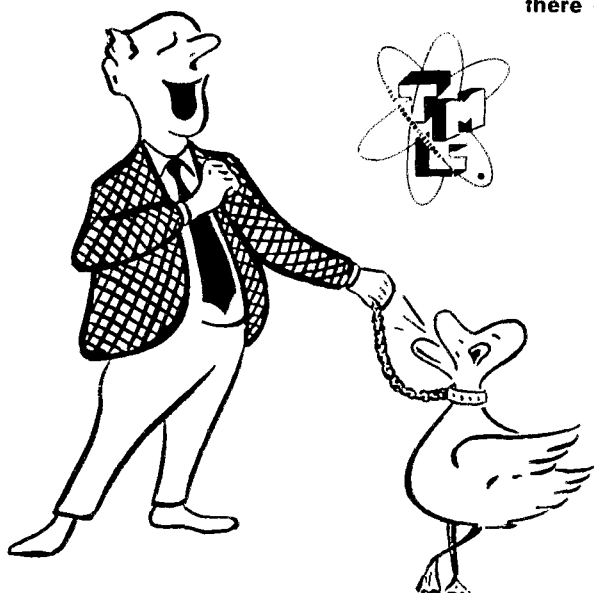
See your distributor

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.

So you want \$149.50 for a Slicer!



That's a down payment on a house! What's in there — gold plated coils?



Okay, so we surrender. — No gold plated coils, but filters, and boy, they cost money, and toroids for stability and full electrical bandspread.

You see, most slicers on the market are of the phasing type, and without trying to beat a dead horse we think better results are obtained with filters, even if they are more costly.

A look at the characteristic of the sideband filter in our slicer shows what we mean. We're trying to take some of the mystery out of this sideband thing, so we'll try to make it fast. The GSB-1 was designed to take in an I.F. frequency of $455 \text{ kc} \pm 3 \text{ kc}$ and its output plugs into almost any phonojack. Both these facilities are available in most receivers with little difficulty, and the GPR-90 already has the jacks and switches in place.

So what good is the thing?

I can tune in an SSB signal without the slicer. It's a little tough, but I can do it! Well, so you can, but here's why a slicer can help you.

First . . . Selectivity—The GPR-90 is a pretty selective receiver, yet in its widest position the bandwidth at 40 db down is 17 kc wide and the narrowest 5.5 kc. The slicer filter has a bandwidth of 4.5 kc at 40 db down, and this is cascaded with the selectivity of the receiver, so that the received aperture against very steep skirts is 3 kc. Since SSB is usually confined to 400 cps to 3 kc, the entire pass band is filled with intelligence.

Second . . . Noise—Within reason, the narrower the pass band the less the amount of inherent noise.

Third . . . Product Detector—The usual receiver with power or grid leak detector is excellent for AM, but falls down considerably when carrier is supplied locally (BFO on.) On strong signals over-modulation occurs and requires considerable manipulation of gain controls. Linear or diode detection tends to wash out in the presence of a strong adjacent signal. The product detector in the slicer eliminates these defects.

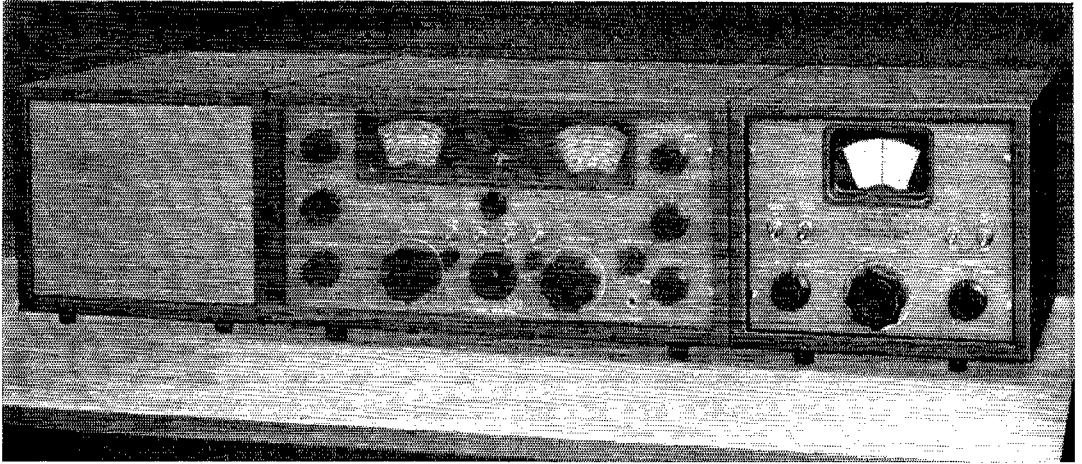
Fourth . . . Reduced tuning rate—The dial on your receiver tunes a signal through the pass band so rapidly that the receiver B.F.O. control must be used. The band spread dial in the slicer which is calibrated in CYCLES per second, enables the signal to be tuned in with ease.

Fifth . . . The above advantages adhere not only for SSB but for C.W. as well, and even double sideband A.M. with carrier fares better when selectivity rather than quality of reproduction is required.

So that's what you spend your money for. You don't have to buy our slicer to do it. You can buy kits and make Q 5er's and put in Q multipliers, but when you're all done you could have bought all the convenience in one matching package, the GSB-1 for \$149.50.

The TECHNICAL MATERIEL CORPORATION

Single Sideband Adapter- GSB-1



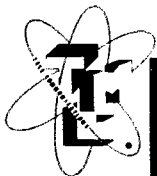
The TMC Model GSB-1, Single Sideband Adapter is a filter type slicer permitting accurate and simple tuning of SSB signals.

The 455 Kc input is converted to a low frequency by means of a mixer and oscillator combination which allows selection of either sideband. The difference frequency is fed to a carefully designed and manufactured bandpass filter, which restricts the band width to 3 Kc at the 6 db points. This filter is so effective that the skirt width 40 db down is only 4.5 Kc. The filter output, in turn, is fed through a second mixer, or product detector, where it is combined with a stable 17 Kc local oscillator. The result is once again passed through a filter having a cutoff at 5 Kc, thus eliminating all unwanted mixer products. The output is a relatively noise and interference free audio signal.

The TMC Model GSB-1 contains a number of features which make it a more useful device. Since single sideband signals require critical frequency adjustment, this unit has been provided with electrical band spread which reduces tuning to the point of greatest simplicity and ease. In addition, AVC is provided within the Model GSB, over and above that which already exists within the receiver, thus serving to further prevent powerful local stations from overloading the slicer. A noise limiter, which reduces impulse peaks, has also been included in this unit.

The Model GSB-1 although originally designed for use with the Model GPR-90 receiver (which already provides the proper terminals) may be used with any receiver which will provide .3 volts (rms) R.F. input at approximately 455 Kc and where access to an audio grid is available.

Illustrated with the GSB-1 (right side) is the TMC Receiver GPR-90 (center) and the companion speaker - Bulletin 179Q.



The TECHNICAL MATERIEL CORPORATION

TMC Canada, LTD.
OTTAWA, ONTARIO

MAMARONECK, NEW YORK.

TMC Single Sideband
Adapter GSB-1
(Bulletin 194Q)
Complete with all
instructions
AMATEUR NET

\$149.50

FRONT PANEL CONTROLS:

- Power ON/OFF Switch
- AVC ON/OFF Switch
- SSB-AM Selector Switch
- Upper or Lower Sideband Selector Switch
- Noise Limiter ON/OFF Switch
- AVC FAST/SLOW Switch
- Main Tuning

SPECIFICATIONS:

FREQUENCY RANGE:

452-458 Kc.

TYPE OF RECEPTION:

AM, SSB (Upper or Lower), CW

IF INPUT VOLTAGE:

0.3 volts rms (normal) for 0.3 volts rms audio output.

IF INPUT VOLTAGE RANGE:

0.1-10 volts rms (with AVC).

AVC CHARACTERISTIC:

With 40 db change in input signal, output remains constant within 9db

INPUT IMPEDANCE:

High-imp IF.

OUTPUT IMPEDANCE:

To match audio grid.

INPUT POWER:

115 volts, 50/60 cycles, 46 watts.

CABINET SIZE:

12" wide x 10" high x 15" deep.
Matches GPR-90 for height & depth

(Continued from page 88)

75A-4 receiver. The Batavia ARC project is building five 10-meter walkie-talkies. GHU renewed as EC for Jefferson County. K2GBN now is in New Jersey. ZOC, ALR, and ORI lost 2-meter antennas in a recent storm. ENI now is in W6-Land. QBD gave an interesting talk and demonstration on transistors at the RAWNY. K2KTK gives code practice each Wed. at 2100 ELST on 3551 kc. then tunes the band for contacts. The Watertown ARC elected the following officers: KN2PDL, pres.; GHU, vice-pres.; KN2PDJ, secy.; SPE, treas. The Corning ARC received from Mr. Cilley a gift of 4 acres on which to build a club house. The high school at Clinton, N. Y., has an informal club, which meets each Friday. The KBT held an auction night in April. K2HPT and KIN dropped the "N" from their calls. New calls in Elmira are KN2s RYP, RSL, and RTQ. K2HPT is putting together a DX-100. KN2PKT has WAS confirmed. The RARA heard K2DQ on converters, simplified equipment for use with b.c. receivers. K2QOQ put up a new 21-Mc. beam in mid-February and worked 88 countries for a total of 115. Traffic: (Apr.) W2RUF 281, K2LSF 264, W2ZRC 194, K2IYF 113, W2EMW 84, J1R 81, O1G 74, K2AMZ 62, W2RUT 54, GBX 45, SJV 39, K2KNV 37, K2XFE 37, DSR 34, W2ZLT 33, K2KTK 22, CUG 24, W2COB 22, BKC 17, FEB 15, RQF 13, FPW 10, IEP 4, K2QOQ 4. (Mar.) W2ZRC 205, K2KXF 26.

WESTERN PENNSYLVANIA — SCM, R. M. Heck. W3NCD — SEC: GEG. RMs: UHN, NRE, NUG, and GEG. PAMs: LXE and AER. Reports from the Mon Valley ARC (ZHV) are that BFA and DZW now hold General Class tickets. The club's s.s.b. job. APN is on 10 meters with an FB signal. UHM is watching stock cars. RSL fixed up the club transmitter. The Cumberland Valley ARC is planning a visit to the Potomac Edison Power Plant at Williamsport Md., arranged by the South Penn. Power Co. Club instructors expect to have a number from their classes ready for their Novice exam soon. *Hamateur News*, the Horse-shoe Radio Club (QZF), congrats Don Slee and his XYL on the arrival of a new jr. operator. FZT and W3NGAS are on with new tickets, and ZUF is joining the YLRL. Novice Contest results show W3Ns BZN, 57 points; EGV, 37.5 points; BVK, 22.5 points. ZUH is on 15 meters. YPA was home from Lehigh University for Easter. FZT has an AR-3 receiver and home-brew rig. YOZ has a new antenna. ZUG again is mobile. ZVA has a new Gonset and is going mobile. KQD will be mobile soon. TAW has a new transmitter and W3NDPH has a new SX-99. The Radio Association of Erie is in the process of electing directors. New faces at the meetings are ZLD, FVH, ZBF, and W3NDLM. At a recent meeting Lewis McCoy, 11CP, from the ARRL, gave a very interesting talk on TVI to a turnout of about 50 amateurs. AWV, of Corry, reports ten hams at present active in that area. A new call is W3GNC. LJG has a new 500-watt rig. NVB is doing real well in armed services radio work. OIE is busy sightseeing in Florida. ADN is joining the ranks of s.s.b. BFB, KLD, and STK participated in a recent search for a missing light aircraft. QN is in a new QTH. VGT has been transferred to Pittsburgh by his company. The club's new Comtruck has new lettering, and at least one rig soon will be operating. The Breeze Shooters Net meets Mon. at 8 p.m. 29 Mc. Check-in time may change to 2100 local time so keep in touch with the BSN for the official dope. ABW and ZRW have new beams up. A new ham is W3GCB, the son of ERJ/ERK. EXD now is General Class. UJP has a new 65A. BEX was the best hamfest ticket salesman, selling mostly to non-hams, reports UJP. UHN reports Novices BVE and EMV passed the General Class exam. Traffic: (Apr.) W3WVQ 1292, YUT, 148, W9OZQ/3 135, W3UHN 50, SJL 32, NCD 20, LSS 17, VKD 7, BZR 1. (Mar.) W3NRE 148, YUL 126, NUG 11. (Feb.) W3NUG 17.

CENTRAL DIVISION

ILLINOIS — SCM, George T. Schreiber, W9YIX — SEC: HOA. RM: BUK. Asst. RM: CTZ. PAM: UQT. Cook County EC: HPG. Section Nets: IEN, phone, 3940; LLN, c.w., 3515 kc. Brothers PFC and KKN are sporting new rigs, 350 and 150 watts, respectively. Other new equipment: UZE and VNW, both with DX-100s; K9AXL, a Globe King; and K9AMD, an Elmac in a new Mercury. Proxy BSA of the Mississippi Valley Radio Club reports attendance never was so good. At the end of this column you will find the final traffic total of MRQ. Asst. RM, who has retired from business and moved to W4-Land. Illinois amateurs mourn DXX, Alice Bourke, who died in April. Have you read the FB page which AA writes for Hall-crafters? EL likes his new three-element beam on a 65-foot tower. KJ lost his 54-footer in a recent windstorm. Congrats to NET and his XYL on a jr. operator. We are glad to report that Director UQT is out of the hospital and on the recovery road. EVZ reports that YWL is now DL4CX and would like

single-sideband contacts with his friends in the Midwest on 20 meters, and that L8UEF is seeking 21-Mc. contacts with Champaign-Urbana stations to contact his son at the university. TLC enjoys Fsk. FFX has completed a seven-stage double conversion receiver. New ORS appointees are SHR, K9CFJ, and UBL. A new OES is SPB. A new call heard is K9QVU. Bricks and sparks flew from the house of OUF, but damage was not great. He's congratulating himself on proper lightning arresters. The Greenville College Radio Club now has 16 members and would like to exchange club newspapers. The club operates K9BJV. The first disaster the St. Clair Amateur Radio Club's truck was used in was when a man (non-club member) climbed in it and committed suicide. The Rockford group is organizing a new club, reports NJG, with forty amateurs interested. The group's 2-meter net is organized for c.d. work. FJY replaced his storm-damaged three-element with a Quad. FXC reports fun with his 10-meter walkie-talkie when the band is open. UAZ sold his homebrew kw. s.s.b. job and replaced it with a store rig of one-eighth the power. YLU recently bought half interest in a California broadcast station, but will stick personally to ham bands. CKU would like to hear from old buddies who served in radio with him in China, under the call AC2RN. JCX received her A-1 Operator certificate. NII now has an "antenna farm" near Dixon and again is active. NN received WASM and OHA awards from overseas, also a heard card from Chicago the same day. KHJ enjoyed a fast motor trip to California, working mobile both ways. With summer here both OAL and YMI have forsaken radio for boating, but swear to be "back in the fall." JID and K9AFE both passed the General Class exam. EU reports that MARS is going great in the Ottawa Area with a net with 14 members on 2258 kc. UZ has fun on s.s.b. and swears he still can use a bug. The Chicago Area Radio Club Council is talking about a national convention in Chicago in '57. Traffic: (Apr.) W9DO 968, SHR 538, MAK 316, YYG 176, OKI 140, K9CFJ 127, W9ICF 120, AA 91, UBI 84, CTZ 66, YLX 59, STZ 44, FAW 36, YFO 33, BUK 26, FRP 24, MRQ 24, VHD 24, IDA 23, EDH 19, SXL 16, VEY 16, VSX 16, DUA 15, PCQ 11, K9AMD 8, W9HPG 7, TLC 7, BA 6, LL 6, PVD 4, YFO 2. (Mar.) W9ICF 56, TNN 41, UBI 10. (Feb.) W9ICF 34.

INDIANA — SCM, Seth Lew Baker, W9NTA — Asst. SCM: George H. Graue, 9BKJ. SEC: QYQ. RMs: DGA, JBQ, TQC, and UQP. PAMs: CMT, EQO, and UKX. WWT resigned as RM for RFN and TQC has taken over this position. Other appointments: DDT, HST, and LDI as OPs; JZU, PUD, and TTB as OESs; BKJ, HEN, and IFZ as OOs; and DZC as OBS. New ECs and their counties: CPZ Pulaski, EHE Porter, HRW Dubois, PIN Whitley, and VPJ Fayette. HUF is Radio Officer for Howard County. EQO reports IFN traffic as morning 123, evening 176, total 299. UQP reports QIN traffic as 173 and WWT reports 121 for RFN. EHZ reports 93 for CAEN. IRCC has authorized publication of *The Bison*, a state-wide paper to be edited by PFO, the former editor. Please send news items to her. Several clubs now have monthly papers, among them Kokomo, Connersville, Indianapolis, South Bend and South Bend Mobile, Terre Haute, and Evansville. The Tri-State College ARC elected ITVL, pres.; 9KLO, vice-pres.; and OKV, secy.-treas. The club station, PMZ, is on 80, 40, and 20 meters. Ex-9QVX now is K4HXF, operating from Winter Park, Fla., on 10, 15, and 20 meters. LSZ was voted a Hoosier Courtesy Award at the IRCC meeting. IAG won an NC-300 at Dayton. UQP won a Naval ROTC 4-year scholarship at Northwestern U. BUQ received an OT certificate. EQZ, HRY, LSJ, VMI, and YIT have DX-100s. A new Novice at Kewauna is K9CWC. JBQ expects to be on soon with 810s running 700 watts. EAO, LSG, and BEY are mobile. HIU has a half-hour spot on WBRD on Sundays. M3N now is Gen. Class and CUT is Tech. K4V is back on the air after a round-the-world trip. State-wide frequencies for RACES are 50.7 a.m., 145.2 a.m., and 147.3 f.m. Contact ZKX, State RACES Officer, or QYQ, the SEC, for information on local frequencies. HQF has an NC-300. YFD has 105 worked and 63 confirmed and FGX has 94. Vincennes has a new club organized with RMV as pres. VPJ has a 2-meter Gonset and JWH is erecting a 32-element beam for 2 meters. CSV and MYI have Elmac mobile rigs. The Kokomo Club holds regular AREC drills on 80, 40, and 6 meters. Those making BPL were NZZ and KTX. This earns a medalion for KTX. Be sure to send in your traffic reports so we can maintain our position among the leading sections. Traffic: (Apr.) W9NZZ 650, ZYK 405, TT 376, TQC 251, EHZ 225, JYO 204, KTX 192, SVL 138, JOZ 127, DGA 86, SWD 64, UQF 64, EQO 63, BKJ 59, WBA 57, VNV 41, NTA 35, AB 22, ALL 21, UKX 21, CMT 19, QYQ 18, HPO 15, LGD 11, STC 10, WTY 10, AZF 8, CG 8, DOK 8, NTR 7, QR 7, AMW 6, DKR 6, WHL 6, HST 4, NSY 4, YV3 3, CDW 2, PPS 2, WLY 2, GDL 1, HUF 1, WAU 1. (Mar.) W9SVZ 56, WUH 41, WLY 8, WRO 4.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: AJR, NRP, and ESJ. RMs: KQB and BVG. Nets: WIN 3685 kc. 6:30 p.m. daily; BEN, 3950 kc. daily; WPN, 1215, Mon.-Sat., 0930 Sun. Wisconsin mobile and emergency frequency; 29,620 kc. About 425 enjoyed the WVRA Hamfest at Wausau, May 12th. CXY is back at traffic-handling again and a 75A4 now adorns his shack.


(Continued on page 90)

EIMAC 4-65A

Versatile
Compact
Rugged

TYPICAL OPERATION

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	1.7w	2.6w	0
Power Input	345w	275w	195w



For low to medium powers, mobile or fixed station, the Eimac 4-65A is truly one of the most versatile tubes in amateur use today. The least expensive and smallest of the Eimac internal-anode tetrodes, this compact, rugged tube is ideal for all-band CW, AM, and SSB rigs.

Short, heavy leads and low interelectrode capacitances contribute to stable, efficient operation of the 4-65A at high frequencies. The tube operates over a wide range of plate voltages — 600 to 3000 volts with power inputs from 90 to 345 watts — and as with all Eimac tetrodes, it requires low driving power and simplifies transmitter construction.

For mobile use, the radiation-cooled 4-65A is a natural. Its instant heating filament eliminates battery drain during stand-by periods. And through application of filament and plate power simultaneously, no warm-up periods are required.

For further information on the 4-65A, write the Eimac Amateur Service Bureau or visit your Eimac distributor.



Eimac

EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

I.L.R. is working with a 10B s.s.b. exciter. Eight operators manned ZPU/9 at the U. of W. engineering exposition and originated 112 messages. AKY requests all hams in Vernon County to contact him for membership in AREC/RACES. KN9CYL is new in Green Bay. EIZ has a class of new operators on the way. SQM brought his new final along to the hamfest. A new operator at GOC is KN9CHK. DYI sent in cards for his DXCC. UDK has a new NC-300. WN9CAN worked a DL4 on 21 Mc. The Blackhawk Club has a new Viking Ranger. KIJ is editor of the *Blackhawk Hatchet*, a newsy club paper. Both the phone and c.w. nets held separate meetings at the Wausau Hamfest. KQB's report on the WIN indicates increased activity, but additional outlets could be used. Both March and April QNI on the BEN were close to 1200. GAB works 8LFX daily at 10 p.m. CST on 144 Mc. IZD started a new 50-Mc. final using a pair of 4-65As. TCJ is driving to the ARRL National Convention in California with a trailer-load of RTTY gear. YQH is the new EC for Winnebago County. GHG has been active on 75, 40, and 20 meters. Newly affiliated with ARRL are the Outagamie and Waukesha Radio Clubs. KKK worked MP4QAL to bring his total to 156 confirmed and 167 worked. IVE moved to Arizona. GPI is Wisconsin State Coordinator for MARS. QIQ has a new Viking Ranger. NUC is working 50 Mc. with QRP (3-watt) rig. YLR missed getting a CO2 on 50 Mc. because of a bad relay. KQB is contemplating a change of frequency for WIN to 3535 kc. to get clear of ITV. CCO is busy in Navy radio school. Traffic: (Apr.) W9CXY 192, SAA 129, ZPU/9 114, KQB 65, GOC 55, AKY 37, OMT 26, EIZ 18, MCK 17, SQM 15, OVO 10, RQM 10, IZD 5, RTP 5. (Mar.) W9GOC 25.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Elmer J. Gabel, W0KTTZ — There is very little news mainly because of poor band conditions, with practically no day-time activity on the lower frequency bands. It will be necessary to rely on individual and club activity reports if this column is to continue. On May 1st the c.w. boys closed down for the summer. Look for them Sept. 3rd at 1830 on 3670 kc. Traffic: W0LHB 74, WRK 71, K0FEM 68, W0FVG 52, KTZ 34, B0FM 26, UBG 21, KLP 19, K0ADI 13, CND 9, ATK 7.

SOUTH DAKOTA — SCM, Les Price, W0FLP — There is more net news than anything else this time. The S.D. C.W. Net report by SMV for April shows 13 stations. QNI 89, low 5, high 9, average 6.8; QTC 36, low 0, high 7, average 2.9. The Phone Net had 29 sessions, QNI 974, high 51, low 20, average 33.5, traffic handled 114. UVL blew the choke out of his big rig. There should be more news but no one sends it in. Traffic: W0GDE 39, SMV 39, BQS 38, DIY 23, NNX 23, BQH 18, EXX 12, GWS 12, K0ARE 9.

MINNESOTA — SCM, Charles M. Bove, W0MXC — Asst. SCM: Vince Smythe, W0GGQ. SEC: GTX. RMs: KLG and DQL. PAMs: JIE and LUX. ZEL has been appointed ORS. Carl Jabs, formerly 9BVH, paid a visit to the St. Paul Radio Club recently. KXW attended the Powered Model Aeroplane meet in North East Minneapolis. The Minneapolis Radio Club will hold its Annual Picnic again this year at the Lake Nokomis Park Pavillion on Sun., Aug. 19th. Everyone is welcome. The Albert Lea hams had a fine display at the annual hobby show. We would like to see more hams check into the Minnesota Junior Net. This net meets daily Mon. through Fri. at 1700 CST on 3700 kc. Net controls are TRJ, KLG, AZF, and ZLV. The St. Paul Radio Club, Inc. held its annual election with the following results: LPX, pres.; PDN, vice-pres.; THY, secy.; and KKO, treas. VBD finally got rid of his TVI and is merrily hamming again. GTX handled seven pieces of traffic on 2 meters. Can anyone beat that? TUS is planning on operating portable on emergency power atop a fire lookout tower. VBS received a CP certificate with a 30-w.p.m. sticker. DQL has been holding down ICC skeds one night a week. Nobody seems to know WDV's OBS sked, so here it is: Mon., Wed., and Fri. at 1815 on 3959 kc. and Sun. at 1700 on the same frequency. VBS worked ZL3CU and KH6AYP. Believe it or not, 47 stations turned in traffic reports this month for another high. The Minnesota Neom Net moved to 40 meters for the summer because of band conditions on 75 meters. Minnesota now has another traffic and emergency net. It is called the Minnesota Teen Age Net and is open to everyone 16 years old or younger. It meets on phone at 1700 on 3810 kc. daily. Net controls are WDY, VXO, and CKE. Anyone, regardless of age, having traffic for Minnesota may dispose of it on this net. Traffic: W0KJZ 278, WVO 232, TUS 199, KLG 198, DQL 162, RLQ 125, GTX 87, UMX 67, IRJ 61, WDW 61, KFN 47, QVR 42, ZBL 39, QXF 35, WMA 34, ALW 30, EHO 28, KWC 28, LUX 24, OSJ 19, NNG 18, KNR 17, QDZ 15, TCK 15, VEP 15, MXX 14, RVO 13, HMY 12, IIV 11, VEM 11, AEE 10, CVD 10, EMZ 10, KXW 10, LST 10, IMJ 9, BUO 7, UMJ 6, VBD 6, ZEL 6, ZLV 6, FCU 5, GGQ 5, OPA 5, LIG 4, VEZ 3, ALW 2.

DELTA DIVISION

ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — ZJI is a new OPS. K5DKT has graduated from the KN

class. There is a new Novice in Booneville, KN5EUY. A new EC is ZJI, at Huntsville. KRO is in the process of building a kw. rig; he is leaving soon for a short course at Southern Methodist University in Dallas, Tex. Please send in some new. Traffic: (Apr.) W5FMF 17, KKO 6. (Mar.) W5MED 17.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — The combination hamfest and fishery held by the Lake Charles Club was a complete success with more than 125 attending. BMK has his mobile working again. BWZ also is mobile. ZMI has a new vertical in operation. K5BQT has a mobile set-up aboard his launch, *The Broker*. ZAK is building a new 10-meter beam. Congrats to KN5EVB, who soon will be on with a DX-100. The Deep South Mobile Club of Baton Rouge operates on 3805 kc. Transmitter hunts are held each Sun. at 2 p.m. OVV won the last hunt. HKZ has a new 813 final on the air getting fine reports on 75 meters. Because of pressing duties as Mayor of Lindsay, FKA has been off the air but has his mobile working again. DLR is putting his DX-100 together. KOQ and SR are thinking in terms of mobile rigs. The Westside ARC, ABD, held a Field Day outing at Fontainebleau State Park. CEVW has a total of 212 countries worked. He recently worked Japan on 80-meter c.w. which gives him WAC on 80, 40, 20, 15, and 10 meters. Recently the Crayfish Net of South Louisiana held an all-day picnic at Bayou Corne, with 27 hams and their families attending. Thanks to the XYL of K5BFF for this report. For expects to be in Poughkeepsie, N. Y., until about Sept. 1st. He would appreciate contacts on 20 meters with Baton Rouge stations. MXQ reports regularly with a good traffic count. He operates RN5-CAN, the Hurricane Net, and MARS. K5AGJ now has his MARS appointment. YSN is building a new final, p.p.4-250A. SVP has an A3 QSO with KC4USA. K5AIE is sweating out the final weeks of school before vacation and DX. BMD is working on a new 813 rig. FMO has gone sideband. Traffic: W5MXQ 144, K5AGJ 52, W5Y8N 23, FMO 15, K5AIE 5.

MISSISSIPPI — SCM, Julian G. Blakely, W5WZY — The Cleveland Radio Club held its annual hamfest at Indianola, Miss., on June 10th. Prizes were an NC-98, a DX-35 and a 60-foot steel tower to mention just a few. Director Canfield, BSR, attended. It was the first 'fest of the season. A meeting was held recently in Jackson to lay the groundwork for a statewide RACES plan. Attendance was good. At this writing much discussion* has been heard about Field Day plans this year. The Rollingfork Club made plans and from the looks of things Field Day participation should double last year's excellent operation. Drop us a line about the plans for your hamfest so that it can be announced in plenty of time. Traffic: W5IGW 118, JHS 61, WZ 26, RIM 4, WZY 2.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: IV. The sincere thanks of all TN members goes to WQW on his retirement as RM after two fine years. FLW reports nice 6-meter openings on three days in April. His many AF4 friends will be surprised to learn that WQT has applied for Army MARS! So has CLM. WQT also reports that the Tenn-Tucky ARC has 3 new Novices, and 1 new General Class member and says the Birmingham 'fest was really great! Congrats to EIN, new Extra Class. ZZ reports regular Knoxville to Nashville 6-meter skeds with AY, and he is planning a new 32-element colinear. WQW was amazed at working SCF on TN. UVU has a new 80-10-meter 500-watt rig and has given his YL her Novice exam. DMS reports he is now QNI/TN with the Tenn. Tech. club station. Orchids to WQW, IV, et al, for a wonderful c.w. meeting in Nashville. Double feature — see the Smokies in full color and HH in full beard! PL is doing fine and sends regrets at missing the Nashville meeting. BAO, operating mobile on 75 meters with 2 watts, made Cotton Carnival tours and worked stations all over, with SCF as co-pilot. K4GFL reports scrounging a visit from WQW, and regular visits from BQG, BAO, and SCF. IV, our new RM, has a kw. on the air and will receive full cooperation from TN members. PVD says the Cookeville ARC is working on a RACES plan. UWA reports two new countries, *Memphis* and Spain! His XYL is awaiting her Novice call. Congratulations, Carolyn, on being Cookeville's first YL ham. She will run 70 watts, ten times the power of OM AL. GGM tells of EARS (Emergency Amateur Radio Society, Maury Co.), and 12 students in their new code classes. Our Delta Division Director spoke at the Memphis ARC meeting. This club will hold another fine 'fest July 1st at Shelby County Penal Farm (outside the gates). Welcome back to ham radio for ODN, who is building cubical quads for 15, 10, and 6 meters on a 70-foot tower. Thanks to both the phone and c.w. nets for their fine emergency operation during the Lexington Tornado. YMB, news editor for WRCC-TV, gave out daily smug reminders about the deadline on compulsory auto inspection. You guessed it, he got a ticket for no inspection tag! Traffic: W4PL 351, VJ 69, IV 56, TZD 54, HLR 49, UVL 36, TIE 34, SCF 31, UWA 21, EIN 18, PFP 16, SZI 13, JVM 12, ZZ 11, PAH 7, K4ABE 6, GFL 6, W4PVD 6, PNG 5, HUT 4, YPG 3, TIZ 2, UVU 2, DCH 1, FLW 1, WQT 1, WQW 1.

(Continued on page 98)

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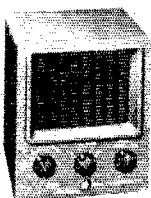
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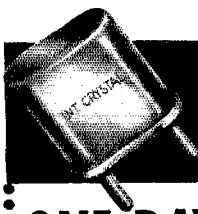
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GREAT LAKES DIVISION

KENTUCKY—SCM, Robert E. Fields, W4SBI—SEC: CDA. PAM: YYL. RMs: ZDB and ZDA. Traffic seems to be falling off now that the weather is getting warmer, but we hope to keep both KYN and KPN running throughout the summer. K4DLI reports that he has an all-band doublet up now and it is working FB. YOK has qualified for 25-w.p.m. CP certificate and is quite active in local AREC drill periods; he also is well on his way toward DXCC with 49 countries confirmed. NGN came through this month with a traffic report of his own. As most of you know, he and Earl combine their report for NIZ. By the time this goes to press 4URF/I should be a civilian again, and the fellows can start looking for a big signal on the air. He is building p.p. 813s with 100TH modulators and will run approximately 900 watts input. SBI is ill at this writing. I am sorry about the error in the May issue of QST concerning the Mammoth Cave Hamfest. We were too late for a correction in the next issue; however, WIAW, our Headquarters station, did run a special bulletin giving the correct time. Traffic: W4QCD 199, KKW 112, ZDA 90, NIZ 84, ZDB 74, CDA 67, NGN 27, BZY 25, SBI 25, YOK 25, HSI 24, URF/I 13, K4DLI 9, W4JSH 9, ZLK 9, SZB 7.

MICHIGAN—SCM, Thomas G. Mitchell, W8RAE—Asst. SCM (c.w.): Joe Beljan, 8SCW; Asst. SCM (phone): Bob Cooper, 8AQA. SEC: GJH. BPL certificates were issued to PHA for March and April and to NOH for April. New appointments were issued to GKT as ORS and to SYV as OO Class IV. Despite the poor conditions during April, our traffic total was up twenty-five per cent over the March level. The following stations took part in the February 14/15 Frequency Measuring Test: OSI, IYZ, HPR, AYY, and SPF. It is interesting to note that none of these stations are OO appointees. Reports from the active OOs indicate that most of the offenses are being made by the Novices, particularly in the matter of harmonic radiation above the 7-Mc. band. This is a problem of mounting concern and each of us should do what we can with our Novices to help them avoid this problem. NUL says that a new club is being organized in the region of Antrim and Kalkaska Counties. It is to be known as the Chain O' Lakes Radio Club. Fellows in that area who are interested may contact NUL for details. According to individual reports and the many club bulletins, there is a growing interest and activity on the 6- and 2-meter bands. Those bands are not the voids they used to be, fellows. What's more, the fellows who are there are eager to have more company. There doesn't seem to be much activity toward 10-meter AREC mobiles as yet. Perhaps it is too soon to expect results, but the decision made at Grand Rapids was unanimous in favor of that as the prime mobile frequency for AREC work in order to provide support to other areas. Traffic: (Apr.) W8ELW 273, NOH 258, ILP 148, PHA 144, NUL 102, JYJ 88, QQQ 86, RVZ 85, GKT 61, QIX 44, IKX 42, RJC 37, SIF 36, OQH 30, PHM 30, FX 28, ZLK 28, SCGW 26, SHP 25, WKO 23, FWQ 19, IUJ 19, AUD 18, TBP 17, SRK 14, HKT 12, DAP 10, OGY 10, RAE 9, DSE 6, HSG 5, EGI 4, FGB 4. (Mar.) W8PHA 123, WGU 63, TBP 45, GKT 20, SLP 19, IKX 10.

OHIO—SCM, Wilson F. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE, and E. F. Bonnet, 8OVG. SEC: UPB. RMs: DAE and FYO. PAMs: HPP and HUX. The Canton ARC toured the local Bell Telephone plant. LEX lost all his antennas in the recent big blow. VWE has 10-meter mobile. We regret to report the passing on of DGV and of WJ's father. CVZ built a 10-15-meter converter and a Q multiplier. TZO got WAS in capital cities and an Extra Class license. PBX has a new SX-96. Cincinnati has an active 6-meter phone net. The Marietta ARC celebrated its third birthday and has four new Novices, KN8s AUX, AWS, and BDZ. KN8AGP is operating from Marietta College. New Vienna (pop. 800) boasts 15 hams. The Canton ARC enjoyed a talk by 11CP on "Causes and Cures of TVI." JDN/8 made 66 contacts from Vinton City in the Ohio QSO Party. KN8AWA is a new ham at O.S.U. UIM has a new Gonset Communicator. RZ worked PZ1AF. K8AAW passed the General Class exam. The Mahoning Valley ARA has a new club house. KN8ATJ is a nine-year-old YL. VVY is on 220 Mc. IJG worked 29 states on 6 meters. BVJ is in the hospital. NQQ has a new DX-100. JWC had a heart attack. CMS needs 2 states for WAS on 6 meters. BJM, EPC, FLD, ICS, LXR, SRM, SZF, and UEM have DX-100 rigs. HZJ is running a kw. on all bands. EQN, chairman of the Ohio Intrastate QSO Party, reports this year's party was the largest ever. New officers of the Ohio Council of Amateur Radio Clubs are GQ, chairman; EMK, vice-chairman; VHO, secy.; and AL, treas. We need better coverage on BN on 3580 kc. Mon. through Sat. at 1900 EST, especially Youngstown and Warren, and on the Ohio Phone Net, which meets on 3860 kc. at 1700 EST Mon. through Fri. The Gallia County RC's new officers are KNM, pres.; QVT, vice-pres.; and FCO, secy.-treas. TFV and QQT got their General Class licenses. UPB monitored 3860 kc. at 2 p.m. EST and 3580 kc. at 3 p.m. EST the Sunday of Field Day to accept Field Day traffic for QSP. In Toledo the Macomber High School has RMX running 1 kw. with a nice set-up. The Toledo RC has helped and worked with the local Boy Scouts Exposition. HNP has

(Continued on page 94)

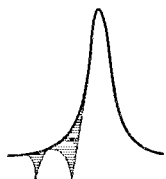
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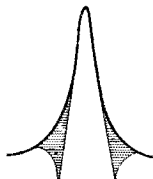
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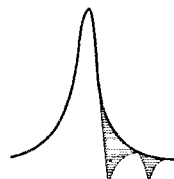
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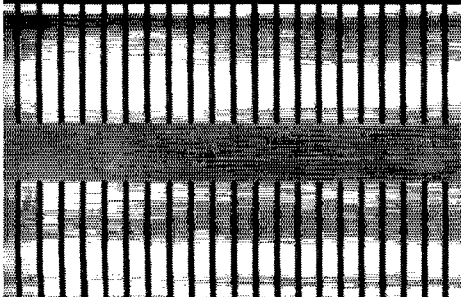
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done a wonderful job putting Lucas City RACES on the map. QKR and his XYL were blessed with twins, a boy and a girl. Seneca City has an active 2-meter net. CUZ made General Class. New appointments: BKP, DL, GFE, and SWZ, as OOs. HXB as ORS; PCK as OES. Despite what has been said before, the fifth Dayton Hamvention was the largest, with more than 1900 attending. There were more than 900 at the banquet and 259 took the FCC examinations for various classes of licenses. John Reimartz, K6BJ, was the keynote speaker and spoke on "Reminiscences of Amateur Radio." LRR was awarded the trophy for outstanding service to amateur radio and/or the public during 1955. UPB, our SEC, presented the Ohio Council of Amateur Radio Clubs' cup to IKM, representing the Canton Amateur Radio Club for its having the largest Field Day score in Ohio in 1955. Prize winners will be announced later. Traffic: (Apr.) W8VTP 336, AXX 170, DAE 138, HNP 86, AL 56, PLQ 49, VWX 35, ARO 33, IIR 30, HXB 28, WE 23, CTZ 21, BEW 20, CVZ 18, HZJ 11, QIE 7, DG 3, JDN 2, RO 1. (Mar.) W8LZE 5, PBX 4, BUM 2, LMB 2.

HUDSON DIVISION

EASTERN NEW YORK — SCM, George W. Tracy, W2EFU — SEC: RTE. RMs: BXP and K2BJS. PAMs: GDD and IJC. Section Nets: NYS on 3615 kc. at 1900 EDT; ESS on 3590 kc. at 1800 EDT; NYSPEIN on 3925 kc. at 1800 EDT; SRPN on 3980 kc. at 1030 EDT; IPN on 3970 kc. at 1500 EDT; MHT on 3716 kc. each Sat. at 1300 EDT. The Crystal Radio Club celebrated its 25th anniversary Apr. 21st. Albany Association officers for 1956 are ONE, pres.; GPC, vice-pres.; ZOY, secy.; K2C1, treas. APF has returned from a world trip loaded with pictures of hams and places. K2HJX is planning to go mobile. BEN installed a station at the Boy Scout Jamboree in Albany Army. 8AVT/2 now is operating as K4IET in Rossmore, Va. W2WQ/2 received his degree from R.P.I. in June. K2HON visited W1SEO in Burlington, Vt. K2BSD is working portable from Lake George for the summer. Edison Award winner JIO was guest of the Schenectady Association in May. New appointment: K2DIM as OO. Endorsements: MHE as OO and OES. Civil defense "Operation Alert" has been rescheduled for the week end of July 20th. The SARA held its Spring Dinner June 1st for members and their families. Your SCM would welcome applications for Official Observer appointments. We need more in the section. How many clubs and independent groups operated during Field Day? Send us a card if you were active. Traffic: (Apr.) W2BXP 210, EFU 60, ATA 52, K2BE 32, AWA 18, BBJ 14, EKS 13, W9GDD 9, K2HQJ 7, W2GTC 5, K2CXO 4, W2GTB 4, WVK 4, WZQ/2 4, K2LHX 3, OSY 3, HNW 2, HON 1, W2TYC 1. (Mar.) W2WZQ/2 10.

NEW YORK CITY AND LONG ISLAND — SCM, Harry J. Dannels, W2FUK — SEC: ADO. PAMs: NJL and OBW. RM: WFL. Section Nets: NLI, 3630 kc. nightly at 1930 EDT and Sat. at 1915 EDT. NYC-LIPN, 3908 kc. Mon. through Sat. from 1730 to 1830 EDT. WFL reports the operation of NLI with 10 stations per evening handling 176 messages in 25 sessions. The net held its Tenth Anniversary Dinner with 43 persons in attendance. Guest speakers were 1NJM, from ARRL, and K2FZ, from FCC. All hands wish the NLI Net continued success. OBW and the NYC-LIPN roll along in fine shape with 99 different stations reporting in handling 125 messages. KFV is the Second Call Area Director for TCPN and his XYL, KEB, is national secretary for the same net. DLO/4 now signs K4IGX from the East Florida section. Pete is active on all bands and has new Telrex beams for 6 and 2 meters, 15 elements on the latter band. EEN is building cubical quads for 15 and 20 meters. K2QMV completed a 6-meter crystal-controlled converter. K2QGO passed his Tech. Class exam. KN2RTE joins dad, K2MFD, and sister, K2PFA. The Newtown HSRC, K2LBD, has a new Heath VFO. The first YL member of the club is Barbara, KN2RUN. K2LHD dropped the "N." Ditto K2MFN. Seven states in five call areas answered K2OEE in the last 6-meter opening. Herb will be operating as K2OEE/4 from Sparta, Tenn., during the summer and will have his beam in this direction during band openings. JCA has devoted much of his time to Official Observer work, particularly with regard to checking Novice harmonics. All Novices are urged to check their transmitters carefully. Bill and this section's OO appointees are ready to assist at any time. HQD is mobiling with an Eimac. 4OYO/2 is a new member of the Levittown ARC. New members of the Amateur UHF Club are K2QGT and R. Katz. QPQ won the club's 420-Mc. oscillator contest. PCJ is a new member of the NYRC. New officers of the Columbia U. ARC are K2DPG, pres.; K2JYD, vice-pres.; K2ERS, treas.; K2IWW, tech. dir.; ISDO, comm. mgr. K2DEM has five continents confirmed and is looking for Asia to complete WAC. BO and EC installed new keys in their Vikings. K2s GHS, JVB, and KMF are using Gonsets on 2meters. Look for K2GHS/1 from Massachusetts and K2KMF/1 from Maine during the summer on all bands. K2CUT's new Windom antenna has improved his signal. The Amityville Memorial HSRC, K2GKQ, has 70 watts on 10 meters. GP's 2 watts on 144 Mc. reached New Jersey. A new harmonic at HAC kept Ed busy, but not on the air! OBU's preparation for the Board Meeting kept George off the air but he did manage

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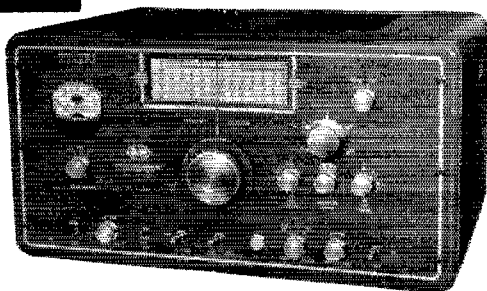
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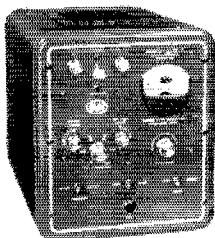
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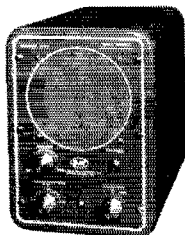


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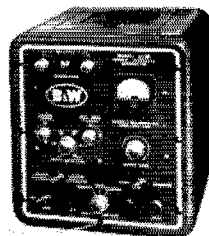


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or 6

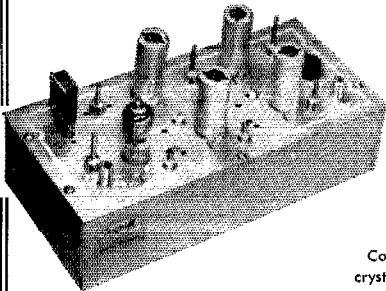
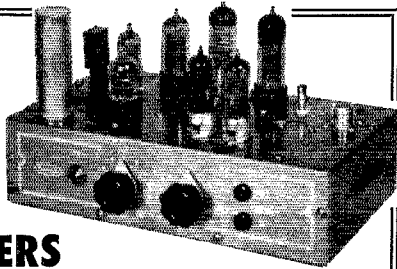
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Hi-Level Plate Modulation • Hi-Impedance Mike • Provisions for Metering All Stages • Tuned Antenna Output System to 52/72 Ohm Line • RF Output-Indicator • Power Requirement 6.3 v AC @ 4 amps & 250 v DC @ 250 ma. • Tubes: 6AU6 osc., 5763 Buf/Dblr; 6360 Buf/Mult; 6360 final amp.; 12AX7 speech amp. & driver; 2-6AQ5 modulators • Power Input to Final, 20 Watts.

Complete with tubes, crystal and plugs... \$59.95
Matching Power Supply 39.95



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crystal and tubes.

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SENSITIVITY: Approximately 1/10 microvolt input will provide a signal 6 db. over noise level.

GAIN: Better than 30 db.

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Collins 75A1, 2, 3.....Specify IF 26-30 Mc.
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MODEL: CC5-50 and CC5-144. For General Coverage receivers. Choose either 6-10, 7-11, 8-12, 10-14, 12-16, 14-18. Any of above in kit form, \$29.75.

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a few hours in the CD Party. K2GWW is now up to 42 countries. K2KRC handled traffic from W9-Land on 50 Mc. during the opening. BQM had a visit from MP4KDS, ruler of Kuwait, Arabia, who spoke to his home station. DCI completed a 10-meter rig. LCF is conducting code practice on 50.25 Mc. (M-W-F, 1900 to 1930) using m.c.w. for the benefit of Gonset owners. MSK does a similar job on Sat. at 0930 on 28.9 Mc. GJKU has a new NC-300. VL vacated in Florida. K2KTT has VK2 confirmed on 20 meters using only an AT-1 rig. K2MDB is anxious to contact 420-Mc. stations in Brooklyn. KN2QWC added 5 more states toward WAS. A new NC-300 sits on the operating table at IVS. Bob "pinned" his girl friend, Sue, with an ARRL pin! 5ZRA/2, GG's son and your SCM's brother, returned from CN8-Land and is now stationed at Pinecastle AFB, Fla. The Fordham RC will auction equipment for amateurs with the commission from sales going to the *Braille Tech. Press*. W2RRR and KN2RRR are both members of the Fordham RC! K2BTT is looking for groups interested in radio chess in order to get up some matches. Traffic: (Apr.) W2KEB 1366, KFV 1241, VDT 276, AEF 256, K2DEM 240, KXZ 129, W2BO 95, WFL 94, K2GHS 70, W2TUK 87, K2CUI 64, W2OME 57, K2OPJ 49, AMP 29, W2LGG 26, PDU 26, GP 18, OBW 18, LDQ 17, K2DVT 13, W2HAC 12, PF 9, K2EQH 8, W2EC 6, OBU 6, UGF 6, K2ADL 4, W2AYJ 4, DUS 4, ELK 3, JCA 3, K2GWW 2, KRC 2. (Mar.) W2BO 90, EC 13, K2ADL 5, GWW 5. (Feb.) K2ABW 6.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC; IIN, PAM; CCS, RMs: MLW, CGG, and NKD. New officers of the Avenuel Radio Club are K2PVC, pres.; K2BKC, secy. LZXA is a new member of Northern New Jersey. The new call is K2SKK. Paul is on from the new QTH with the DX-100 and an HQ-140X. The Bloomfield RACES group again is publishing a very fine monthly news letter entitled *The Signal*. K2PIM has received his 20-w.p.m. Code Proficiency sticker. Art is adding a new antenna system for 10-meter operation. K2MTL now is on 2 meters with a 522 transmitter and new ground plane. The Raritan Bay Radio Amateurs official club paper, *Sideband Spatterings*, makes for very interesting reading. Our deepest sympathy goes to QHF in his recent loss and family misfortune. GNQ has just completed the first course in a series that he intends to conduct as RACES Officer for Bergen County. Forty-five student operators attended the course. The April NJN report received from MLW shows 25 sessions held during the month with an attendance of 334 and a traffic count of 247. NJN meets daily at 1900 on 3695 kc. New members are invited to call in at any time. The IRAC held a very successful transmitter hunt and picnic on May 13th. YGM is spending lots of time at his home QTH tutoring candidates for the Novice exam. A new net has come into being in Northern New Jersey on 10 meters at 1705 each day. It is composed of guys and dolls who work mobile on the way home from work. Name of the net is Nuttynet. The IRAC meeting room is open for code practice sessions every Mon. at 1900 hours. The address is Community Bldg., 1143 Clinton Ave., Irvington. New members are invited to attend. HXU is back after a year of QRL. NIY still is limited to few DX contacts and ragchews. KN2SEB is a new ham in River Edge. After only two weeks on the air George had worked seven states with his Viking Adventurer. RGV reports for the Lakeland Amateur Radio Assn., which held its picnic on June 10th in celebration of its 10th anniversary. The affair was a very successful one with rigs on 6 and 2 meters guiding guests to the picnic scene. The program consisted of a hidden transmitter hunt, contests for children, games for all, and PB prizes. LRO is doing some rebuilding on the low frequencies and on 2 meters. GVV has qualified for Class 1 OO. The Raritan Valley Radio Club meets the 1st and 3rd Fri. of each month at 2000 hours at the club house in Middlebush. Anyone interested in becoming a member should attend a meeting or contact K2JOM. CVW should be back in full stride with the closing of college. K2DHE is the new RACES RO for Monmouth County. Our thanks to ENM, the retiring RO. The coming of warmer weather has necessitated that K2ICE increase the speed of the blower mounted in the Gonset Communicator. We look for a clean take-off any moment now. NLE is becoming an expert with the varnish brush aboard mobile NIE, the cruiser *Jane K*. K2IPR is looking for teletype contacts on 2 meters. Look for him on the low end of the band. K2POO now is General Class. DVD is a new member of the 2-meter gang. Traffic: W2MLW 234, K2EQP 107, KGB69, W2BRC 43, K2MTL 25, W2OXL 16, CFB 8, NIY 6, GVV 5, CVW 2, K2JOM 2.

MIDWEST DIVISION

IOWA — SCM, Russell B. Marquis, W8BDR — New officers of the 75-meter Phone Net are CSP, BDR, FLMI, GKN, HNE, and LPW, directors; YUA, net control; KJN, ERP, BTX, and K9BEC, alternates; WLY, secy. NG5 vacationed in Arkansas. BDR visited the Davenport and Clinton Clubs. SLC has a new Elidco transmitter. The Fort Dodge Club has organized a 6-meter emergency net with five stations active so far. KN6DTG has 2nd-class phone license. KN6DPT, BRE, CQC, DHQ, AAF, and

(Continued on page 98)

HOW MUCH SHOULD YOU PAY FOR A GOOD ROTARY BEAM?

The only true measure of value is (a) performance and (b) amount of aluminum per dollar cost. Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

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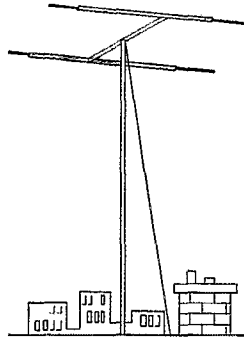
MATCHING. Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

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STANDING WAVE RATIO. A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

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10 METER BEAMS

- Std. 2-El Gamma match 11.95 T match 14.95
 Deluxe 2-El Gamma match 18.95 T match 21.95
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AAK have dropped the "N" KNØEMR is a new Novice. RQW received an OBS appointment. Lewis McCoy, 1ICP, from ARRL Headquarters, visited the Cedar Rapids and Sioux City Clubs giving talks on TVT. CLT has a 70-foot vertical. RFC has a skirt with KC4USA. KØDBW and YI are new TLÇN members. YHP is whipping out a local v.h.f. newsletter for the Quad City Area v.h.f. hams. The 6-meter activity in the Quad City Area is growing by leaps and bounds. The Midwest Division Director, Iowa SCM, and SEC all belong to the Central Iowa Amateur Club. BDR has a new NC-300. QQA made WAS on 75-meter phone. 6WLY/Ø. Volga, worked KC4USA on 40-meter c.w., being told he was their first QSO on that band. Traffic: (Apr.) WØSCA 1182, BDR 1103, BJP 364, LGG 329, LÇX 263, CZ 171, QVA 117, LÇW 88, BLH 68, YI 40, UTD 33, KJN 30, KØDBW 27, WØKVJ 23, NGS 21, NYX 21, PRT 17, PTL 17, KØWAD 13, WØVWF 12, K3BAX 10, WØCLS 10, DJY 6, EEG 5, JPJ 4, FMZ 3, FDM 2, GQ 2, QQA 2. (Mar.) WØWPM 64, IKP 14, GQ 8, KØASR 7.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC; PAH, RM: QGG, PAM: FNS. Congratulations to our new RM, QGG. Besides taking on the RM job Jim is EC for Zone 7 Woodson, Allen, Bourbon, and Neosho Counties. OBS operating on 3610 kc., and ORS, The Scott County c.d. station, YLO, set up at the state lake Apr. 7th for a demonstration for Boy Scouts. Mobiles ML, EUP, OWJ, and LIF, with ZUX and YLO at the fixed station, were in close contact during the test. ZUX, while tuning on 6 meters for alleged TVI Apr. 4th, heard eight or nine 5-9 plus signals from the 8th and 9th district. MOX/Ø has a new crystal converter for 2 meters. On May 2nd about 20 stations from Kansas, Oklahoma, Texas, Nebraska, Indiana, Ohio, and Missouri were heard. Louis's daily sked with QDH, of Salina, clicks about 50 per cent of the time. KØEIJ is the new call at Forbes AF Base. Recent high winds took KØFEI's 15-meter beam but the five-element Telrex on 20 meters came through OK. Incidentally, KØFEI monitors 3950 kc. from 8 to 5 p.m. daily. CHJ changed his system of keying on his Viking to blocked grid and likes it very much. Clarence also is working on an s.s.b. rig. UAT has a new B&W TR switch and Signal Sentry. The KVRÇ, of Topeka, has changed its meeting place back to Police Hq. and meets every other Friday. Traffic: (Apr.) KØFEI 628, WØBLI 443, NIY 205, FNS 174, ALXG 155, QGG 151, ØHJ 125, TOL 111, ABJ 75, SAF 57, YVM 45, QGB 26, FØJ 25, RXM 23, VZM 15, WWR/Ø 15, TNA 12, ECD 11, ONF 11, KØAØQ 8, WØLX 8, KNØDDW 7, WØLOW 6, UAT 6, KNØEAM 4, CBN 2, WØITO 2, DEL 1, KØAHV 1, KNØDNV 1. (Mar.) WØOHJ 1006, VNL 10, ECD 2.

MISSOURI — SCM, James W. Hoover, WØGEP — SEC; MFB, PAM: BVL, RMs: OUD and QXO. State nets: Mo. Emergency Net, Mon., Wed., and Fri. 3900 kc., 1800 CST; and Missouri Net; Mon. through Fri., 3580 kc., 0700 and 1900 CST. All Missouri stations are invited to participate. Reports indicate that April was "new equipment month" in Missouri with OMM and ZIH, NC-300 receivers; VTF and KØBWT, Viking transmitters; TDR, an EE-2 electronic key; JHY and ECCO, 10-meter walkie-talkie; ZYL, a Heathkit VFO; SZT, a 500-watt Globe King; VTF, a 10-meter beam. OMM and CPI both reported that a good time was had at the Eureka Springs Hamfest. WIC and KØBDT are now operating s.s.b. KØACK is trying 6 meters. SAK received his high school diploma on May 11th. CBV is back on the air after a long absence. RTW is troubled with a weak signal because of loading problems on a new antenna. ETW will be at Ft. Reilly, Kans., for a 6-week ROTC summer camp this year. PME, Missouri's stellar OO, is suffering from spring fever but managed to get out a number of OO notices. TDR received a CP-25 certificate. ECE will have more time for traffic since being relieved of his duties as acting chief of police. JHY is now mobile on 10 meters. The 6-meter gang had a field day with the opening on April 15th. New appointments this month are JHY and KØAWC, as OOs, YKC and RWG as ECs, and KØAWC as OBS. Twenty-one stations answered roll call on the Springfield Emergency Net, 29,625 kc., during the last session. Traffic: (Apr.) WØCPI 1128, GAR 626, GEJ 522, BVL 119, OMM 94, OUD 89, RTW 61, KIK 52, IIR 44, WAP 41, ØKQ 31, VPQ 30, HUI 25, SAK 24, YKC 23, GEP 11, KØBDT 9, WØKA 8, QFD 8, TDR 7, EEE 6, MFB 6, QMF 6, VFP 6, BUL 2, ECE 2, VTF 2. (Mar.) WØTDR 41, KA 28, JHY 3, QFT 2.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — Asst. SCM; Tom Boydston, ØVYX, SEC; JDJ, PAM: MÅO. The new PAM for Nebraska is none other than MÅO. The 75-meter phone NCS reports the following for April: 64 members on net roll call, total QNs is 874 with an average of 29.1, total traffic 121, time spent on the net 1069 minutes, longest session 77 minutes and the shortest 14 minutes with an average length of 35.8 minutes. A new member of the net is KØBYK. QNs for NSS: Total 238 with an average of 9.6, total traffic 43, KØCPD and KÅWO now have their General Class licenses. New members are KNØCSJ and KNØELC. KØEAMH is the new call for the Tri-State Radio Club. Weekly tests are held on 3900 kc. and the station, located at City Hall, also is on 6 meters. The Gering Club is experimenting on 2 meters for emergency work. KJP stopped in North Platte for a short but very

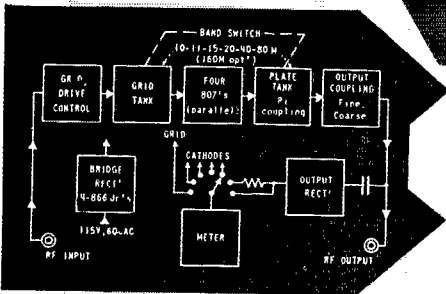
(Continued on page 100)



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Model 500W... compact... handsome... powerful! Pi network output, single knob bandswitching. Covers 10, 11, 15, 20, 40 and 80 meters and has provisions for an extra band which may be 160 meters.

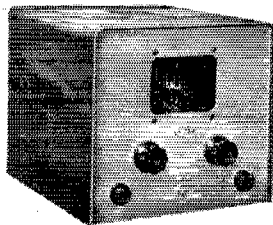
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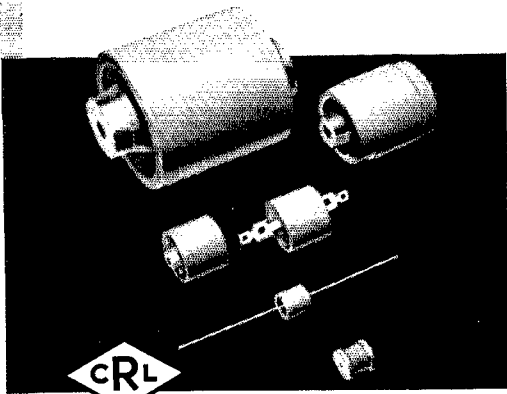
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welcome visit while returning from Arizona. What a mobile set-up he has! CDG is a new member of MARS. The Western Nebraska Net reports 35 sessions held. The net has changed the time to 0700 MST. All club secretaries are urged to get the RACES forms in to JDJ, at Lincoln. Those wishing forms may contact Fran now. YEA has a new DX-35. LRK recently made some repairs to his beam. Traffic: (Apr.) W9ZJP 267, YOY 183, ZAG 183, UJK 176, DDT 144, TIP 79, K0EBL 72, W9MAO 67, EGO 42, FRS 26, KXK 26, K9CDG 23, BDF 22, W6FBY 20, NIK 19, ORW 19, SPK 14, HQN 11, CBOQ 8, PPT 8, TFZ 8, VGH 8, ZNI 5, LAY 4, KFY 4, KLB 4, RMO 4, DDF 3, QKR 3, KN0BQY 1 (Mar.) W9ZWG 60, ZWF 3.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF, RM; KYQ, PAM; YBH. Traffic Nets: MCN, 3640 kc. at 0645 Mon.-Fri.; CN, 3640 kc. at 1845 Mon.-Sat.; CPN, 3880 kc. at 1800 Mon.-Sat. and 1000 Sun. KYQ reports fair to good conditions on CN, which met 25 times and handled 293 for an average of 11.8. RGB (22), KXQ (21), and AVS (19) were most frequently QNI. On MCN, 74 messages were handled in 20 sessions with BVB (18), RGB, RFL, and IBE (17) most regular. We welcome YBH as our new PAM, succeeding LWW. RRE prepared the April CPN report which shows traffic 120 in 28 sessions and RRE, VOV, and EOR/1 having the highest QNI. EFW thanks all who helped move the BCV traffic from the Progress Exposition in Southington. IUC and FKE are new reporters on CN. EGL, FDJ, and GNS have qualified to drop the "N" from their calls. FVV, active on 6 meters, raised his states worked to 16 on that band. YU reports OBS schedules will resume in the fall after the antenna relocation, etc., is settled. The HCARA-sponsored talk by K6BJ (ex-1QP) was well attended including several non-member old-timers. FB bulletins were received from the Manchester and Middlesex Clubs. How about others? FB reports from OOs BVB, GLX, and VW with particular reference to Novice harmonics in the 7400-kc. area were received. New EC appointees are VLY and NQO. Renewals of ORS went to WPR, EDA, UED, and YYM; EC to RPX; OPS to YYM; and RM to KYQ. Appointees of all types are requested to watch expiration dates, and if you desire renewal send along certificates for endorsement. Inquiries are invited regarding any appointment in which you may be interested. AWK reports successful operation of the booth at the Ansonia Scout Show. BDI is improving antennas for 15 and 20 meters and v.h.f. LIG now is at Westport where MAI is postal clerk and MRJ is his mailman. Doc is mobile on 10 meters and also has a new DX-100. UKY was married recently and now is located at Trumbull with a new DX-35. BRL and his XYL went to California. He has a 10-meter mobile using Letting 240, Traffic: W1AW 384, ECV 269, YBH 214, KYQ 207, RGB 129, LV 121, EFW 108, RRE 104, TYQ 104, BDI 67, CUH 64, BVB 41, YNC 40, KV 33, AVS 19, EDA 16, DHP 13, HYF 8, GIX 5.

MAINE — SCM, Allan D. Duntley, W1VYA/BPI — SEC: TVB, PAM; WTG, RM; EFR. The Pine Tree Net meets on Mon., Wed., and Fri. on 3596 kc. at 1900; the Barn Yard Net Mon. through Sat. on 3900 kc. at 0800-0930; the Sea Gull Net Mon. through Sat. on 3940 kc. at 1700-1800; the Teen Age Forest Net Sat. and Sun. on 3900 kc. at 1000-1100; the State C.D. Net Sun. on 3993 kc. at 1100-1200. All hamdom in the State of Maine is "busting out all over" with pride. The XYL of RSB is "Mrs. Maine." The best kept secret on 3900 kc. — the new Dykeman baby boy. FHG has dropped the "N" and also turned his 2 meter beam over to horizontal. QCC, in the Bangor Area, has some layout on 2 meters. It would pay you to go and look at it. Also Russ could give you some pointers on u.h.f. operation. Sorry to lose IKW from our State, but good wishes to you, Dave, in your new location. ZM is breaking ground on Zipper Hill for the new mansion. He's got to wait about three years before he becomes a grass roots State of Mainer. Congrats to the Androscoggin Amateur Radio Assn. on its 15th anniversary. Hope you all had fun and ran up a large score Field Day. The gang on 3900 kc. surely misses EBJ. Dig that rig out of the moth balls, Amos. We also hope Helen is feeling better. We have a retraction to make and are glad to do it. *JYU is not on 8 meters and not going on.* We thought "Mr. 2 Meters Himself" would not make such a mistake. Traffic: W1LKP 163, CEV 46, EFR 45, BCD 34, BX 26, UDD 22, BBS 18, ZUL 10, OTQ 9, FSK 8, BCB 7, FCS 4.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP. New appointments: SRG as OO. Appointments endorsed: QGJ, Woburn, TVD Andover, WNP Concord, WAG, Taunton, YHY Fall River, BWH Attleboro, AWA North Reading, DWY Beverly, as ECs. QMJ as ORS, QGJ, UKO, and VYI as OPSs, PXH as OES. AWA as OES. The South Shore Club elected VOU, pres.; FBT and MME vice-pres.; TUP, secy.; TZQ, treas. Milton and Holbrook have RACES licenses. Sector 1-B Headquarters station is on the air on 2, 6, and 10 meters. AJU is home again. The South Shore Club, IA, had a station on the air at a Science Show at the Quincy Armory sponsored by WJDA and handled messages for those present. ROB is mobile on 10 meters. KFG, ex-9FJK, is on 2 meters.

(Continued on page 102)

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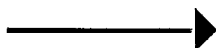
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By BOB BERGE
(W9KRU)
Project Engineer

DID YOU KNOW THAT . . .

Amateur history was made recently. Lee (W9EH), Sandwich, Illinois made a successful QSO on 10 meters using a Transistor Oscillator! He contacted Tom (W7DND) in Seattle with a c.w. test signal. Actually, skip conditions were bad and QRM was abundant; but contact was made and hams in this area greeted the news with great interest. This took place at approximately 12 o'clock, CST.

Circuit development and packaging of the Transistor Oscillator was done by Bob Berge (W9KRU). The unit consists of a miniature crystal-controlled transistor oscillator completely packaged in the JK Thermystal. With 6 V.D.C. at 2 ma. input, approximately 2 mw. output is achieved. For this history-making feat a four over four ten meter beam 80 feet high was used for transmission and a 36 element beam was used for reception.

We at The James Knights Company feel justly proud of this feat when we remember that W9EH is president of our company, that W9KRU is a research and development engineer at JK, and that development of this Transistor Oscillator took place in our laboratories.

More things are bound to happen at JK that will be of interest to the amateur. WHY? Because the following hams work here:

W9EPU, W9TZZ, W9JGU, K9ARN, W9EH, W9KRU, W9AWC, and W9EYY.



WRITE
THE JAMES KNIGHTS COMPANY
SANDWICH, ILLINOIS

JFQ has AT-1, FBT has General Class ticket. Heard on 2 meters: UBF, FJX, RX, IFL, FAO, HVJ, RCY, JPU, VDE, KDF, KCO, QPU, KCY, ION, and GYU mobile in plane. Heard on 10 meters: TTS, EMZ, AF, GVV, YCM, BJX, NUP, and UBU. Heard on 75 meters: WJM, MJQ, CUY, ZSJ, HQO, KIX, KSU, and QA. AYG, BW, BGW, QKM, HJP, GDJ, LQQ, and CLF took part in the February F.M.T. The Braintree Radio Club held a meeting and MME discussed the 2-meter project. Radio Amateur Open House held a meeting and AAT talked on spark transmitters and old receivers. KII and GUY are new in Braintree. UVM has a DX-100. RWY, KPX, and QPT have been on the sick list. CTR says that the following MARS members picked up some gear at the Army Base: AUU, EPE, TUD, DWO, HGH, LVR, TUP, OI, EG, and JKO. CTR is fixing up his 2-meter rig. GDJ is working on a mobile rig. WN1UU, new in Lawrence, is on 40 meters. NF has a B&W s.s.b. generator and an SX-100 receiver to go with his B&W 5100-B transmitter. WN1HC has completed a new rig. EMG received a BPL medallion. WSN built a walkie-talkie for 2 meters. EPE's son, WN1KEE, will leave for Guam for 18 months duty. UKO has a one-element rotary beam. CSS has a new DX-100. To all Novices who are on 80-meter c.w., watch your harmonics outside of the 40-meter band. AGA spent 5 weeks in Florida. WN1ETD is now an Eagle Scout. LQQ needs Nantucket for WANE. FAA is in the Navy at Bainbridge. The Yankee Radio Club held an auction with AAT as auctioneer. AKN will have more power on 2 meters. SMO is NC for EMN on Tue. nights. AOG is building a portable 2-meter rig. ZQM has a new NC-300 and a TBW transmitter and with FGL's help is on RTTY. THO, our 6-meter PAM, reports the following on 6 meters: ANK, AQR, CGT, CLT, CUB, DA, DZH, EQP, FAO, P'RY, FVW, GRW, IO, JBA, JBD, KID, NRZ, QMN, QDR, RO, RGY, UMA, WYX, YSK, and KNI. UAR/4, in South Carolina, was coming through during an opening. HJC is mobile in Boston. DJ has a new five-element beam. ION has a rig. Correction: CNT, not DIR, has a DX-100 beam. New Bedford hams on s.s.b.: UIE, ME, ZPE, AEN, and HPH. MUAM was hurt in an accident. YHY has been away on vacation. The T-9 Radio Club met at Al Barton's QTH. MJO is Alternate R.O. for Norfolk. The Norfolk County Radio Assn. held its annual banquet and elected HTR, pres.; ALK, vice-pres.; AYI, secy.; IIP, treas. MGL is going to school. ARU will be on from Falmouth with a DX-100 this summer. MKW sends in news about the Cape hams: LNR is mobile on 2 meters, SGL, now on 75, has his antenna for 10 meters. TJW has a new 829 rig on 2 meters. 3WV/1 has a 2-meter beam. EUE now is General Class. JFM is a new Novice. DJK has a 300-watt all-band rig and short beam for 20 meters. AKN, CMT, and MKW are building a GE ham news rig for 2 and 6 meters. LYV has a fourth harmonic. BCN, WHC, and YEB made hay on the last 6-meter opening. EGZ is building a kw. rig. MBQ has a 4E27 and beam on 2 meters. YHQ is gaining on his polo and is home after a stay in Boston. QAQ has a new v.f.o. on 80 meters. QG built a new v.h.f. receiver. JGD is on 80 and 2 meters after many years' absence. DPO has a new 3-band beam for 10, 15, and 20 meters. MFI is building a copy of a Conset 2-meter receiver. New WNs in Winthrop are KAH and JGF. Rene Moisson passed the General Class exam. April 23rd drill: 18 stations, 31 people, including DEL, AGB, BDU, CMW, DJ, OIR, DLY, IOO, KAH, MQB, ORV, UOC, JJI, VIS, NAX, EHZ, and BB. AHE is on 2 meters and getting things for the rig on 220 Mc. WN1HX is plugging for General Class. The Area 1 Radio Committee held a meeting with TWG, ZYX, CQ, AR, DWY, TQP, AWA, KTG, and QQL present. YCR is moving to Framingham. SXD has a DX-100 going. BL has 800 watts on 2 meters. PIW is working on TVL. UH is calibrating 22L. UG is on a cruise. LVN is in Southern waters. The Newton Club had a shot-gun election. CGU has an 832 on 6 meters. MJA was in W6-Land. NEN is on the road a lot. LMU is playing with transistors. UKA was in Michigan. SGH changed jobs. AGR still is busy. Braintree now has a RACES license. Traffic: (Apr.) W1EMG 399, K1USA 144, W1WSN 124, EPE 90, UKO 51, AVY 50, GNX 43, NUP 41, CUW 30, ATX 24, IBE 22, UE 19, TY 16, AHP 11, QLT 10, AUO 8, CLF 6, LQQ 6, SMO 6, AKN 5, BY 4, ADL 2, CZW 2. (Mar.) W1BOA 16, AOG 13, NUP 6, ABF 4, HWE 2.

WESTERN MASSACHUSETTS — SCM, Osborne R. McKeraghan, W1HRV — SEC: RRX, RM: BVR, PAM: QWJ. The WMCW Net meets on 3560 kc. Mon. through Sat. at 1900 EDST. The annual WM net bulletin, put out by BVR and DVW, was another fine job. DVW has been appointed Asst. RM for Hampshire, Hampshire, and Franklin Counties. ZUU is Asst. RM for Worcester County. ZEO, ex-0NZQ, is the new EC for North Adams. WPW has been appointed EC for Athol. EC endorsements were made for HRV, LLN, LSZ, and LUA. UVI is doing a swell job as chief operator of Westfield C.D. MKD is moving to Williamstown and is a director of communications for the Mass. Wing of the C.A.P. The Central Mass. Amateur Radio Club held its Annual Gabfest May 12th at Army Reserve Center in Worcester. DFW was program chairman. The Hoosac Valley Radio Club of North Adams is reporting much activity, with an Old Timers Night held April 24th and Open House May 12th. The HCRA held its annual

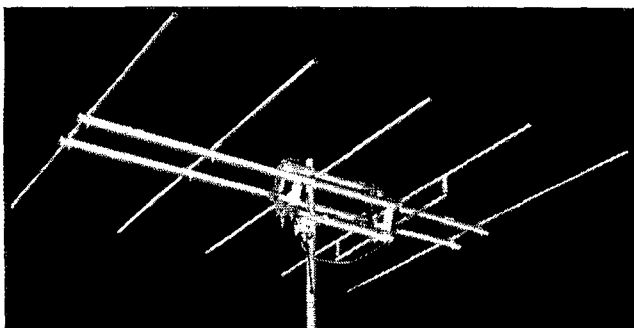
(Continued on page 104)

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Model HM2-5AK	5-element	7.80
Model HM2-7AK	7-element	10.50
Model HM2-10AK	5-over-5	12.95
Model HM2-14AK	7-over-7	16.95

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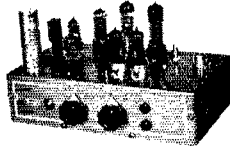
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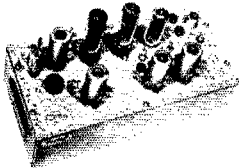
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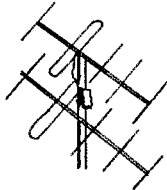


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banquet at the Chateau Harmony in Granby. HRV was Field Day chairman for the HCRA. The MARS radio training program is being held at Springfield Armory under the guidance of Capt. Schreck, director of AA1WAV. Code the theory instructions are being ably handled by MNG and WLE. A radio class under the direction of KUL finished up with 18 members. At exams held recently in Springfield, 7 of the graduates passed the General Class test. RO HRV, of Easthampton, has received 6-meter equipment for the town c.d. station for the RACES program. A communications room is being prepared in the town hall and equipment will be in operation there very soon. Word from ex-TRB, now KL7BHG/4 operating in Florida, is that he expects his 1 call back soon. The Sector 3D Net in the Clinton Area meets on 10 meters every Mon. at 1930 EDST. They will change net operation from 10 to 6 meters soon. Traffic: WIBVR 98, ZUU 65, HRV 60, LVV 21, TAY 17, AJX 14, AGM 6, RWR 5, DWA 2.

NEW HAMPSHIRE — SCM, Harold J. Preble, WIHS — SEC: BXU. RMs: CRW and COC. PAM: CDX. The Granite State Phone Net operates Mon. through Fri. at 1730 and Sun. at 0900 on 3842 kc. New Hampshire Emergency Net operates Sun. at 1300 on 3850 kc. Equipment is being secured by the State for ten County RACES Headquarters and State Headquarters in Concord. See your local EC for information on the latest developments at the local level. Check in Sun. for further information. Plans are being completed for the N. H. State ARRL Convention to be held Sept. 30th at the State Armory, Concord. The Concord Brasspounders had an FB station in operation at the recent Do It Yourself Hobby Show in Concord with rigs on 2 and 10 meters and RTTY. WBM is building a new 60-watt rig for 6 meters. 8KAY is looking for New Hampshire contacts on 2 meters. The EC for Strafford County reports fine cooperation from the c.d. director in getting equipment for RACES. The situation was the same at Keene. A hearty welcome to the following Novices: IBI, ICL, ICT, IDN, IJX, IKM, IMB, KVG, IBERN is now 3FFI. Traffic: (Apr.) W1IP 94, HOU 52, COC 36, GNH 26, KZ 21, AIJ 14, BYS 12, VZS 8. (Mar.) W1WBM 50.

VERMONT — SCM, Robert L. Scott, WIRNA — SEC: SIO. PAM: RPR. RM: OAK. Vt. nets meet on 3860 and 3520 kc. RPR resigned as PAM as of May 1st. It is with regret that his resignation was accepted. Thanks, Paul, for doing such a fine job. I know all the gang will miss you. The VTN went on summer sked May 14th, operating Mon., Wed., Fri., and Sat. evenings at 1930 hours. At this time your SCM is considering seriously of resigning to allow someone else who has more time to be on the air to take over. RNA firmly believes that the SCM should be on the air either phone or c.w. or both to keep track of the goings-on first hand. Traffic: W1OAK 129, VZE 34, AVP 25, IT 21, ZNM 15, RNA 14.

NORTHWESTERN DIVISION

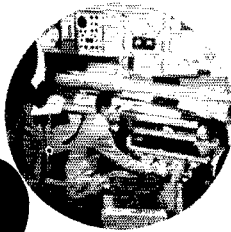
IDAHO — SCM, Alan K. Ross, W7IWU — Lewiston: GMC. EC, reports the City and Nez Perce County is c.d. organized. IDZ heads the group, with YBV as Asst. EC. GMC is debugging mobile for a California trip. The Lewiston-Clarkston gang meets on 3920 kc. each Sun. at 1300 for a round table. Gifford: VWS keeps running out of Official Observer cards for mailing to Novice harmonics in the 7.4-7.5-Mc. region. It is urged that all Novices have someone locally check their 3700-3750-kc. signals for 2nd harmonics. Moscow: VQC reports receiver trouble so was off for a few days. He checks into the FARM Net on 3935 kc. and the C.D. Net on 3997 kc. The National C.D. Tests are scheduled for July 20th and 21st. All Idaho stations are urged to check in on 3509.5, 3997, or 1995 kc. when the time comes. Boise: Visitors in May were BNU and ACD. Traffic: (Apr.) W7GMC 220, VQC 3. (Mar.) W7GMC 203.

MONTANA — SCM, Leslie E. Crouter, W7CT — SCG is on with a DX-100 and a new 20-meter beam. JHR is back on mobile in Miles City for a few weeks. TAT has a rig in on Bozeman. PXR is working s.s.b. YHS has a new G66 receiver for his car and is setting up a Model 26 Teletype for RTTY. MQI has a new Harvey-Wells unit. ARP is installing a 10-meter beam. CHK took the Conditional Class examination and expects to be on phone soon. BMI has his DX-35 working now. 6ACN/7 is in Billings from California. BXX moved to a farm outside of Billings. KGF and his XYL are building a new home. CPY is back from Arizona. GAP has a 55-foot pole for beams. SVB is working in Lewistown for the summer. AWX and his XYL have a new harmonic named Kathi Jean. The Harlo gang is trying to clear up some QRM. YPN is moving to Butte. YZQ/m worked Midway again on 80-meter phone. The above news was hard to get and came from only one source. Please let us have some reports. We would like to know if there is any other activity in Montana. Recent appointments and endorsements: KGF as RM, COH and UWY as ECs. Traffic: W7SPK 40.

OREGON — SCM, Edward F. Conyngham, W7ESJ — PRA has a new ground-plane for 2 meters and is now active on the OSN, OEN, OARS, RN7, and Snake Eye Nets. WFO, having been relieved as secretary of OARS, is now ragchewing and practicing c.w. WLL has a new three-element beam for 10 meters, also some fine mobile equipment,

(Continued on page 106)

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and is doing OO work. TSH has been active on OEN. BVH has been traffic-handling on OSN in addition to doing MARS work. ABJ is working both OSN and OEN. ATQ is working the OARS Net. YZM is on both the OARS and the Columbia River Nets, 3860 kc. JGJ has a new Z match and is working the OARS Net. YUY is practicing to get the C.P. 30- and 35-w.p.m. certificate. APF made BPL in March and April. QYS is active with SEC work. TSH is having VFO troubles. The OARS's new officers are VGL, pres.; LRT, vice-pres.; WN7DGA, secy.; GUR, treas.; PTJ, act. mgr.; WFP, ED mgr.; JGJ, chairman of Board of Directors. The OARS has just completed a new Oregon Amateur Radio Call Book. OSN has discontinued the Saturday night net sessions. Those presently reporting to OSN are ABJ, AOK, BVH, BZD, KAB, OMO, PRA, QNI, TSH, UJL, UVD, WJB, YFE, YUY, ZND, and ZXC; with THY, PHJ, WQR, UIU, YU, WLT, OE/6, TAZ, APF, and GVV making occasional check-ins. Traffic: (Apr.) W7APF 506, QKU 454, BVH 53, PRA 41, OMO 36, LT 32, YUY 30, HDN 19, BLN 14, ABJ 10, GUB 10, YZM 4, JGJ 2, WFO 1. (Mar.) W7APF 617, WPW 30, GUR 22, QYS 11.

WASHINGTON — SCM, Victor S. Gish, W7FIX — CUZ reports a 209 traffic count for April — his first full month of holding a license. BA reports a six-way s.s.b. round table — ZL3IA, VK3AEE, ZS6OY, W2QZ, DL4EW, and W7BA — and also ran a phone patch to Tacoma for KC4USA. RGL reports the North Kitsap Radio Club has been organized, with Paul as first general chairman (pres.). CGJ dusted off his license and bought a Gonset Communicator. PSL is moving back to the Clarkston Area. WN7CUI wants to get a Novice Net started on 80 meters. AIB was elected president of the West Seattle Amateur Radio Club and still is experimenting with antennas. CWN, working 20 meters, reports new prefixes for him are GI, EI, and DJ. PGY reports band conditions are very poor for NTN's morning sked (0630 PST 3920 kc.) and he is thinking of moving to 40 meters for the summer. EYF has a recorder he uses to monitor transmissions. GAT is QRL print shop and c.d. work. Skagit C.D. is going to 2 meters with five stations now equipped — PQT (RO), ZSH, ZEK, LAN, and GAT. WN7BEC is on the air with a DX-35. CLZ says "Glad you are in again for two more years. Vic. Sort of like being a good potato peeler in the Army, once on KP, never off — Hi!" Right you are, Vilas, being SCM seems to be a job not wanted by many but we don't mind. However, we would appreciate more reports. EVW renewed his OPS appointment. Four made RPL this month — PGY, BA, VAZ, and K7WAT. Add two for March — FRU and AHV. KTL, now on 75 meters, is getting ready to take down his 10-meter beam and move to West Virginia July 1st. Traffic: (Apr.) W7PGY 1608, BA 1426, VAZ 812, K7WAT 583, W7FRU 387, CUZ 209, RGL 76, USO 68, RXH 38, UNI 27, AIB 22, APS 19, FZB 12, GVV 12, AMC 10, EHH 10, WQD 9, EVW 5, CLZ 3, CJQ 2, HDT 2. (Mar.) W7FRU 709, AHV 104, EYF 45, TH 40, GAT 11, OPC 4.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — BJJ continues to do a good job dispensing "Worked 25 Nevada" certificates. Those wishing to qualify for this certificate should send cards directly to BJJ in Boulder City. CNG, of Carlin, is active on 40-meter phone. VYC, Las Vegas EC, has reorganized the Vegas mobiles. Both Henderson and Vegas mobiles assisted in parade control in the recent "Industrial Day" celebration. The Southern Nevada Amateur Radio Club held its annual picnic May 6th on the shore of Lake Mead. VIU and VNO, of Winnemucca, were both quite active during the last CD Party. The 2-meter bug is getting JLN and BVZ. A number of ARRL appointments are available to active hams in the Reno Area. Write to see if you can qualify.

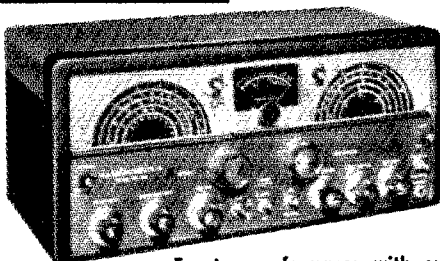
SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — Asst. SCM; Roy E. Pinkham, 6BPT, SEC; NVO. There were twenty-eight persons present at the Pacific Division Director's meeting held in San Jose Apr. 21st. These included representatives from clubs and nets as well as SCM, SEC, and EC in the division. HC was NCS of the open forum at the Fresno Hamfest held prior to the ARRL Board Meeting in Hartford. KN6RUA is a new call heard in South San Francisco. L. L. Libby, assistant chief engineer of the Sierra Electronics Corp., was the speaker at the May meeting of the PAARA, talking on noise figure in receivers. CFK traded in his s.s.b. exciter and came home with a Viking II transmitter. He also installed a set of the new five-band doublet coils. UTV is moving his TV store to a new location in Willow Glen. ZRJ finished rebuilding his rig and is cleaning up those nasty leaks that let the old TV get out to do damage. DOC has been QRL with school work so cannot get on the air much of late. The TVI Committee still is going strong helping those of us who are at work cleaning up harmonics and such from our rigs. It is possible to clear up all TVI caused by spurious radiation from transmitters by working, trying all sorts of hints and kinks, finding circuits that are resonant at frequencies falling in the TV bands, and shielding and by-passing. The time is spent in finding the part of

(Continued on page 108)

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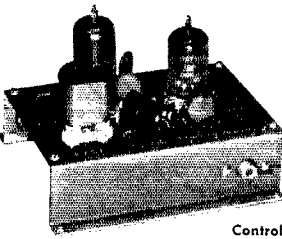
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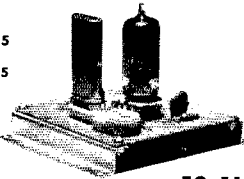
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the circuit from which this radiation is coming. Once this is located, the rest is simple. It can be done, so let's all do our part by pitching in. Traffic: W6YBV 397, K6GID 145, DYX 134, W6BPT 95, ZRJ 60, AIT 29, KN6LSL 3.

EAST BAY — SCM, Roger L. Wisson, W6FDJ — Asst. SCMs: Harry T. Cameron, 6RVC, and Oliver A. Nelson, jr., 6MXQ. SEC: WGM, PAM: LL, RMs: EFD, JOH, and IPW. A recent Official Bulletin has indicated that an increasing number of Novices have been reported by official monitoring stations. My OO reports for this month bear this out. We had reports on seven Novices for harmonic and spurious radiation. I feel it is up to the experienced amateur to give these newcomers a hand in getting their equipment operating properly. Everybody is busy getting ready for the National Convention that will be held in San Francisco July 6-7-8. From the reports coming in, it should be one of the greatest shows ever put on. Let's get behind it and show the rest of the nation that we really can put on a convention. Around the clubs in the East Bay: The RTTY Society of Northern California had an FB dinner in San Francisco. Talks by EFT and MTJ were enjoyed by all. The East Bay Club had a movie, "This is Automation." The film was arranged for by SY. The Oakland Radio Club, Inc., had a movie on c.d. operations in Syracuse, N. Y. A second picture was shown on the development of the jet plane. The SARO held its meeting in San Francisco and on the program was a tour through the RCA Communications Center. The Hayward Club had a talk on RTTY given by yours truly. For its second meeting of the month the club had a talk on TVI problems and their cure, given by WGO. The Hayward Club still is doing an FB job with its Novice classes. Once again I would like to invite club secretaries to inform me of their club meetings and what they had on the program. This is your column and I would like to include every club in it. I depend a lot on your letters and comments, so drop me a line and let me know what is going on, please. A card from ITH tells me he has finished mailing out 2500 QSLs for his activity as K57RT. Reg has his new 50-1L 3-band rotary completed and reports it is working FB. My apologies to K6WAY for not sending in his BPL report. A recent letter from 2BFD tells of ZL1WB copying our RTTY signals on 40 meters. The boys are sending him some gear so he can get on RTTY regularly. QST on RTTY is being sent each Wed. night on 3625 kc, and 7145 kc, at 7:00 p.m. A special thanks to members of the Oakland Radio Club, Inc., for the splendid job they did in recovering Harry's Gaset Communicator. Recent arrests made by the Police Department have shown that communications play a vital part in robberies. These criminals are constantly on the lookout for some unsuspecting ham who will furnish them with the necessary communications they need to pull hold-ups and other crimes. Bootlegging is the first step in breaking the law we amateurs live by and obey. Don't let your buddy get away with it. Protect your hobby by being a good citizen. Traffic: K6WAY 539, W6LPW 248, K6EPC 68, W6ASJ 14.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — A demonstration on transistors by the Pac. Tel. & Tel. Co. was enjoyed by the members of the Sonoma County Radio Amateurs at its April meeting. The club has decided to hold meetings at its present meeting place instead of changing over to Scout's Hall, as suggested. YQZ, a member of the Humboldt Radio Club, received the "Commendation Ribbon with Pendant" from high officials of the National Guard for his work in radio communications during the flood disaster while on duty with the Guard. K6IRD, of the same club, has dropped the "N" from his call. 2APP and his XYL sent word to PHT that they are enjoying their travels in Madrid. The Central California Radio Council held its April meeting in Mt. View. Each meeting is held in a different city, with member clubs acting as host for the month. K6EEE was hostess at her QTH for the April meeting of the Young Ladies Radio Club of S.F. K6GYA is now a commissioner of the Amateur Radio Commission in American Legion Net. Technical films of general interest to all were shown at the regular monthly meeting of the San Francisco Radio Club in place of the usual guest speaker. SY came in first at the 29er Club's hidden transmitter hunt. K6ANP gave all the fellows a merry chase with the transmitter hidden under a lumber pile. K6IYW had the 6-meter transmitter hidden next to the local police station and had to go into detailed explanations with the boys on duty as to just what was taking place before the hunt could go on. KFS won the honors by first finding the hidden spot. About eighty-five showed up at the regular 6-meter monthly luncheon held in April at the Kjo Wah Cafe in San Francisco. The gang grows bigger each month. GQA sent in his regular monthly OO report with two full pages, many being boys with "N" calls. Novices in the section are requested to watch out for "second harmonics." BIP worked 360 stations in 58 sections in the April CD Party and placed third in the nation. W6KFS, K6HYW, K6JES, and K6HHL camped at Black Mountain and set up for the CQ V.H.F. Contest. RBQ's XYL reports that Bill is once more home from the hospital and, although he has a nurse on duty at all times, is able to get around a bit with the help of a cane. Hope that you are fully recovered very soon. Bill. CBE worked 15 new

(Continued on page 110)

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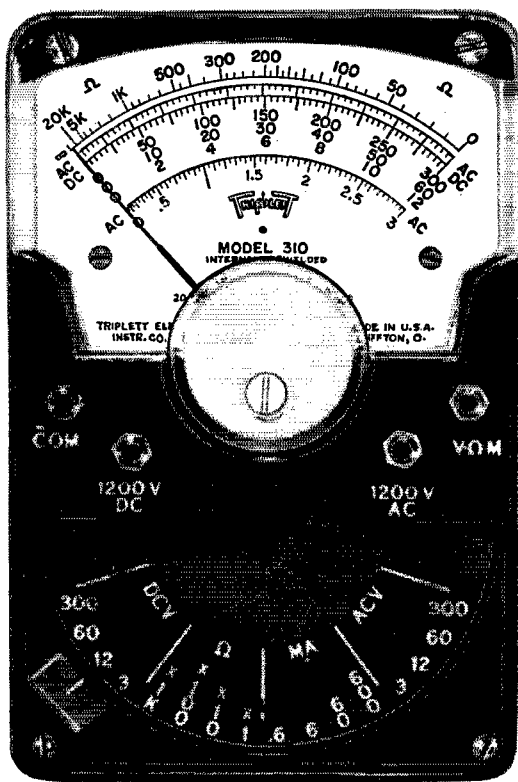
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countries in April and says 20-meter c.w. DX is excellent. FEA and QMO both handled 128 pieces of traffic for April. QMO now is on the day shift at USA and is able to check in on the NCN Net as a regular. SWP's XYL has requested this SCM to dispose of all Pat's private radio gear as the doctor reports that his case is hopeless. FEA, WJF, EJY, JWF, and GGC and his XYL enjoyed the hamfest at Fresno, Calif. Lots of reservations are coming in for the National ARRL Convention being held in San Francisco July 6th, 7th, and 8th. A good time is planned for all. Traffic: W6FEA 128, QMO 128, K6TFM 48, W6WJF 34, GGC 20, GHI 16, JWF 6.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — AKB and WSH paid a visit to JDN the day before the fishing season opened. IVD has a new SK-100 and hopes for good DX; he also is going in the e.d. program. K6EHT is doing fine work in the CVN, RN6, SEVN nets. Thirty attended a spaghetti feed at K6AKF's and also took part in the hidden transmitter hunt, which was won by K6AKF. The nice thing was that the cooking was done by the XYL of AKF. K6EQR furnished home-made ice cream and pie, KYO furnished a cake, and SXP and K6BJV furnished the beverages. K6CNE is putting the finishing touches on a high-power c.w. final. K6LYC is a new traffic man on CVN. K6ASX is getting ready to go into the Navy. CMA is doing a wonderful job as RAI for the section. Give him more aid, fellows. Even I check in at times when home. K6ER still is making out the cards to aid those before the FCC sues them. This is a wonderful service. Joe, and I know many really appreciate your effort. Just keep it up. Fellows, let's try to attend the convention in San Francisco. It's going to be the best, I am told. Traffic reports have fallen off, fellows. What's the trouble? We hope that the report for June will be larger. The Director's meeting was held in San Jose, Calif. Because of illness it was impossible for me to attend. Hope to be at the next one. Traffic: W6CMA 180, K6EHT 83, W6JDN 5.

SAN JOAQUIN VALLEY — SCM, Ralph Saroyan, W6JPU — The Fresno Amateur Radio Club held its annual hamfest with an attendance of 271. One out of three won prizes. OML, from Mojave, won the 10B exciter. We'll bet he will be on a.s.b. right soon. SGH won the DX-100, and this ought to put Jerry on the air. PCC is going high-power mobile, at least 1 kw. OHB is on 10 meters. JPU is being bootlegged down in North Hollywood, according to reports. DVL showed his usual lucky streak at the hamfest. FYM was a recent visitor to Fresno. OVR burned out his 2-meter gear because of a faulty regulator on his motor-generator. We understand HYZ is going to get married. K6GTI is going to plunge into s.s.b. The 2-meter repeater is being heard in the Los Angeles Area. ZYR and K6LTP teamed up to win the 75-meter hunt at the hamfest. K6BP has a new square-corner reflector on 2 meters. OSX is back on 2 meters. KN6RUQ can't load an antenna. DBH bought a Gonset for 2 meters. K6CRI judged the best mobile at the hamfest. The Stockton Radio Club has a membership of 160 and is getting bigger all the time. The club has a very fine roster in booklet form. HKV is on s.s.b. with a 20A and a very fine signal. I need an EC for the Merced Area, and an EC for the Modesto Area. It is important to get all reports in to me by the first of the month, because I send mine off on the sixth. Traffic: W6ADB 159, W6EBL 23.

ROANOKE DIVISION

NORTH CAROLINA — SCM, B. Riley Fowler, W4RRH — A special tribute to the Official Observers in North Carolina: These men are doing a splendid job. They are your friends, and it may be that the corrective measures you are to do will keep you from a citation. The Official Observers in the State are K4DJZ, W4HUW, and JZQ. Congratulations to our PAM, DRC, for his timely bulletin on procedure and traffic-handling. Our SEC, ZG, held meetings with the State C.D. Director and the e.d. officials in Fayetteville and Wilmington, and is Radio Officer of the State Civil Defense set-up. Congratulations. Plans are going forward with emergency communications in the State. We have the following generators available, according to the count this month: MARS members 35, amateurs 53, and available to amateurs 17, for a total of 105. I am sure there are more. Please write me. VUF sends a splendid report on the Kinston Amateur Radio Club. These boys have purchased a bus and are placing radio gear with a generator in it. TTA reports that the Rocky Mount group has a special power line to the club station and gave a demonstration for the orphanage there. HUW sent a report for Raleigh. Max has an old ambulance with a 300-watt transmitter, a receiver, and a generator. FUS reports on the Catawba Valley Club's Field Day plans. HKB reports on the C.D. 2-meter Net. Traffic: W9ONI/4 65, W4BCF 23, RII 23, DRC 22, DSO 20, DTI 20, ZWF 20, FDF 10, RKW 7, FUS 3, K4AJR 2.

SOUTH CAROLINA — SCM, Bryson L. McGraw, W4HMG — LX is on 420 Mc. with 2 tons of gear and has 6 watts output. CHD is active on three nets. EGI is going FB on 160 meters with a 100-watt. ZQS is getting a big kick out of the dowry compliments from HDR, to the chagrin of OM CAL. ZGP is our first mobile marine with

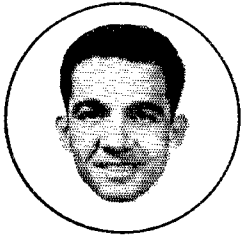
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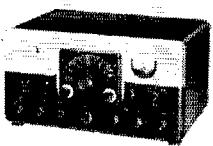
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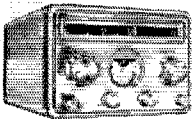
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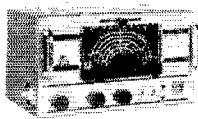
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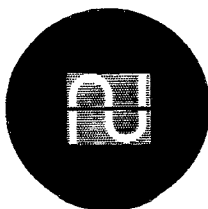
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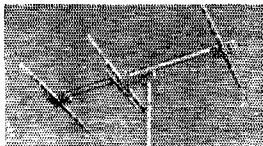
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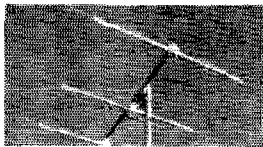
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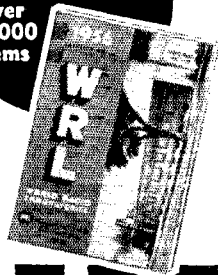
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a complete Elmac aboard the 50-footer *Dolphin*. HDR is doing an FB job for the WX Bureau during the tornado season. K4ALM is yearning for OM KIANI, in Korea. Seallions to the character who tried to entice NCS EOZ (who remained the gentleman) into a hassle. NQP's new 610 sounds FB here. We welcome newcomer KN4HE. Greetings to the new Edisto Amateur Radio Club of the Williston, Barnwell, and Springfield Areas. Officers are DSK, pres.; GDL, vice-pres.; HMU, act. mgr. ETB, secy. Highway Patrolman K4DSK has been dubbed "Dennis The Menace" by the 75-meter phone gang. (His real name is Dennis.) Mobile NCS DXW needs fixed-station help badly for the Sunday drills. AVU is doing an FB job as Columbia EC. TWW reports improvement on the bad a.c. line noise in parts of his area. Novices should watch harmonics in the 3700-3750 kc. region. UUB reports the Spartanburg Club has new beams and FB DX and a major 75-meter converter project for all member cars. AWB and FB QSL via 6 meters from Nebraska. VIW is QRT for USN. ILP is upping power to 100 watts after being a confirmed low-power man. NWB is nightly NCS for the 50,250-Mc. gang in the Greenville Area. ZRH, our SEC, is putting faith in a 2-meter north-south net for the hurricane seasons. Congrats to CEL on the birth of a new daughter. We all love OAK, an FB operator. Congrats to ZVY, a new Class 1 Official Observer. EKG is a new AREC member. EGH is receiving the FB WX Bureau Award for flooded river work. Traffic: W4YAA 112, ANK 24, HMG 18, K4EJ 15, W4ZIZ 9.

VIRGINIA — SCM, John Carl Morgan, W4KX --- TYC is the new VN mgr., succeeding PXA, who now works nights at WRAD. PFC, back in the BPL column, now has a gallon on 15 meters. K4BBR made BPL the hard way. FOR is back chasing traffic after a long layoff. SJJ is at sea. LW is due back at the old QTH in Arlington in August. VPU now is stationed in DL4 and PJW has been transferred to Eritrea. K4DKA says being a ham actor in a school play cuts into ham radio. BYZ has a new B&W 5100 and is Mon. NCS of VFN. KRR beams that earning a living reduces air time, but look at his traffic total! IA reports the Morning Watch Net is going well. Ev also got his 100th confirmation for DXCC. JUJ has a new YLCC certificate. Twelve-year-old KN4IYE is a new one in Arlington. The Danville Club now is at home in a Mt. Top club house. UCH is working all over the map with a 5-over-5 on 6 meters. HMK and CZB exhibited rigs at Jr. Science Day at U. Va. HQN is planning a 150-foot steel tower when he gets time to light. CVO is rebuilding into a studio-type console. K4AET reports fine DX on 10 meters with the beam still on the ground. IF surprised all hands by trying 75-meter *phonel* BJL completely rebuilt to de-TV1 in the extreme fringe area. BZE moved out of the attic and now is using brother-in-law HTI's Viking II. Tom reports some 50 or more showed up for the Richmond Club's QSO Party. Net Managers urge all NCSs to send in lists of those reporting during their sessions each week promptly so as to assure inclusion in Bulletin reports. Traffic: (Apr.) W4PFC 630, FOR 249, K4BBR 164, W4AAD 107, IA 82, K4DBC 60, W4SHJ 56, BYZ 39, K4AET 38, W4CVO 20, SZT 20, K4EAQ 16, W4CXQ 14, K4DKA 13, W4TYC 9, CZB 8, BRF 6, AQA 2, K4CZB 2, W4LW 2, KX 1. (Mar.) W4KRR 246. (Feb.) W4KRR 340.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ --- SEC: GEP. PAMs: FGL and GCZ. RMs: DFC, GBF, HZA, and JWX. ETF is Assistant Radio Officer for the State of West Virginia civil defense system. He is now running 400 watts on 75 meters. 4FLQ is now located in Charleston and became a member of the Kanawha Radio Club. New Novices in Huntington are FNI and IHY. SDU is on 20-meter phone now. KBT is working lots of DX on 15 meters, as is LSG. LVV has a new 40-meter ground plane. LS has a new s.s.b. rig. The following attended the Dayton Hamvention: AFB, AHF, NYH, LS, CLX, PQQ, and HZH/ORT. Officers of the Tri-State Club are LVV, pres.; EZR, vice-pres.; ESH, secy.; IEQ, treas.; and WNSFNI, property manager. JUI will operate a portable station at the Salvation Army camp near Berkley Springs July 2nd to 9th. Please keep an ear open for his traffic. GBF, PZT, and SNP did a good job in the recent Frequency Measurement Test. UMR is set up on all bands and is working lots of choice DX now on 23, 21, and 14 Mc. CWY is doing a bang-up job on 14 Mc. PQQ has been handling traffic from the Byrd station, KC4USV, at McMurdo Sound. UQP worked KC4USA on phone at the base station. GHQ is on 7 Mc. with 300 watts. BKT is rebuilding his 2-meter gear and is putting up his 32-element beam on a 66-ft. pole. HZA made a seven-band contact with K2DSW during the April CD Party. Traffic: WSHZA 74, KXCD 41, JWX 30, PZT 20, PQQ 5, UYR 5.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, James B. Simpson, W0HEM --- SEC: NIT. RMs: KQD and MYX. PAM: IUF. Officers of the Lamar Radio Club are WTN, pres.; NRV, vice-pres.; and NVX, secy.-treas. K0DWZ reports the club meets the last Friday of each month and had the TV dealers at the last meeting and explained the club's TVI set-up. The club set up on Apr. 13th and 14th two rigs for display

(Continued on page 114)

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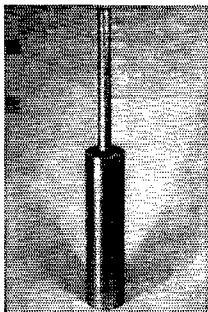
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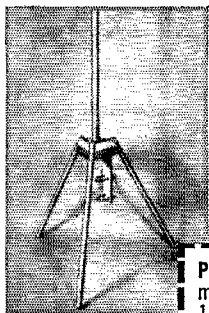
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and moved 95 messages through KQD, K0WBB, and NVU. Those participating were WPY, WTN, WPX, TDG, and K0CXF. The new officers of the Ski Hi Radio Club are OHB, pres.; OGI, vice-pres.; KN0AOX, secy.; OXS, treas.; and James H. Craft, program director. OXQ gave a winter course in fundamentals, KQD gave the code, and now we have six more hams, KN0EQC, KN0EQI, KN0EQJ, KN0EQL, and two others who have not yet received their calls. The Monte Vista High School Radio Club has a station set up with the call K1DSE. The trustee is HOP. Two new licenses are KN0EJL and KN0EJJ. K0AVP has been named EC for Pueblo. Traffic: K0WBB 854, FDX 604, W0KQD 504, TVR 327, KN0CEO 323, W0TNK 277, NVU 157, TVI 135, EKQ 104, SWK 104, K0DXF 73, W01A 50, AGU 23, DRY 28, HOP 26, VLS 20, NIT 19, QOT 14, WVG 13.

UTAH — SCM, James L. Dixon, W7LQE — Greetings, gang, glad to be your new SCM. Thanks to UTM for doing an FB job. Please send your activity reports by the first of each month. I will take some reports via 75-meter phone. JPN had his OBS, OPS, and OO appointments cancelled because of lack of time. MWR worked 15 Europeans on two CQ calls on 20-meter c.w. Marv has sent his 2100th QSL! FJE has the BW-5100 back from the factory de-TV'd and s.s.b. added. He lost his 10-meter beam in the wind. NIA sold his DX-100 and has a new NC-300 with 250 watts s.s.b., 120 watts a.m. 0ZEE/7 is now 7DBR. YDZ worked ACD for the first 6-meter Utah-Idaho contact. LQE and VTJ have a new 10-meter three-element beam and are working ZL, VK, and South American DX. Blind hams in Utah: VTC and VTJ, XYLs, and VTD, VVD, GQN, YPC, JSS, and WNTDHM, the newest. A RACES authorization has been issued for Weber County and Ogden City. Assistant ECs for Ogden are LRF, NHL, OCX, SAZ, and VHS. There are a number of station appointments open in Utah. Traffic: W7WRV 15, MWR 12, UTM 4.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL, Asst. SEC: COU, PAM: K4AOZ, RM: KIX, The Tuscaloosa Area has a new General Class licensee, K4GRA, and two new Novices, KN4ILL (the XYL of KN4HMQ) and KN4IPQ. K4BDJ is racking up DX on 80-meter c.w. WOG needs only 23 more for DXCC but can't find 'em! GJW has 76 countries confirmed. BMM is working 10 and building for 2 meters. ZUP reports that the Muscle Shoals Club now has a DX-100 and soon will have its club station, JNB, on the air. BJL got the bugs out of the 813 and now is active on 75 meters both fixed and mobile. KCQ has a new test bench operating. HIG has a Viking II, an HQ-140, and mobile on 75 meters. The Decatur Club has produced six new Novices as a result of its training program and has two more ready for Conditional Class. A class for Technician is planned if enough interest is shown. YFN reports 100 watts on 75 and 40, 15-watter on 2, and 15 watts on 75 and 10 meters mobile. YRO is doing some careful transmitter shopping. Traffic: (Apr.) W4RLG 307, UHA 266, KIX 133, K4AOZ 65, W4DIT 53, UJJ 51, EVD 45, WOG 39, K4ACO 37, W4HON 32, YRO 26, DXB 20, AVX 19, CNU 12, DGH 10, TXO 10, WHW 10, HHG 9, RTQ 9, SXS 7, FFZ 6, HPE 6, CRY 5, LEN 5, TOI 5, EWB 3, YFN 3, GHW 2, ZUP 1, (Mar.) K4FDY 471, W4KIX 99, EJZ 34, NZM 15, FEC 11, HTP 4, RYY 4, YNG 4, BMM 2.

EASTERN FLORIDA — SCM, Arthur H. Benzee, W4FE — SEC: IYT, Jacksonville: DU was set up in midtown, as usual, on Armed Forces Day to handle traffic. K4BGU is on s.s.b. The Duval County Emergency Net will shift to 50 Mc. Dade County: K4ANW is on 2 meters with beam and ARC-4; YJE purchased a 75A-4; DTV installed a 40-ft. crank-up tower; LFL has a new four-element 10-meter beam and 51SB exciter; ZFO also has a new 40-ft. crank-up tower with 10-over-20 beams; WWJ installed a 51SB; K6J has a folded dipole on 75 and 40 meters; WUS is leaving for M.I.T.; the ARCAES has the call K4IWT for Red Cross Hq. Officers of the Miami Springs Radio Club are HQW, pres.; K4AEE, vice-pres.; EWA, secy.-treas. DEN is rotating NCS each Mon. with good success. LMT reports growing interest in 2 meters on the West Coast. DVR reports the installation of a 5-band doublet which is really working. CX5CV visited K4AHW and made contacts home in Montevideo. Lake City: New Novices are KN4s IQL, IQJ, IQK, IQL, and IQR. St. Petersburg: New officers of the SPARCYS are BIL, pres.; KN4EBQ, vice-pres.; BAV, secy.-treas. GXZ is in Tampa, as her OM, COW, is being transferred — he doesn't know where yet. New Novices: KN4s IKW, IHL, IJN, and GOZ. K4CUI, DII, and CHB dropped the "N". New ECs: K4ANJ, Marion County; NKD, Orange County; K4GZN, Gilchrist County. Traffic: (Apr.) W4PJU 509, K4AHA 503, W4LMT 190, ZIR 93, WS 90, DVR 73, IYT 66, K4AHW 60, W4HED 40, AZJ 35, GGQ 30, FSS 27, ZJZ 25, KGJ 23, RWM 21, EHW 20, BWR 17, GOG 17, YNM 8, (Mar.) W4LMT 168, GOG 29, EHW 5.

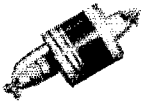
WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE, ECs: MFY and HIZ. RMs: K4AKP and W4XP. We welcome the following new hams to the section: K4IXV, KN4IYQ, KN4IVD, and KN4IVE.

(Continued on page 116)

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SET OF TRAPS
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10, 15, 20, 40 and 75/80 Meters • 75 Ohm Twin-Lead or Coax Feed Line • Concentric Coil and Condenser Completely Potted in Polyester Resin • High-Voltage Polystyrene Insulation on Concentric Capacitor **\$1295**

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RG11/U Coax\$0.13 per ft.
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MODEL FT-100 BEAM ANTENNA

**3-Band Parasitic Array
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Over 8 db. gain on 20 & 15 meters, somewhat higher on 10 meters • In most installations the front to back ratio exceeds 30 db. on 10 & 20 meters and 25 db. on 15 meters. • Boom consists of two 12-ft. lengths of 2 1/4" dia. tubing with .065" wall. Weighs 55 lbs. • Total length of elements less than 28 ft. • Clean design with shortened elements gives low wind resistance • Uses RG8U as feed line • Trap capacitor insulation is of highest quality polystyrene.

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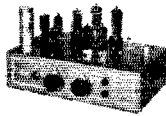
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Single unit, complete with mike. **\$6975**
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Also available for 12 volt DC (plus 115. volt AC) at same price.

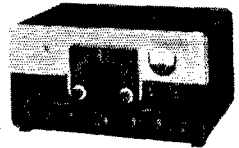


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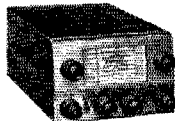
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PSR—6/12 power supply for 6 or 12v DC. **34.00**

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Bands 80-40-20-15-10

Antenna Length 108 ft.
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**Coil specs: Weight 6 oz. Length 6".
High Q and tensile strength.
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Extra heavy duty 72 ohm twinlead. Matches center impedance of antenna using ReycO coils. Easily handles 1 KW. 6¢ per ft. plus postage. A real value.
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Ward J. Hinkle, Owner

K4AFF, the Pensacola High Radio Club, has its DX-35 perking. CYQ has a new car but is not mobile. ROM is C. D. Radio Officer over Ft. Walton way. MFY is QRL car noise. CMJ has been in W5-Land. RKH and RRF are running 10-meter coverage of the section with Vert polarization mobile. LPP is another newcomer to the section. KN4ILA is firing up the rig. K1HFQ will be heard shortly. UXW proudly operates his de luxe mobile rig. The Pensacola Amateur Radio Club held open house in the new club rooms at Municipal Airport. ZAE has joined the Navy but will retain his OO and OES work. K4DKG has been appointed OPS. JLW has been busy getting the final watt into his FB antenna assembly. UYZ has a new 32V-3. AXP keeps the LO Nite hot. CCY is trying to compress a kw. into minimum band width. DAO/DEF is busy helping new hams. QK keeps Hurricane Net drills. CYC is happy that 10 meters is open. K4DDD is QRL building gear for a bigger and better station. HJA is enjoying his 75A-4 receiver. GTOR-4 has s.s.b. gear going over Milton way. KN4EHL says his 80 watts have a rough time on 40 meters at night. ZPN keeps up his good work. BGG is building a quad antenna. K4EAP is working on 8-meter gear. K4AGM is dusting off 6-meter equipment. VR keeps 7-Mc. c.w. pounding. PAA has a new NC-300. MS is working on his antenna farm and looking for a tall tower at RE. HIZ has been doing more than his share of work on the club station. ZFL is custodian of K4AFF. NJB is building a new receiver. EQR is getting hair fever after a long layoff. JPD operates happily TVI-free. RDC keeps going on low power. PQW wants a B&W 5100 transmitter. K4AKP is busy with Route Manager work. Stations in the section wishing to join nets, please contact our RMs K4AKP and W4XP. The Tallahassee gang is really getting things set up. ACB and YUU are the guiding lights. CDE keeps Blountstown on the map. CHZ has just completed an FB v.f.o. ACB wrote an FB article on CD for *The Bug*, the Tallahassee Club paper. I know there is activity in Panama City and I'd like to include it here. How about it, someone? Don't forget the Mobile and Tallahassee Hamfests coming off in June. Traffic: W4JLW 3.

GEORGIA — SCM, William F. Kennedy, W4CFJ — SEC: YTO. PAMs: LXE and ACH. RMs: MTS and PIM. Nets: G4CN, 3995 kc, at 1830 EST on Tue, and Thurs., 0800 EST on Sun. ATLCW, 7150 kc, 2100 EST Sun. The Georgia State Net (GSN) meets Mon. through Fri, at 1900 EST on 85.0 kc. PIM is NCS. The Atl. Ten-meter Phone Net meets at 2200 EST on Sun, at 29,600 kc. K4DMK is new I.C. for Charlton County. K4HAV, K4CJW, and K4HPK now are Generals. The Teen Age Club now has its constitution. KN4GIA and KN4ETX are new Technicians. The Confederate Signal Corps turned out six new Novices. Thirty mobile units participated in the Atlanta 1955 School Alert Evacuation. Members of the Atlanta Radio Club, Confederate Signal Corps, and the Kennehoochie Radio Club did a wonderful job in the evacuation. YEK did a fine job as EC for Fulton and DeKalb Counties in the Alert. The South Ga. Rag Chewers Club had a wonderful picnic in Thomasville. MIM is the club call of the Albany Radio Club. We sure hate to lose MTS but Alabama is getting a good and faithful operator. ZSC is building a new relay system. LNG has the mobile rig working on 10, 6, and 2 meters; he also is running 250 watts on 2 meters. FGH finally converted his mobile to 12 volts. ACH, Ga. Cracker Net manager, now has completed his emergency station with an emergency power supply. All had a good time at the Dublin radio picnic on Apr. 15th. BWD's son took his Novice exam. Don't forget the Augusta Hamfest on July 29th. The Atlanta Radio Club made 21 new Novices in April and is holding a school for those interested in the Technician Class license. VTA has moved to East Point C. D. Headquarters. ZD, our Southeastern Division Director, had a fine trip to the Southeastern Division Conference in Puerto Rico. SHR is doing a fine job helping Novices in Tifton. Traffic: W4PIM 203, DLY 148, K4BAI 89, W4ACH 82, BXV 47, CFJ 44, ZD 42, YR 31, PBK 21, OPE 8, BYJ 4, K4CFN 2, W4LNG 2, K4IWN 1.

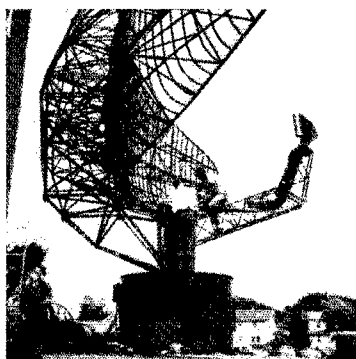
WEST INDIES — SCM, William Werner, KP4DJ — SEC: HZ. The West Indies ARRL Convention/Hamfest was well attended by 175 hams and their families. The presence of General Manager Budlong and Director Born gave prestige to the affair. Forty-four hams, including W4FE, GHU, HZ, ZD, 5UEQ, 6CIW, 7BSG, and K9BPY were initiated into the Royal Order of the Wouf Hong Apr. 14th. W2FME, a PAA pilot, arrived too late for ROWH ceremonies but attended the Hamfest at Bayamon the next day. KP4ABA was the first to be initiated. ABA has applied for OBS appointment. WR, in Aguadilla, transmits Official Bulletins on 3925 kc, running 400 watts. KV4BA, of St. Thomas, attended the convention. The Chief of the San Juan Weather Bureau has asked for a volunteer to report to the Antilles Net, 3815 kc, to obtain weather reports from the islands to the east and south of P.R. W3CVE, NCS of TCN, requests a San Juan outlet for traffic including Weather Bureau traffic from Washington, D. C. If interested contact your SCM or the Chief of the USWB at International Airport. KD worked VRIE for DXCC No. 212; he received a QSL card from F87RT, French St. Martins, a WPR-N-50 certificate, and a WPR-400 sticker. KD has worked 54 WP1s and 406 KP1s. KD

(Continued on page 118)

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W1GWD—O. L. Dewey, Mgr., Gov't. Service Dept.
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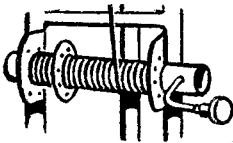
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worked KP4ZV on 80 meters to complete the OM-XYL team ZW-ZV. WP4ADR sends greetings to the gang from Fort Kilmor, Edison, N. J. W4OY also attended the Convention/Hamfest. ZV skeds W4ZIR three times weekly for traffic. Her OM, ZW, has 131/87 for DXCC. WW has left for the States. Mayaguez: La WT ha estado muy activa repartiendo las pruebas que hacian VA portable con DG portable, ambas del Colegio de Agricultura. Durante el "Open House" del Colegio CO operando DG portable hicieron una magnifica demostracion a los visitantes comunicandose con WT desde el salon de fisica. DO frente el nuevo cerebro electronico hecho por el, explicaba a los visitantes su complicado mecanismo. KV4BA de St. Thomas paso una semana en Mayaguez visitando familiares, despues de haber visitado Ramey AFB donde fue huésped de WW, luego de HG y WT. ZW and ZV visited WT. There are now three mobiles in Mayaguez, CG, DL, and DO. HG has at last received a new coil for his DX-100. Three new Novices in Mayaguez are WP4AFE, AFK, and AFL. GH and GI work 20 meters only. CO, DV, and RA renewed AREC membership. DJ, HZ, and QA were NCS operators at KP4DC/KP4 at Police Headquarters during April on 3925 kc. Students (and future hams) of the Colegio Ponceño are having an SWL Contest. If you receive a card from any of them please send your QSL right away. Send your photos and stories for *Ground Wave*, official paper of the PRARC, to Box 3533, San Juan. Test messages from Police Headquarters sent on the amateur net frequency 3925 kc, were delivered and QSLed via the police V.H.F. Net within two minutes of original transmission. KP4DV has been reclassified as OO Class I. DV joined C.A.P. as director of communications. W7BSG/KP4 is awaiting reissuance of his KP4WX call. KP4AAB's sister is now KP4AEU; she will be on 6 meters from Rio Piedras. KV4BA applied for EC, OBS, and OPS appointments. KV4BD returned from the States. Traffic: KP4WT 90, ZW 10, DJ 4.

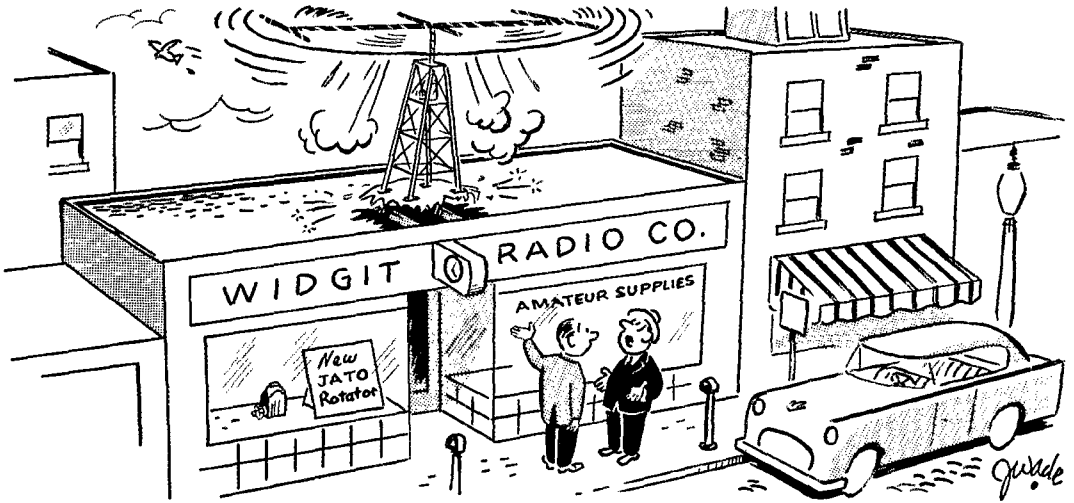
CANAL ZONE—SCM, Roger M. Howe, KZ5RM—The tuna clipper *Dominator* was in port again in April and W6VDA/MM had some of the KZ5 gang aboard to see the very fine movie he has on the art of tuna fishing. KA has been awarded a certificate for placing top in this district in the c.w. section of the Seventh YL-OM Contest. NM and LM are enjoying a Stateside vacation. When last heard from they were in Houston, Tex. RV and VR had a visit from T2BX. DG and GD had visits from P08AD and VSIBD, who stopped in to say hello on their way through the Canal Zone. We want to welcome KZ5FC and his XYL, KZ5FD, to the Canal Zone. Jim already has a 15-meter beam in the air thanks to the "washer" gang. K4GYF was a recent visitor to the Zone. He is the brother of RM and no stranger to these parts, having been raised here. This is his first trip to the zone in eight years. Traffic: (Apr.) KZ5GB 119, HA 90, DG 77, CF 72, VR 69, RM 11. (Mar.) KZ5GB 196.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, William J. Schuch, W6GMN—Asst. SCM: Albert F. Hill, Jr., 6JQB. RMs: BHG and GJP. PAMs: PIB and MEP. GYH is very QRL on TXN. USY is busy with traffic, DX, and school. QGX made an FB traffic score. GJP is covering the 144- and 3.5-Mc. nets. BHG is new manager of the SCN Net. LYG is DXing. K6MON is QRL traffic and OO job. K6LJF is doing a nice job on SCN. K6GUZ writes that the Rio Hondo Club had four rigs in Field Day. KN6OZJ is busy on the 2 x 4 x 6 Net. K6EA is back in traffic after a long layoff. QRS has been fishing. VSH turns in a nice traffic list. TDO finally finished the new shack. MLZ is very busy with TWT committees. NTN is doing an FB job as Pasadena EC. K6LMW has a new beam. K6EIA is back on the air after an illness. K6BWD is moving into a new home in Valley. K6BEQ is mostly c.d. these days. K6ELX is in a new QTH. K6BFC is planning to move to KH6-Land. NJU will be /KC4 in July and August. K6JHR is using QRP with lots of success. LVQ is mobile again. K6PLW is building new gear. K6s IZE and GEF made WAS. K6CHR finally worked a ZS. INH is back in the traffic fold. The local gang apparently did well in the CD Party, at least the bands sounded like it. Traffic: (Apr.) W6GYH 600, USY 374 QGX 262, GJP 222, BHG 190, LYG 170, K6MON 143, IYF 108, GUZ 96, KNOZJ 63, W6KTZ 60, MLEP 55, K6EA 53, W6ORS 52, VSH 40, TDO 38, INH 35, CMN 30, WRT 28, ALZ 19, NTN 8, K6LMW 7, EIA 6, BWD 4, BEQ 3, ELX 3, W6CBO 2, K6CHR 2. (Mar.) K6LTA 148, W6LIP 142.

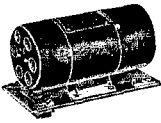
ARIZONA—SCM, Cameron A. Allen, W7OIF—Asst. SCM: Fred W. Wilgus, 7LNJ. SEC: JYH, PAM for AEN: ASI. RM: PKW. The AEN meets Tue. and Thur. at 7 p.m. MST on 3865 kc.; Arizona C.W. Net Tue. and Thur. at 8 p.m. MST, on 3690 kc. and daily Mon. through Fri. at 4 p.m. MST, on 7115 kc.; Grand Canyon Net Sun. at 9 a.m. MST, on 7210 kc. I would like to take this opportunity to thank all the gang who supported me in the recent election. K6DGC, who was W0AAI/7, is back in Tucson. Our directors attended meetings at both the Tucson and the Phoenix Clubs. There will be a big hamfest at Ft. Huachuca Labor Day week end. More details later. CJY and MAL are s.s.b. Ex-GYK and his XYL are on at Weston.

(Continued on page 120)



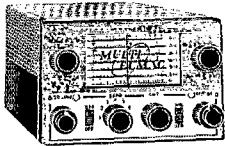
"Okay! Okay! I know it's powerful, but I don't need one."

Special



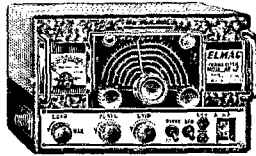
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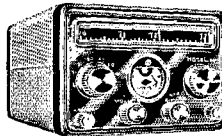


MULTI-ELMAC PMR-7 MOBILE RECEIVER. Less Power Supply. Net.....\$ 159.00

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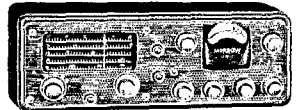


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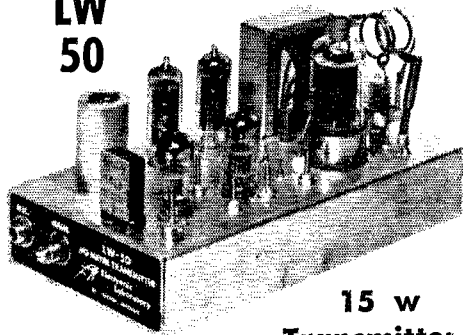
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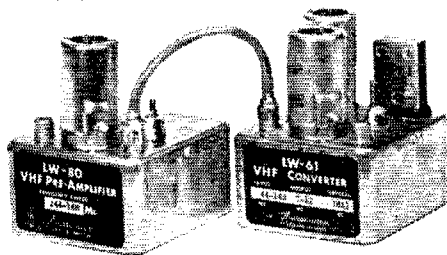
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Mo. Vern is K9BZC and Clara is K9BZB. Ex-DPE, of Ajo, paid the gang a visit. He now lives in Illinois. WKMI, ZBK, and UXZ have new DX-100s. OIF pushed the big rig back for one also. OAS has a new all-band antenna and is getting the best signal reports ever. AMM has left us to go to Europe. OAH is on up in Idaho. Every month the Phoenix gang goes somewhere for a picnic. Everybody is welcome to come. Listen on 3865 kc. for the time and place of the next one. WYY has been skin-diving to the bottom of Montezuma Well to study the floor of the well. Traffic: W7NFL 116, OIF 35, LVR 12, LOJ 4.

SAN DIEGO — SCM, Don Stansifer, W6LRU — K6IPV is now an OO, and LWT is an OES. LWT is active on 2 and 6 meters, and 420 Mc. from San Diego, and is now working on amateur TV gear. K6DGB is now in KR6 for the Navy. The Sixth Annual Upper-Ten Picnic will be held on July 22nd at Glenn County Park near Cardiff. A new member of the YLRL is 7YDN/6, who teaches in La Jolla. JZZE is in the Marine Corps and stationed at Camp Pendleton. Among the San Diego Section 6-meter gang who got good DX during the recent South American openings were K6DWX, COE, JBW, IBY, and W6WNN. BAM still is trying to find time for DX, and hopes to reach 200 countries by 1965. K61XA, in India, is very active, and checks in on two San Diego nets. JVA is up to 51 countries now. BGF is heard regularly on 14-Mc. c.w. with a nice signal from his DX-100, and no key clicks. K6OOH/6, 70 miles east of San Diego, 3,300 feet up in the mountains, is looking for contacts on 144 Mc. from the Los Angeles and San Diego Areas. Bob runs a Gonset into a 6-element beam. The newly-formed Ryan Club has drafted its constitution and plans to affiliate with ARRL and conduct code and theory classes. The May San Diego DX Club meeting was held at the home of GBG, who now is in DU-Land. NIF is back in town for a six-months' stay before returning to W4-Land. He was a top 28-Mc. c.w. DX operator in 1946-7 from this area with QRP. UZL has moved over the hill to Ocean Beach, and is working FB DX on 21-Mc. phone. K6EOG has joined her OM, GEM, on Guam. MWU was snowed in near Julian at Easter time, but kept on the air with a Communicator on 144 Mc. K6AWF has been TVI chairman for San Diego for a year and a half, and wishes to be relieved of the job. Anyone interested who has the time and patience, please contact him or your SCM. He has done an excellent job. Congratulations to SK, CAE, and GBC on their excellent results in the recent F.M.T. SK is now a Class 1 OO. KTE and UWL have left for KA-Land. Traffic: (Apr.) W6YDK 1378, SK 230, K6DXA 15, JYO 11, W6JVA 6. (Mar.) W4UOA/6 14, W6JVA 4.

WEST GULF DIVISION

NORTHERN TEXAS — Acting SCM, Ray A. Thacker, W7TFP — SEC: PYL, PAM; TFP and IWQ. RMs: KPB and PCN. What a fine thing it would be for our hobby if all OO appointees were doing as terrific a job as BKH is. Here is a man who is spending many hours in the service of his fellow hobbyists. It sure is good to hear DTA/5 back on the air after a duty tour overseas — traffic reports will pick up for sure! The Dallas ARC was invited to headquarters at the Red Cross facilities, an arrangement that should prove a boon to both organizations. JXU, SFW, MJD, and CYN report 6-meter contact to the Argentine! BXA has worked fifteen states in as many days on 6 meters! Sounds hot, doesn't it? KYM reports antenna research at an end — he's satisfied. FCX "took the big step." His new XYL is favorable to ham radio. RHP advises that 235 registered at the recent NETEN Hamfest in Tyler. CF, PYL, and AQD were on the rostrum. A big time was had by all in the City of Roses. The NETEN reports 81 per cent attendance for April. NT-O checked in 1750 stations and handled 680 messages in the public service during March and April. K5BDF has completed a new air-conditioned shack. We sure hated to see RRM move to Oklahoma but were happy for him over the reason! Our loss is Oklahoma's gain! October 1st is the deadline for applying for your call letter license plates. Headquarters will solicit SCM nominations soon. Meanwhile, the services of your Acting SCM are at your disposal. How can we help you? See you at the Galveston Convention! Traffic: W5KPB 361, DTA/5 259, FFB 208, RP 125, BKH 120, FCX 100, FJB 90, TFP 49, YKT 27, OCV 23, YPI 23, JFX 10, ZTG 10, CF 6.

OKLAHOMA — SCM, Ewing Canaday, W5GIQ — Asst. SCM: James R. Booker, 5ADC, RM: GVS, PAM; MFX. A word of thanks to all for their well wishes. As your SCM I want to help and be helped by the whole gang. James (Reedy) Booker, ADC, has been appointed Assistant SCM. Other appointments will be made. We need stations as OOs, OPSS, and OESs. The ACARC hamfest in Oklahoma City was quite an affair, with 259 paid registrations. Some 70 hams attended a weather short course Apr. 30th at Oklahoma A. & M. College. Staff Meteorologist William Hardy and Oklahoma City Weatherman John Hamilton briefed the group on tornadoes and ways we can help during severe weather alerts. Members of the Oklahoma Storm Warning Net have been commended for valuable information furnished the WX Bureau. ZBI was handling emergency and

(Continued on page 122)

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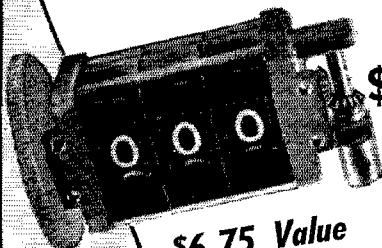
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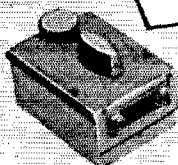


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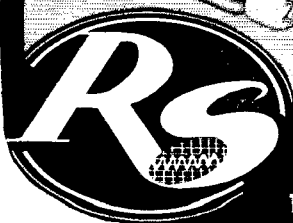
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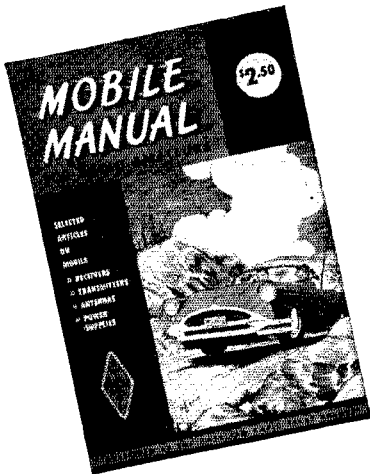
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welfare traffic out of Drumright within hours of the tornado there on Apr. 9th. He was assisted by ZBD, ZBJ, ZBL, CMO, CTI, and OGA of the Tulsa gang. RST brought mobile and WEI also helped. GIQ furnished power for a funeral home. We regret to report that JBX passed away on May 12th. The Enid Club reports the purchase of a DX-35 for emergency and portable operation. KL7GN is now K5EXU. Among new Novices are KN5s DWQ, DUC, EVF, and EQE at Cushing and ERO and ETM, Enid. Traffic: (Apr.) W5FEC 470, K5AOV 290, W5QAC 86, MFX 72, GIQ 68, GVS 51, GXH 42, KY 34, CCK 30, PNG 22, ADC 16, EHC 14, RST 14, WEI 5, VAX 4, KN5CBA 2.

SOUTHERN TEXAS — SCM, Morley Bartholomew, W5QDX — SEC; QEAL, Bryan, Tex., was completely without communications when struck by a tornado Apr. 5th. Within minutes DJO had set up a base station on emergency power and had a number of mobiles assisting police. They were DPP, DPT, RAL, FXQ, RAS, WQN, UJC, AC, YSA, GHX, SOO, WVU, WVV, HAI, IYQ, GBR, JUS, and K5s BDA, BEF, and FFN. AQN is president of the Freer RC; KN5GPX is secretary-treasurer; Pee Wee Mullins, vice-president; and Jake Hammack, activity manager. Pee Wee and Jake are sweating out the mail for their licenses. The club members all belong to ARRL. The Brazoria County ARC has made very good progress along c.d. lines this year and is working for a club station. PAR has a new mobile rig. The Magic Valley Radio Amateurs, Inc., of McAllen and the upper Rio Grande Valley reports lots of activity in that section. EJT won a 4-400A tube by being the first one to find the hidden transmitter at the San Antonio RC picnic in New Braunfels. LVE was second, DKF was third, DKK was fourth, and OZQ was fifth. IAH hid the transmitter. LUU and his XYL are the new editors of *Gutter Dope*. TQL was not hurt, but his car and mobile installation were completely destroyed by fire after another car plowed into him from behind. ANQ and TTF are attempting to install a 10-meter mobile in their outdoor runabout. Traffic: W5MIN 27, FXQ 21.

NEW MEXICO — SCM, Einar H. Møsterud, W5FPB — SEC; FHP, RM; RKS. The NMIEPN meets on 3838 kc. Tue. and Thur. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0800 MST. Let's have a few show up for the NM C.W. Net on 3833 kc. at 1900 MST. A nice letter was received from NQG giving information on the local amateurs, also several pictures of John and his station; he has had only a local contact on 144 Mc. so is building a 100-watt rig. Also a copy of the first issue of the HARC *Communicator* was received. Congratulations on the club paper. The Mesilla Valley Radio Club held its sixth annual banquet and elected the following officers: WHH, pres.; K5CAW, vice-pres.; K5DDS, secy.; VFZ, treas. CIN, SGC, and WKW operated from Four Corners April 7th and 8th, operating in four states and three call areas and making 139 contacts. They received a nice write-up with pictures in the local paper. QNT is active on 40-meter c.w. 6BZB is at Farmington installing equipment at CAA facility. Traffic: W5MYM 82, UAR 39, K5FHU 35, W5GEM 8, RKS 8, FPB 5, ZU 4, KKW 2, LEF 2, NQG 2, RFF 2.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCMs: Fritz A. Webb, 1DB; Aaron D. Solomon, 1OC. SEC: RR. VC reports the North Shore ARC is holding a hamfest on Sept. 1st and 2nd. Details will follow. JD is active again and chasing DX on 3.5-Mc. c.w. with a QRO rig. MH has a new 32-V transmitter. WB, PF, EV, IZ, ACX, PZ, FQ, VO1T, and WJSH/VO1 attended a civil defense course at the C.D. College at Arnprior, Ont., recently. VE2ATQ operated fixed portable in P.E.I. and N.S. during a business trip. Members of the Dartmouth ARC enjoyed a tour of the Newport Naval Radio Station, and later visited ham shacks nearby. The host was PX, assisted by AV. New HARC executives are LY, pres.; DB, vice-pres.; EK, treas.; ex-3EA, secy.; FQ, bulletin editor. WL is getting good results with a new two-element 50-Mc. beam. FQ and OM also are active on 50 Mc. WP is happy with his new all-band tuned doublet. MZ, ex-1VO, is using a new rig with an 807 final. OO appointee BN reports keeping frequency violators in line. Reports are sadly lacking from Newfoundland and Labrador. How about news from you boys in VO-Land? Traffic: VE1FQ 120, AO 66, VB 55, OC 50, AV 46, YO 42, BL 20, WP 20, ME 18, YB 16, OM 9, DB 6, GA 6, YQ 4, WL 2.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — DPO reports rapid strides being made in the recently-formed Amateur Radio Philatelic Society. Sessions are held Mon. at 2000 EDT on 3780 kc. AEJ, ALE, PH, DPO, and W6OCO solicit inquiries from anyone interested. AVS attended the Kirkland Lake Annual Dinner. VE6HI, ex-3EO, now is located in Calgary. Sympathy is extended to BV on the loss of his mother. CCV is Official Bulletin Station for the Hull and Ottawa Area. VZ, CJM, and BZB are ORS appointment holders. AFO gave a very interesting and constructive demonstration of home-built tape-recording equipment and AGU explained single sideband operation at the recent Ottawa Club meeting. High tribute to

(Continued on page 124)

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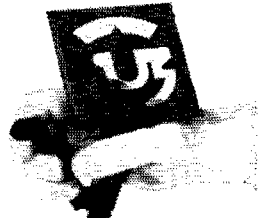
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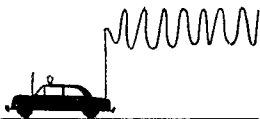
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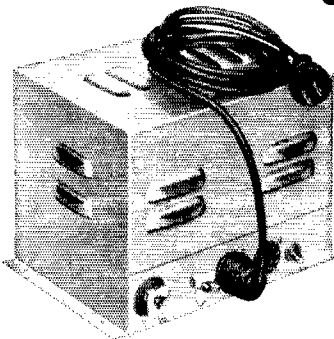
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one who has done much for Canadian amateur radio was evidenced by the large turnout at club meetings in Hamilton and Toronto, the latter under the auspices of the Northtown Club. The occasion was the official visit of Alex Reid VE2BE, our Canadian Division Director, who outlined many of the problems confronting amateur radio today. He explained simply and precisely what was being done to assist and protect our interesting hobby. Members of both clubs have voiced their appreciation of Mr. Reid's kindness in making changes in a very crowded schedule. Thanks, Alex, and may you long represent the Canadian amateur. Traffic: (Apr.) VE3VZ 78, GI 75, NG 61, KM 47, DPO 45, BUR 37, BIA 32, NO 24, AUU 17, CJM 14, HZB 9, PH 9, APL 7, DH 6, SG 2. (Mar.) VE3VZ 52, SG 10.

QUEBEC — SCM, Gordon A. Lynn, VE2GL — PQN will meet at the same time, 7:15 p.m. Daylight Saving Time Mon., Wed., and Fri. for the summer. The first XYL to be licensed in Valdor is VE2AWJ (Joan). AMY and AJQ are en route to Florida and hope to meet hams en route. FL reports the Northland Net attendance is greatly improved since meetings are held six nights per week; conditions were better during the early part of the month but there was complete "blackout" on 80 and 40 meters on April 27th and 28th. TVI has reared its ugly head at the QTH of YU. So!!! VA and AVZ are skedding regularly on 3.7 Mc. AOL, UB, AIG, ADU, and AAE operated mobile at the Vianney "rabane" picnic. VI has a nice controlled-carrier phone on 75 meters. DR was active in the CD C.W. Party but reports conditions impossible during the CD Phone Party. ATQ has left for the Maritimes and already is working home on his mobile and reports into PQN with home traffic. Traffic: VE2DR 68, EC 37, ATQ 18, GL 11, FL 7.

BRITISH COLUMBIA — SCM, Peter M. McIntyre, VE7JT — SEC: DH. Sorry there was no column for the last two months because of lack of time and scarcity of reports. DH wanted me to type an "L.L.P." box in memorandum to the ECs as he hadn't heard from them at all and figured somebody had buried them. The VARC's correspondent is keeping us posted on the doings of that club. The club transmitter is making the rounds of the members so hope nobody needs spare parts while it is in their possession. K6EWW is a new club member. Sun., July 29th, the BCARA is sponsoring a picnic at the Peace Arch at the Canada-United States border. Bring your own food, etc., and get there early and save some tables. YQ spent a week at Arn Prior Civil Defense Training Center during April to find the ins and outs of c.d. communications. AKD has a new QTH which is one of the best. It is 900 ft. above sea level and he was all primed for the best QTH ever. Then, 100 yards away, somebody else had the same idea, a VE6 who is westernized. Good DX, fellows. Hope you all had a good time on Field Day, minus rain, mosquitoes, sleep, and you name it. We hear a couple of potent signals on 20 meters for which JB has put up beams. My apologies to those reporting traffic for March, whose reports I have mislaid. Traffic: VE7ASR 104, AIO 4.

MANITOBA — SCM, John Polmark, VE4HL, PAM: GE, OO: RB, OBS: KG. Congratulations to the Rev. Dick Stephenson on receiving his amateur ticket. Lots of luck. His call and QTH are DJ at Devon Mission La Paz. Sorry to see you leave, RC. Lots of luck on the new job and VE3 call. HT has moved to Alexander and hopes to get back on soon. 8NK is back from the north and is going to settle in Lynn Lake. Hope you can get on 75 meters. We could use a contact up in that country. AN is trying out a new 20-meter antenna. Hope it helps some of the BCI, George. Looks like we might get some new Dauphin contacts. WW has a group of college boys just about ready for their exams. The fellows around Winnipeg are going on s.s.b. en masse, looking for more interested victims. Those at present known to be on s.s.b. are TE, XZ, MK, BT, MO, JS, QI, ER, NI, LO, RL, GC, and CJ. Traffic: VE4EF 21, KL 16, AY 10, RB 10, FF 8, HL 8, KN 8, AN 4, MN 3.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — IG has his ticket endorsed for A3 and also is a new member on the phone net. Ex-4YR now is 5YR and also is a new net member. GQ and RO are new calls heard. HJ, who took a General Civil Defense course at Fort Qu'Appelle, also did a good job at the communication center there. We are sorry to record the passing of LY's father and offer our sympathy. 1IJ now is 6IJ at La Ronge. QL now is mobile and also advises RE will be assisting as PAM. 7ZF is now editor of the *Assiniboia Times* and will be a VE5 soon. CW had a big month of traffic and made BPL. CF has accepted the call from St. James Church, Saskatoon, and will be heard from a new QTH soon. NN has left for Winnipeg and a promotion with the D.O.T. LM reports that 7-Mc.-phone is hot and he is keeping regular skeds with 7IW and other VE5s. RU is taking his mobile trailer to Fort Qu'Appelle for the summer to try and prove it is not a poor reception and transmission area. BZ has discontinued swap and shop for the summer. DZ sends in an FB report and advises she was winner in the YLRL, W/VE, SS, and YL-OM Contests. Her OM, GW, is going over plans for mobile. MO has had his activities curtailed because of TV servicing. Traffic: (Apr.) VE5CW 201, BZ 27, LM 21, DS 17, HR 15, HN 12, LU 12, CB 10, BI 6, GX 4, PJ 4, TM 4, PQ 2, RE 2. (Mar.) VE5HN 48, CW 47, LM 36, BZ 26, EX 23, RE 16, DS 14, VL 12, CT 10, CB 7, BF 6, QL 5, CI 4, GO 4, GX 4, SL 4, PJ 2, TM 2.

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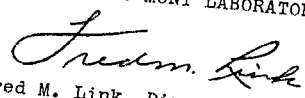
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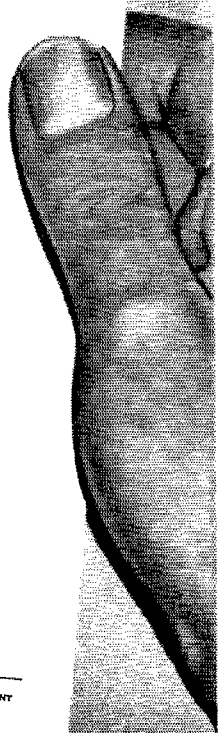
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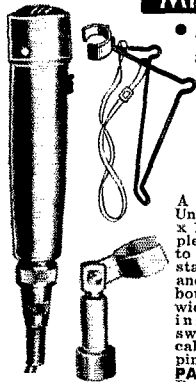
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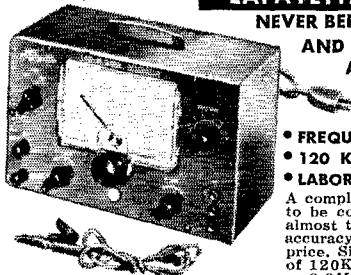
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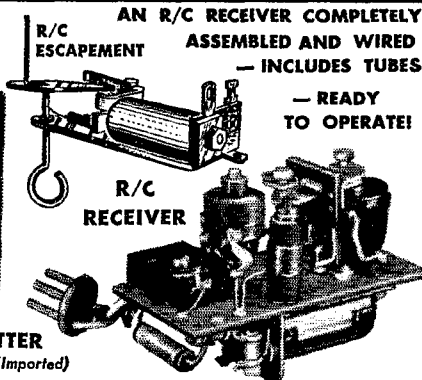
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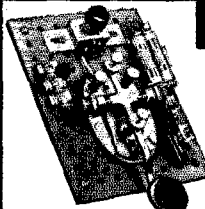
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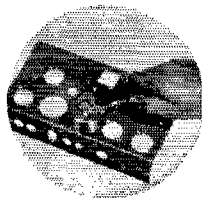
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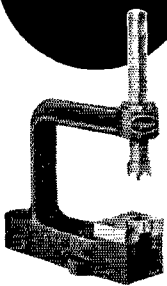


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Happenings

(Continued from page 73)

80) On motion of Mr. Reid, unanimously VOTED that the General Manager is hereby authorized to pay, during the period between January 1, 1957 and the 1957 meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amounts than 1956 authorized amounts.

81) On motion of Mr. Rand, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of the Awards Committee during the year 1956, but not to exceed \$500.

82) Mr. Roberts reported for the Finance Committee; whereupon, on his motion, unanimously VOTED that the report be accepted and the same placed on file. Mr. Maer reported for the Membership & Publications Committee; whereupon, on his motion, unanimously VOTED that the report be accepted and the same placed on file.

83) On motion of Mr. Canfield, unanimously VOTED that, pursuant to the terms of the Trust Agreement under the Pension Plan, the following persons are appointed to serve as a Pension Committee from June 2, 1956, to June 2, 1957: Arthur L. Budlong, George Grammer, and David H. Houghton.

84) Moved, by Mr. Cowan, that, pursuant to Article 7 of the Articles of Association, R. Rex Roberts, F. E. Handy, and David H. Houghton are hereby appointed members of the Executive Committee, to serve as such for the period ending May 15, 1957; but, a division of the question being called for, on motion of Mr. Crossley, VOTED that the motion be laid on the table. On further motion of Mr. Crossley, unanimously VOTED to open nominations for the election of one member to the Executive Committee. Mr. Born nominated Mr. Cooke; Mr. Noble nominated Mr. Roberts; Mr. Joos nominated Mr. Brabb, but Mr. Brabb withdrew his name. Whereupon, on motion of Mr. Crossley, unanimously VOTED to proceed with the election. The Chair appointed Messrs. Houghton and Grammer as tellers. The tellers announced the result of the ballot as follows: for Mr. Cooke, 9 votes; for Mr. Roberts, 7 votes. On motion of Mr. Roberts, unanimously VOTED that the election for Mr. Cooke be made unanimous. Whereupon, the Chair declared Mr. Cooke elected as a member of the Executive Committee for the period ending May 15, 1957.

85) On motion of Mr. Cowan, unanimously VOTED that, pursuant to Article 7 of the Articles of Association, F. E. Handy is hereby designated and appointed a member of the Executive Committee to serve for the period ending May 15, 1957.

86) On motion of Mr. Cowan, unanimously VOTED that, pursuant to Article 7 of the Articles of Association, David H. Houghton is hereby designated and appointed a member of the Executive Committee to serve as such for the period ending May 15, 1957.

87) The Board was in recess from 10:31 A.M. to 10:59 A.M.

88) On motion of Mr. Maer, the Board at this point voted to take from the table the discussion of a public relations program. Without formal action, the Board then discussed the subject.

89) Without objection, the Board took from the table Mr. Crossley's motion to amend the Articles of Association to require the Executive Committee to poll the Board on certain questions. Moved, by Mr. Crossley, to add a new By-Law 23A to read as follows: "The Executive Committee shall submit to the directors for advance approval or disapproval any proposed participation in any official legislative or rule-making proceeding affecting amateur radio." But, after discussion, the yeas and nays being ordered, the question was decided in the negative. Whole number of votes cast, 16; necessary for adoption, 11; yeas, 9; nays, 7. Those who voted in the affirmative were Messrs. Born, Brabb, Cooke, Crossley, Denniston, Engwicht, Joos, Matthews, and Rand; those who voted opposed were Messrs. Anderson, Canfield, Cowan, Gowan, Maer, Reid, and Roberts. So, the motion to amend the By-Laws was rejected.

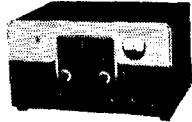
90) Moved, by Mr. Rand, that the Board now discuss the matter of Headquarters salaries; on motion of Mr. Brabb, VOTED, 11 votes in favor to 4 opposed, that the motion be amended to read that the Board now resolve itself into a Committee of the Whole for the subject of further discussion of salary matters. The question then being on the motion as amended, the same was unanimously ADOPTED.

(Continued on page 130)

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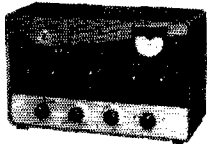
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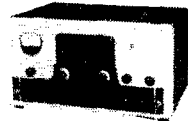
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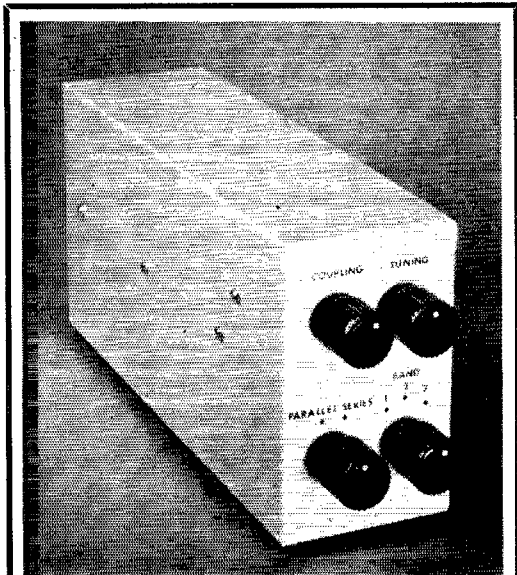


Fig. 5-49 — Front view of the antenna tuner.

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130

91) Whereupon, at 11:47 A.M., the Chairman appointed himself Chairman of the Committee of the Whole and Mr. Quayle B. Smith its secretary. At this point, the Headquarters staff members present retired from the meeting. The Board, sitting as a Committee of the Whole, was in recess for luncheon from 12:20 P.M. until 1:46 P.M. The Committee arose at 1:47 P.M.; Mr. Dosland, as Chairman of the Committee of the Whole, reported to the Board that the Committee arose without recommendations.

92) On motion of Mr. Roberts, VOTED that the matter of the continuance of the QST article awards be assigned to the Merit & Awards Committee for study.

93) On motion of Mr. Engwicht, unanimously VOTED that the Communications Department be instructed to make a study of the desirability of re-instituting the trunk-line type of net operation into the National Traffic System.

94) On motion of Mr. Joos, unanimously VOTED that the Board now take from the table the motion to pay expenses of directors to attend the National Convention. After discussion, the yeas and nays being ordered upon request, the question was decided in the negative; whole number of votes cast, 16; necessary for adoption, 9; yeas, 3; nays, 13. All the directors voted in the negative except Messrs. Canfield, Joos, and Matthews, who voted in the affirmative. So the motion was rejected.

95) On motion of Mr. Joos, unanimously VOTED to remove from the table his proposal to add a new Article 8.5 to the Articles of Association. Moved, by Mr. Joos, to amend the motion, by striking therefrom the words, "upon five days' notice to the Secretary." But, after discussion, on motion of Mr. Cowan, unanimously VOTED that the entire matter be again placed on the table.

96) On motion of Mr. Gowan, unanimously VOTED that the President appoint a Membership & Publications Committee for the purpose of reporting to the Board at its next meeting recommendations for increasing membership and interest in ARRL among Novice and beginning amateurs. On further motion of Mr. Gowan, unanimously VOTED that the General Manager is authorized to pay the expenses of the Membership & Publications Committee for the year 1956 in an amount not to exceed \$1,000.

97) On motion of Mr. Born, unanimously VOTED that the Board hereby expresses its sincere thanks and deep appreciation for the untiring work and devotion of the Vice-Directors, director assistants, SCMs, SECs, and QSL Managers of the League.

98) On motion of Mr. Born, unanimously VOTED that the BPL medallions be engraved with the call of the station which qualifies for the medallion.

99) On motion of Mr. Anderson, the following resolution was unanimously ADOPTED.

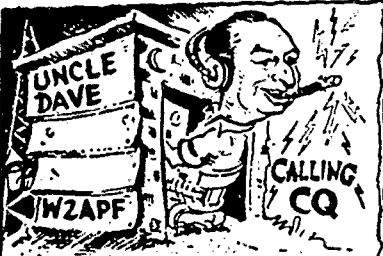
WHEREAS, Phil Simmons, W1ZDP, and one of our Headquarters Staff members, has done exemplary work in contest reporting,

BE IT RESOLVED that the Board of Directors meeting in Hartford, Connecticut, on May 12, 1956, expresses its recognition and appreciation for the good will he has engendered among contest enthusiasts.

100) Moved, by Mr. Crossley, that it is the sense of this Board that the name shall be established as assistant director. The assistant director has no official standing in the League, except for assistance he can render for and as requested by the director concerned. On motion of Mr. Maer, after discussion, unanimously VOTED that the motion be amended to provide that the question of status of assistants to directors be referred to the Planning Committee for recommendations to the Board at its next meeting. On further motion of Mr. Maer, VOTED to further amend the motion to provide that the matter of the wording of the certificates to be issued assistant directors also be referred to the Planning Committee for study and recommendation. The question then being on the motion as amended, the same was rejected, 6 votes in favor to 10 opposed.

101) Moved, by Mr. Crossley, that the Board establish a "student grade" of ARRL membership much like the similar grade established by Engineering Societies. This membership to be available for high school students and others who at the time of application for membership shall not have reached their nineteenth birthday. This membership shall be limited to not longer than three years and the applicant must be a licensed operator of Novice grade or higher. This grade of membership shall be at the rate of \$2.00 per year, and cannot be used in connection with the family or affiliated club rates. Eligibility to the full member-

(Continued on page 132)



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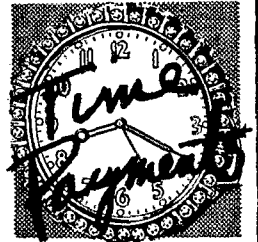
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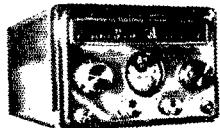
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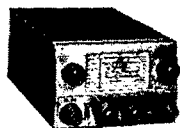
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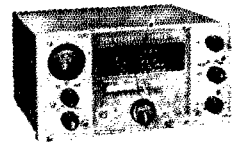
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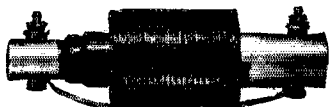
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ship, of course, is not to be denied, if eligible, but while a Student Grade the member shall have no voting rights in ARRL or affiliated clubs. But, after discussion, RULED by the Chair that the proposed motion is out of order because of inadequate notice.

102) Moved, by Mr. Cooke, that paragraph 30 of the By-Laws of the American Radio Relay League be amended by striking the entire text thereof and substituting the following: "30. The following standing committees are established: Finance Committee, Planning Committee, Membership & Publications Committee," and that the following paragraph be inserted between paragraphs 33 and 34 under the heading, "Standing Committees": "The Membership & Publications Committee shall act as a reference body to which the Board may from time to time by resolution refer problems requiring special study and recommendations as to membership and publications problems." The question being on the amendment of the By-Laws, and the yeas and nays being ordered, the question was decided in the affirmative: whole number of votes cast, 16; necessary for adoption, 12; yeas, 16; nays, 0. All directors voted in the affirmative. So the By-Laws were amended.

103) On motion of Mr. Cooke, unanimously VOTED that the Membership & Publications Committee conduct a study of all League educational material, and progress in license grades and evaluate numerical results of present licensing and examination methods — to aim at increase in progression, through licensing grades.

104) On motion of Mr. Brabb, unanimously VOTED that the Board go on record as commending the Field Engineering & Monitoring Bureau of the Federal Communications Commission for its assistance and co-operation rendered amateurs over the past year.

105) Moved, by Mr. Rand, that his earlier proposal to authorize reimbursements to vice-directors and director assistants for certain travel expenses within the division be now taken from the table; but the motion to take from the table was lost, 3 votes in favor to 10 opposed.

106) On motion of Mr. Denniston, the following resolution was unanimously ADOPTED.

WHEREAS, the International Amateur Radio Union is devoted to the continuance and improvement of amateur radio, to the co-operative study of technical developments, and to the founding and strengthening of international companionship and fraternalism among amateurs, and

WHEREAS, in furtherance of these ideals the societies of Region I are meeting in unity of purpose at Stresa, Italy, in June, Now, therefore, BE IT RESOLVED that the Board of Directors and Staff of the American Radio Relay League, on behalf of amateurs in the United States, its possessions and Canada, extend their hand in friendly greeting to amateurs everywhere and do express their particular appreciation and support of the delegates, observers and guests assembled at the Region I Congress at Stresa, 1956.

107) The next order of business being the election of officers, the Chair announced the opening of nominations for President. Mr. Reid nominated Mr. Dosland. On motion of Mr. Brabb, unanimously VOTED that the nominations are closed, and that the Secretary cast one ballot for Mr. Dosland. The Chair thereupon declared Mr. Dosland elected as President for the new term.

108) The Chair announced the opening of nominations for First Vice-President. Mr. Engwicht nominated Mr. Groves; Mr. Matthews nominated Mr. Brabb; Mr. Reid nominated Mr. Maer, but Mr. Maer withdrew his name from the nominations. On motion of Mr. Canfield, unanimously VOTED that the nominations are closed. The Chair appointed Messrs. Grammer and Houghton as tellers. The tellers announced the result of the first ballot as follows: Mr. Groves, 12; Mr. Brabb, 4. On motion of Mr. Brabb, unanimously VOTED that the election of Mr. Groves as First Vice-President for the new term be made unanimous.

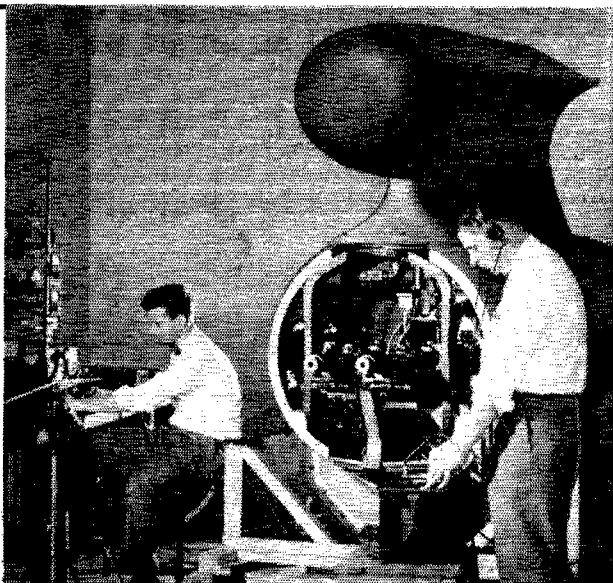
109) The Chair announced the opening of nominations for an additional Vice-President. Mr. Rand nominated Mr. Noble. On motion of Mr. Brabb, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot for Mr. Noble. The Chair thereupon declared Mr. Noble elected as Vice-President for the new term.

110) The Chair announced the opening of nominations for an additional Vice-President. Mr. Born nominated Mr. Handy. On motion of Mr. Reid, unanimously VOTED that the nominations are closed and that the Secretary cast one

(Continued on page 154)

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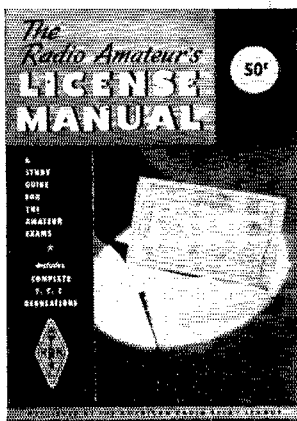
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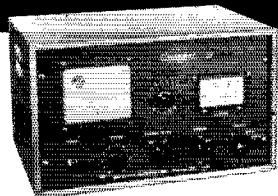
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ballot or Mr. Handy. The Chair thereupon declared Mr. Handy elected as Vice-President for the new term.

111) The Chair announced the opening of nominations for Secretary. Mr. Canfield nominated Mr. Budlong. On motion of Mr. Matthews, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot for Mr. Budlong. The Chair thereupon declared Mr. Budlong elected as Secretary.

112) The Chair announced the opening of nominations for Treasurer. Mr. Anderson nominated Mr. Houghton. On motion of Mr. Crossley, unanimously VOTED that nominations are closed and that the Secretary cast one ballot for Mr. Houghton. The Chair thereupon declared Mr. Houghton elected as Treasurer.

113) At this point, the Chair announced the following committee appointments for the coming year:

Finance Committee:

- Mr. Roberts, Chairman
- Mr. Anderson
- Mr. Cowan

Planning Committee:

- Mr. Brabb, Chairman
- Mr. Born
- Mr. Gowan

Merit & Awards Committee:

- Mr. Cooke, Chairman
- Mr. Denniston
- Mr. Budlong

Membership & Publications Committee:

- Mr. Maer, Chairman
- Mr. Matthews
- Mr. Joos

National TVI Committee:

- Mr. Rand, Chairman
- Mr. Canfield
- Mr. Grammer

114) Whereupon, on motion of Mr. Roberts, the Board adjourned *sine die*, at 3:35 P.M.

115) (Time in session as a Board, 12 hours, 11 minutes; as a Committee of the Whole, 34 minutes; total time in session, 12 hours, 45 minutes; total authorizations, \$31,-345.69).

A. L. BUDLONG
Q. B. SMITH
Secretaries

Earth Satellite

(Continued from page 41)

Acknowledgements

The simplified Minitrack electronic tracking system is the result of work by a large number of engineers. Some of those working on the system are Edward Bissell, C. B. Cunningham, Dr. J. J. Freeman, Edmund J. Habib, John B. Martin, John T. Mengel, Victor R. Simas, and Martin J. Votaw, all of the Naval Research Laboratory.

How's DX?

(Continued from page 136)

blown 6146 final valve didn't cramp ZD1DR's 21-Mc. style substantially. Dave resorted to a 6146 replacement which will hold out till a new '46 arrives In an effort to lick Portuguese Guinea's strict currency regulations and lack of replacement radio gear, CR5AC is marketing photo albums of CR5 flora, fauna and native life. We can't vouch for an unseen product but this pitch is a far cry above the scummy sale of DX confirmations. Check with SWL S. Terry, 625 Library Pl., Evanston, Ill., for details W4FJW journeys to Eritrea for a three-year hitch and trusts to be signing an ET2 call by July or August K5AQD, business-tripping abroad, sat in on the activation of an elaborate Liberian ham installation where EL4s A, B and C hold forth on 15 and 20 meters According to W4TFB, OQ9L studies solar and seismological phenomena in Ruanda-Urundi when not busy on 10 phone. W4TFB was ZD4BR's final QSO before the latter closed down for U.K. holiday The sudden shuffling of

(Continued on page 136)

BANDMASTER Z-MATCH

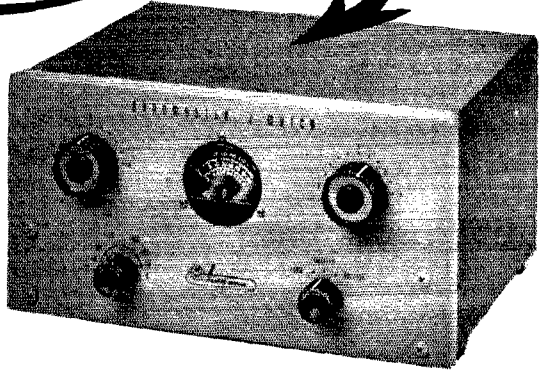
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2. Forward-Reflected Power Wattmeter
3. R. F. Wattmeter
4. Dummy Load

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The tuning arrangement covers from 3.5 to 45.0 megacycles, while matching a 50 ohm input to reactive and non-reactive loads from 10 to 2500 ohms without switching coils. The R.F. Wattmeter is in the circuit at all times, and the Dummy Load may be used to tune your transmitter before going on the air, in accordance with F. C. C. regulations. The Micro-Match circuit is built-in, with a panel switch to read Forward or Reflected Power.



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ness. These Registries are used by communication engineers, consultants, Government officials, Civil Defense and Red Cross organizations, radio supervisors, and amateur operators as the standard reference source of information on 2-way radio telephone systems. The titles below show the services listed in the individual Registries. Prices are postpaid. All four Registries may be ordered for \$8.00.

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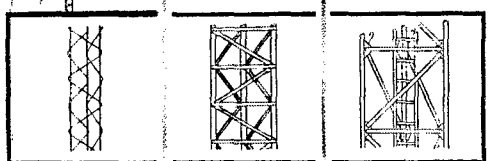
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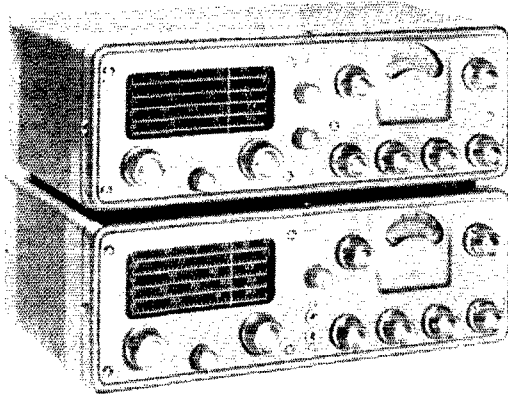
Liberian call signs was brought about by official rezoning of EL call areas. For example, EL2s G and K are now EL4s A and B.

Oceania — From VR2BC: "The bands are beginning to sound quite 'DXy' and I'm finding the Pacific a happy hunting land for the exotic calls I only used to read about when I was VP1GG. Still finding many W/K contacts and meeting many old friends again." ... KJ6BM won't be bothering with very many Twos, Sixes and Nines. W1QDW reports him hard at work on his Johnston Island WAS with a 90-watt and new 75A-4 ... VK2TN, back home in Randwick after an exciting world tour, expresses appreciation of the wonderful ham hospitality encountered everywhere, especially that offered by W7BAR in Idaho ... T.T. notes from the mill of KC6UJ: "New faces on the bands include KC6KG, who will be working fixed-portable at different spots in the Territory; KC6AK, who favors c.w. work; KC6AL, who continues activity on Ponape; and KX3NC, c.w. from Majuro. KC6s AK, AL and NC are Weather Bureau technicians stationed in the Territory. The call KX6BO was assigned to a licensee on Eniwetok but was never put on the air; the license arrived the day after amateur activities were ordered QRT. KC6 and KX6 amateurs use American phone frequencies on 10, 15 and 20 with no 11-meter operation. Our phone on 40 is restricted to 7100-7150 kc." ... VK3WIA, featured at the recent Victoria Boy Scout Jamboree, piled up 480 contacts with 38 countries on all continents and contacted 38 W/K states. VK3RJ nominates VK3s AG (equipment) and ZA (operating) as deserving major credit for a task well done ... The New Hebrides condominium is prospering hamwise. In addition to YJ1s AA and RF, WGDXC reports regular performance by F08AA on 15 meters and F08AC on 20 and 40 phone.

Europe — Penmanship by ZB2R: "There will be a few more ZB2s on the 20- and 40-meter bands fairly regularly now. ZB2Q, ZB2T and myself are hoping to work more W-land boys. Our gear is nearly all RCA. . . . Regarding activity from the U. S. A., you fellows put good strong signals in here almost any time of the day or night — plenty of action!" ... Via W1s VG and ZDP we learn that the first Yank winner of the EDR (Denmark) OZ-CCA award (note p. 63, August '55 QST) is OT DX specialist W2BXA ... Crete's SV6WN (W1TYW), interviewed by W2GVZ, states: "Would appreciate less cutthroatism by overzealous DX fanatics. I don't get a chance to operate here regularly, for I'm using borrowed equipment. I'm attempting to assemble a separate station and, if successful, will be on the air at more predictable intervals using low-powered c.w., or higher power if I can get all the junk. Will be here till November. . . . There will be other calls on Crete shortly — one is on the air now." ... W9EVZ reports DL4CX (W9YWL) banging through on 20 s.s.b., looking for old pals around Granite City, Ill. . . . Across the pond at APO 107, W1RAN licked the Deutsch Poste ham exam and should be signing a DL4 call at any time.

Hereabouts — W1ZDP directs attention to a news release which stresses the possibility of a future Clipperton Island airbase. More F08s à la AJ? ... YV0AA's visit to Aves Island may shortly be followed by other YV0 forays. Ws 2EIK 3TYW 4YOK 6NJU 9ZTD and others have evinced Caribbean DXpeditionary intentions. Say, what ever happened to Swan Island? ... West coastal islands are attracting attention once more with W8s AIW EIB MAF OJW and UQV invading Socorro Island of the Revillagigedo group off Mexico as XE4A ... W9NN could use info on the present whereabouts of Bunny, operator at K6QMC in 1941 ... "Anyone who would like to work the farthest-north amateurs can look for W0WCR/KL7 and W7H8S/KL7 on 20-meter s.s.b." Leo and Bob are summering at Point Barrow ... VP4LL protests the arrival of QSLs for 7-Mc. QSOs inasmuch as he doesn't use the band ... When TI2PP and XYL arrived in Quito for a recent visit to Ecuador there were some two or three dozen HC1s on hand to greet them at the airport. W2OHF has photos of this gala reception committee ... W0UQV apprises W5CAN of phony FPSAN activity on 21 Mc. ... W0FWW, prolific "How's" contributor of a few years back, rejoined the fray with a new XYL and new 14-Mc. kw. ... The tail wags the dog down in VP5 areas. W1ZDP snagged five VP5s before he collected "easy" Jamaica. ... W5FTF, very active on 15 and 20 c.w., offers New Mexico schedules to DX stations bent on WAS. ... K5AQD reports that HC2TR's hamming talents stood in good stead during emergency communications concerning the recent murder of five missionaries in Ecuador ... W50LG, aided by son W5IPN, takes over W5 ARRL QSL Bureau duties, succeeding W5UXY. With the DX facet booming daily, QSL Bureau managerships certainly are far from sinecures ... W3ECR and W5CEW are winners in an intramural WGDXC competition based on scores rolled up in the 1955 ARRL DX Test.

When:
Ten Years Ago in "How's DX" — Some six months after the lifting of wartime ham prohibition, DX is till
(Continued on page 138)



MOBILE COMPANIONS

Perfectly matched in appearance and performance, Morrow's MBR-5 and MB-560 make a terrific combination for mobile operation!

MBR-5 RECEIVER. Exceptionally stable, extremely sensitive. 13 tubes with 20-tube performance. 100 kc crystal calibration; dual conversion; noise-balanced squelch; SSB, CW and AM reception. 80, 40, 20, 15, 10 meters. Amateur net, \$224.50, less power supply.

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372	394	416	487	509	533	404	463	4080	5740	6325	7475	7766	8690						
374	395	418	488	511	534	441	464	4165	5750	6340	7500	7773							
375	396	419	490	512	536	442	465	4190	5775	6350	7506	7775							
376	397	420	491	513	537	444	466	4280	5775	6373	7520	7800							
377	398	422	492	514	538	445	469	4340	5780	6375	7525	7806							
379	401	424	493	515	540	446	470	4397	5806	6400	7540	7825							
380	402	425	494	516		447	472	4445	5840	6406	7550	7840							
381	403	426	495	518		448	473	4490	5852	6425	7573	7841							
383	404	427	496	519		450	474	4495	5873	6473	7575	7850							
384	405	431	497	520		451	475	4537	5906	6475	7625	7906							
385	406	433	498	522		452	476	5030	5925	6750	7640	7925							
386	407	435	501	523		453	477	5327	5940	6775	7641	7940							
387	408	436	502	525		455	479	5367	5955	6800	7650	7950							
388	409	438	503	526		457	480	5385	5973	6825	7660	7975							
390	411	431	504	527		458		5397	6206	6850	7673	8250							
391	412	433	506	529		459		5437	6226	6875	7675	8376							
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5910	7380	2030	2220	2360	3202	3995			
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6497	7810	2082	2282	2435	3250				
6522	7930	2105	2290	2442	3322				
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49¢ each—10 for \$4.00

4035	5706	6306	7473	7750	8630
4080	5740	6325	7475	7766	8690
4165	5750	6340	7500	7773	
4190	5775	6350	7506	7775	
4280	5775	6373	7520	7800	
4340	5780	6375	7525	7806	
4397	5806	6400	7540	7825	
4445	5840	6406	7550	7840	
4490	5852	6425	7573	7841	
4495	5873	6473	7575	7850	
4497	5875	6475	7575	7850	
4480	5875	6675	7583	7873	
4852	5880	6700	7600	7875	
4930	5892	6706	7606	7900	
4950	5906	6725	7625	7906	
5030	5925	6750	7640	7925	
5327	5940	6775	7641	7940	
5367	5955	6800	7650	7950	
5385	5973	6825	7660	7975	
5397	6206	6850	7673	8250	
5437	6226	6875	7675	8376	
5485	6240	6900	7700	8300	
5500	6250	6925	7706	8306	
5660	6273	6950	7710	8310	
5675	6275	6975	7725	8316	
5700	6300	7450	7740	8320	

79¢ each—10 for \$6.50

3655	6173	6600	7440	8400	8733
3735	6175	6606	8000	8425	
3990	6185	6625	8050	8450	
6025	6206	6640	8125	8475	
6040	6450	6650	8173	8500	
6042	6473	7090	8175	8525	
6073	6475	7025	8200	8550	
6075	6500	7075	8225	8575	
6100	6505	7125	8275	8600	
6106	6525	7150	8280	8625	
6125	6550	7206	8350	8650	
6140	6573	7325	8375	8690	
6150	6575	7425	8383	8700	

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strictly a 3.5- and 28-Mc. proposition, with 10 meters bearing the brunt. . . . On ten the Pacific (11s show strongly, lead by such as W6MBA/Tinian, W8WVSY/KP6, W8RWW/J9 and W1HUX/J9 of the Marshalls, and W3GZT/J5 on Okinawa. Also mighty sought-after are EPIA, A and C, HS2F, LZ1ID, W20AA/J8 of Korea, VS5JH, Y16JS and ZC2CU. . . . The vagaries of 28-Mc. operation inspire W1EH to term ten the "Wonder Band" — one forever wonders what will happen next! . . . The return of 20- and 40-meter frequencies to FCC-licensed amateurs is expected at any time. Nobody looks forward to this event more anxiously than the DX gang!

25 Watts

(Continued from page 21)

specific type that is quite tolerant as to dimensions. This antenna consists of a single horizontal wire fed at the center with an open-wire line. Ideally, the wire should run in a straight line, and the feedline should be brought off at right angles to the antenna, as shown in Fig. 4A. How-

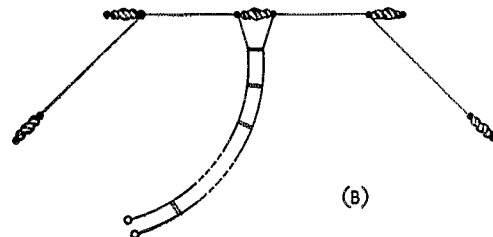
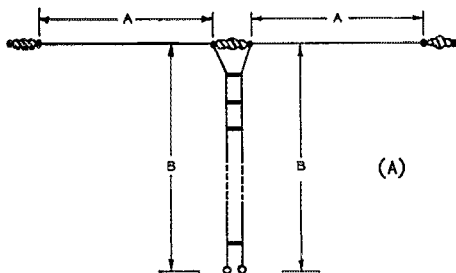


Fig. 4—Sketch of a recommended antenna for the transmitter. In restricted space, the ends of the antenna may be bent as shown at B. The antenna may also be shortened, as discussed in the text, provided that A + B totals 130 ft. Glass or porcelain antenna insulators should be used as shown.

ever, where space is restricted, the ends of the antenna may be bent out to one side, or downward, as indicated in B. Also, if the transmitter must be located at one end of the antenna, the feedline may be draped back under the antenna as indicated. Normal dimensions are 65 feet for each of the A sections, and 65 feet for each of the B sections. However, where room is not available, sections A may be made shorter or longer if sections B are made longer or shorter to keep the total length of wire in each side of the system at 130 feet.

A grounded quarter-wave antenna would require less space, but experience has shown that its use can give rise to bad cases of TVI under certain circumstances.

(Continued on page 140)



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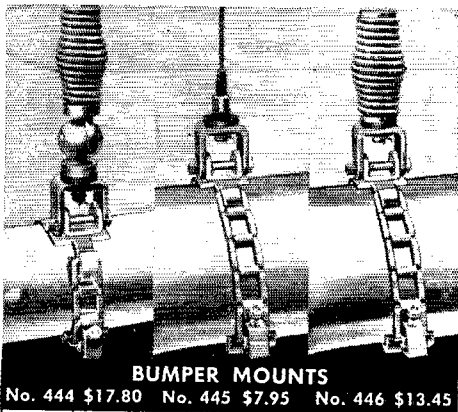
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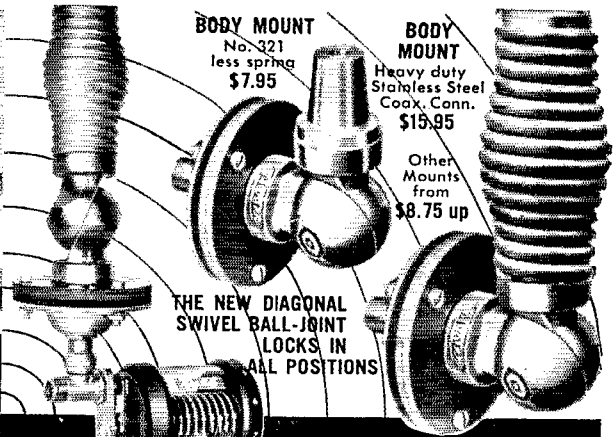
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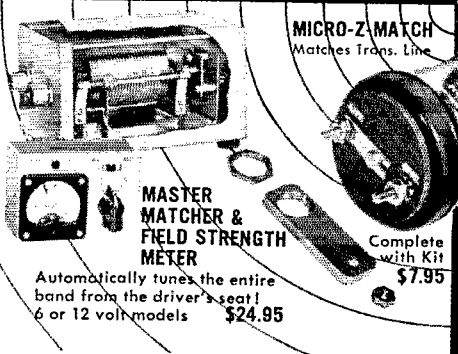


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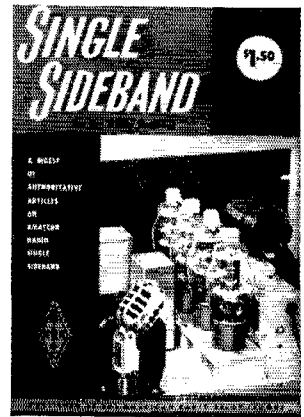
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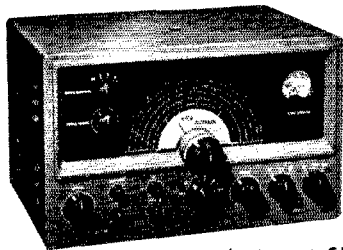
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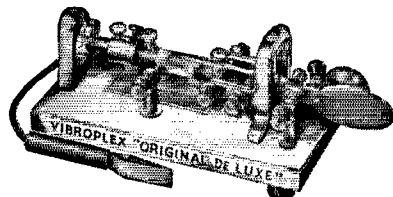


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After the antenna has been erected, connect its feedline to the antenna terminals of the transmitter. The tuning adjustments for both the oscillator and the antenna coupler are then carried through step by step. The tuning procedure when working into the antenna is identical to that employed when working into the dummy load. It is advisable to start with loose coupling between L_2 and L_3 (separate the coils by $\frac{3}{4}$ inch or more) so that the current dip at resonance can be readily identified. In all probability, the coupling at full load (approximately 100 ma. cathode current with a 325-volt plate supply) will be optimum with L_2 and L_3 separated about $\frac{1}{2}$ inch.

Don't forget to tune the oscillator (C_1) to the high-frequency side of resonance for the best keying characteristics.

In the final assembly of the complete station, the transmitter should be grounded by connecting a ground lead to the third terminal on the antenna strip as a safety measure.

Saving a Life

(Continued from page 65)

Additional Related Directions

It is all-important that artificial respiration, when needed, be started quickly. There should be a slight inclination of the body in such a way that fluid drains better from the respiratory passage. The head of the subject should be extended, not flexed forward, and the chin should not sag lest obstruction of the respiratory passages occur. A check should be made to ascertain that the tongue or foreign objects are not obstructing the passages. These aspects can be cared for when placing the subject into position or shortly thereafter, between cycles. A smooth rhythm in performing artificial respiration is desirable, but split-second timing is not essential. Shock should receive adequate attention, and the subject should remain recumbent after resuscitation until seen by a physician or until full recovery seems assured.

In Conclusion

The most important thing to remember is that if breathing stops because of electrical shock or some other cause, it is imperative that artificial respiration be started *immediately*. Do not delay — seconds count. As soon thereafter as possible, send someone for a physician.

The new method is particularly ideal because it may be easily administered in cases where there is a weight difference between the subject and the operator.

It is suggested that group instruction in this method be made a subject for club meetings, so that knowledge of its use can be disseminated widely for application and use as emergencies may arise.

A film entitled "Artificial Respiration," (F-23)
(Continued on page 142)



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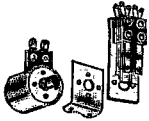
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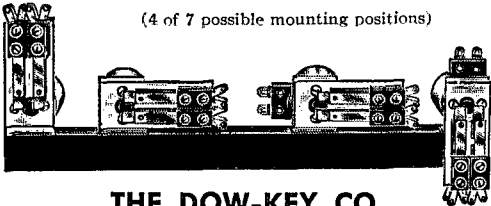
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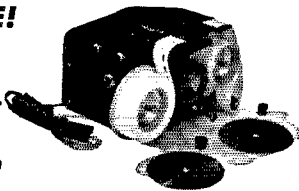
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World Above 50 Mc.

(Continued from page 61)

suggests 145.62 for a Florida calling frequency, and he would like to have out-of-state stations watch that channel and other spots above 145 Mc. when conditions are good.

Skipping back to the West Coast: W7LHL, having worked almost as far as he can go to the south in contacting W6NLZ, would like to see Middle West stations turn their antennas to the west, for a change. No mountain need be thought of as a complete barrier to v.h.f. signals. Many of them may actually *aid* the passing of a 2-meter signal through some degree of knife-edge refraction. In any event, W7LHL is certain that he can add to his 3-state total, if he can just get the cooperation of stations in adjacent W7 states and the nearer W8s, at least. Aurora contacts should be possible with at least 7 more states, and the extreme range of tropospheric and meteor propagation might add another 5 or so. He will be glad to talk things over on any lower band, or by tape letter.

Far-North 50-Mc. DX chances: A note from W8SWG says that VE8MA will be on 6 looking for signs of DX through the summer. And we have the promise of Dick Deck, whose W9 call we can't place at the moment, that he will be /KL7 in time for the fall P2 DX season.

It appears that no state is missing from the activity column this summer. W7UFB is on 50.146 in Casper, Wyoming, and W7ILL is active on 50.4 in Big Piney. Utah has dozens of Stations. W7KKB, W7CJN and W7JRG are on in Montana. W7ACD is back home in Idaho. W7BDB has been reported from Ely, Nevada. The WAS business should get a boost before this summer is over!

50-Mc. DX oddities: W9MFH, Ravenswood, Ind., has no TVI downstairs in his own house, but he got a Channel 2 TVI report from Middletown, Conn., during a recent opening. Though everyone complains about low-edge crowding, some of the gang are trying to do something about it. W2IDZ recently heard W0s GEP and NOA chewing the rag on a net frequency of 52.45 Mc. Ed tuned up to the channel (his rig is entirely gang-tuned) and broke in for a 3-way. At W1HDQ we've made a few tries above 51 Mc., just to see what will happen. Many a station has been called on 51.3 Mc. or so, following his "CQ DX," only to hear him come on and CQ again. Yet on the rare occasions that raise someone in the portion of the band above QRM Alley, the QSO turns out to be of "private-line" quality.

Think it takes big antennas to hear 2-meter DX when conditions are good? Not always; W0IHD, Overland, Mo., had to leave a fine DX session to go to work, the night of May 2nd. He turned on his mobile receiver, and in the 3½-miles drive to work he heard W5HGH (whom he had just worked for his 25th state) and many stations in Kansas, Illinois, Missouri and Indiana. The mobile antenna is a 2-meter halo.

The higher bands: W5OXL, Fayetteville, Ark., has 10,000-Mc. gear using 723A/B and a converted rarfar receiver. He would like to hear from anyone in that area interested in work on that band. A 420-Mc. note from

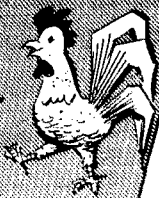
(Continued on page 144)

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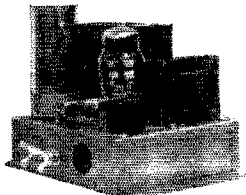
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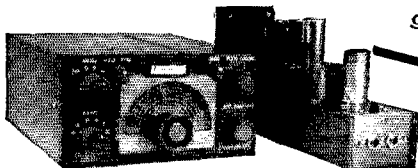
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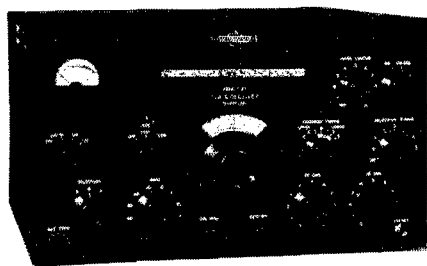
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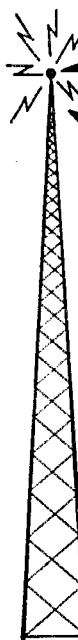
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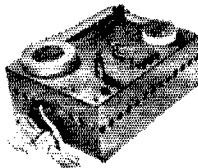
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K6GKX, Long Beach, says that there are about 14 stations on 420 regularly in that area. Contacts are made easily with W6MVV in San Diego, and W6SDM, Oxnard. Activity peak is 2000 to 2200 Pacific time.

V.H.F. Picnics

V.h.f. enthusiasts are a gregarious sort. They'll travel dozens, even hundreds, of miles to meet their brethren. This urge to get together personally is probably at the bottom of that wonderful summer institution, the v.h.f. picnic. Two famous ones come up in the next few weeks. The Turkey Run affair, almost a national convention of v.h.f. men, is scheduled for July 29th, at the Turkey Run State Park, near Terre Haute, Ind. There is a large shelter, in case of bad weather, and lots of space and facilities outside for all the family, if the weather is fair. Your conductor can recommend the Turkey Run V.H.F. Picnic, from personal experience. V.h.f. enthusiasts show up there from the most amazing distances, every year.

Equally well known and widely attended is the picnic held each summer by the Two Meter and Down Radio Club of Southern California. This will feature transmitter hunts, and games and prizes for all the family. The place is Ladera Park, on Slauson Ave., near La Brea, Los Angeles. Date: Aug. 12th. Time: 10:00 A.M.

OES Notes

W1AHE, Stowe, Mass. — Despite prevailing opinion to the contrary, low-powered c.w. on 144 Mc. can be heard via aurora, when conditions are really good. The 10-watters can't compete in Kilowatt Alley, however. There's plenty of room above 144.1, and if the fellows who work aurora regularly would tune higher in frequency, and make an effort to work the weaker signals, they'd be doing a tremendous amount of good for 2-meter interest generally. Would like to hear from anyone who has tried 417As on 220 and 420, as to whether they are superior to 6AN4s or 6AJ4s.

K2ITN, Ikon, N. Y. — Primary interest is 10,000 Mc. and up. Two sets of gear for 10,000 Mc. ready for use. Working on equipment for still higher frequencies.

W2RXG, Chenango Bridge, N. Y. — Operating on 144 Mc. with 1-kw. c.w. to 4-125As, 500 watts phone, 28-element array. Interested in low-noise receivers. 50-Mc. gear in works; now receiving only.

W3GKP, Spencerville, Md. — Hot pilot-light noise generator (April QST, page 45) was described in W9NFK's VHF News for August, 1949, by W6WWP, who said it was old then. Still good stout, however. Relatively low noise output, due to burn-out limit of bulbs, depends on filament temperature, not wattage, so anything works. Have tried No. 47 pilot lamp, 32-candlepower auto lamp, and 100-watt home-type lamp. Some trouble in matching to 100-watt lamp, but same noise output. With tungsten filaments, the noise increase limit is about 13 db., so you need a fairly good receiver to start with. Suggested improvement over QST diagram: Select lamp having operating resistance much higher than receiver input impedance, then match to receiver input with resistive L pad, with the two arms equaling the receiver input impedance, the shunting portion being as low as possible.

W3UJQ, York, Pa. — 50-Mc. halo 12 inches above car roof gives much stronger signals and lower noise than vertica lwhip. There are now about 19 6-meter stations in York County.

W4HHK, Collierville, Tenn. — Built "secret weapon" for use at hidden transmitter hunt on 420 Mc. at Dayton Hamvention. Used dipole with screen reflector and diode detector with transistor audio. Didn't find hidden station,

(Continued on page 146)

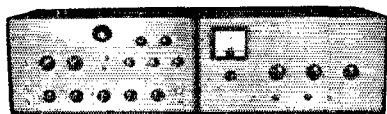
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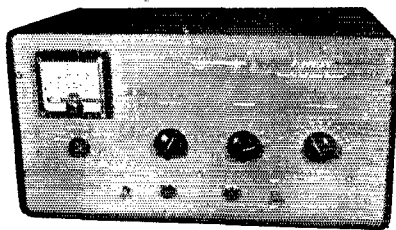
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Complete antennas with 88 ft. of KW twinlead, 12 inch insulators, and high strength wire.

No. 5BA-F Antenna for phone **\$27.50** postpaid
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MONEY BACK GUARANTEE

If not available at your jobber, write
Don Larimer, W9IYP

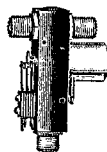
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Antenna Division

434 Wilnot Avenue Burlington, Wisconsin
Manufacturers of quartz crystals for all applications

Really SILENT A-C Relays

Model DKC



1000 WATTS
Length 4 1/2",
width 3"

DKF rigid adapter for external chassis mounting, **\$1.85**



← **Silent A-C magnet prevents hum modulation of carrier—A-C types guaranteed as quiet as D-C.**

Special connector protects your receiver from ← R.F. during transmission (Optional).

Transmit contact-pressure over 75 grams, making the 1000 w. rating very conservative. Causes negligible change in SWR up to 100 Mc.

AC types (All Volt.) Amateur net. **\$10.50**
DC types (All Volt.) Amateur net. **9.50**

See your distributor. If he has not yet stocked Dow Co-axial relays, order from factory. Send check or money order or will ship COD. Prices net FOB Warren, Minn. Shipping Weight 9 oz. Dealers' inquiries invited. Literature on request.

Add \$1 for external switch (Optional)
Add \$1 for special receiver protecting connector (Optional)

Magnets and all parts of current DKC relays are interchangeable and available in kit form—see your dealer or write for prices.

THE DOW-KEY CO., INC.
WARREN, MINNESOTA

Distributed in Canada by Canadian Electrical Supply Co., Ltd.
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Shakespeare — WONDEROD

Fiberglass Whip Antenna

Try one with your present equipment. —You'll notice first the shorter length for best impedance match.

—Use it and see how it silences road noises and vibrations. Your Wonderod stands up almost straight at any car speed. Light weight reduces sway as car slows or accelerates.

A surface of full length glass fibers surrounds the conductor metal in Shakespeare's exclusive Howald Process to give greater strength to slim diameter. Wonderod withstands sharp impacts, is extremely flexible. Never takes a set . . . cannot rust or corrode.

Prices (—amateur net) for standard whips 54"-60", 5.75; 61"-90", 6.95. For base extensions 18" —.350 dia, 3.95; .500 dia, 4.80; —36" —.350 dia, 4.70; .500 dia, 5.82. Fittings are 3/8" — 24 thd, chrome plated brass.

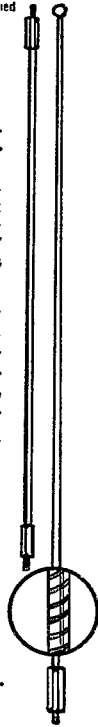
Inquire about custom antennas and industrial applications.

Look for the spiral markings, trademark of Shakespeare Howald Process Wonderods.

COLUMBIA PRODUCTS CO.

Subsidiary of Shakespeare Co.
P. O. Box 5207, Columbia, S. C.

Pat.
Applied
for.



but gadget turned out fine for checking up on XYL's activities with the 10-meter mobile, while walking around Hamvention. Also found two 2-meter stations in hotel!

A hidden transmitter at home serves a more useful purpose. 12AT7 oscillator-tripler with 48-Mc. crystal, operated at low input, is run continuously in a building several hundred feet from antenna. It provides a constant reliable check on receiver and antenna performance.

W4KK, Rome, Ga. — Example of ionospheric scatter copy on 50 Mc.: "W2FBZ W2FBZ please send signal report to W2FBZ 207 lorraine ave upper montclair nj this station is (not!) monitoring the band." And a long burst from W1HDQ: "— v v v de W1HDQ 0830 test test 50 — are made ea — saturday and sunday at 0330 0840 0850 and 1130 est on this freq bt each test is 5 minutes duration bt operators at distant points are invited to monitor these tests and report any DX — — — — — eq eq eq de W1HDQ" Other scatter signals heard frequently while listening to north; many would be readable on c.w. Signals much better in April and May than during December to February.

W9GAB, Beloit, Wis. — Completed 416B preamplifier for 144 Mc. Noise figure checks at 1.5 db. Second stage is 6B8B cascade. Now work W8LFX, Cincinnati, regularly, and hear W8KAY, Akron, on his skeds with W9WOK. Distances are more than 300 and 400 miles respectively.

W9HPO, Marion, Ind. — Worked W5GMA, Dallas, Texas, May 18th, for best 50-Mc. mobile DX. Used vertical whip.

W0QMF, Perryville, Mo. — Long feedlines can work, even on 144 Mc. W0LMM had very poor location, so he put 2-meter antenna up on a bluff. This required about 500 feet of feedline, but he gained 200 feet of height and his signal is much stronger.

W0WEQ, Normandy, Mo. — 50-Mc. operators interested in developing a relay system for groundwave traffic handling and possible east and west-coast circuits are asked to write Midwest V.H.F. Association, 4204 Marlin, Normandy, Mo. Give information on reliable contacts you have at distances of 50 miles or so. Would like to conduct first test about Aug. 1st.

Hints and Kinks

(Continued from page 58)

INEXPENSIVE CIRCUIT BREAKER

A MODEL railroad item which may have some utility for builders of ham gear is a 3-amp. thermal-type circuit breaker, also called a "grass-hopper." It resembles a small fuse, and consists of a cartridge about one inch long which mounts on fuse clips which are supplied with the device. A bimetallic strip on top heats up on overload, springing up and breaking the circuit; the strip is pushed back into place to reset.

The circuit breaker's strong points are its small size, low cost (about 50 cents complete with clips and mounting screws) and simplicity of mounting. It also does away with the need for replacing fuses which blow on week ends when the radio stores are closed. Chief disadvantage is its slow action; the strip must heat up before it

(Continued on page 148)

WHY NOT Do It Yourself?

We have what you need: • Aluminum Tubing
• Castings • Stampings—everything necessary for making beam antennas.

2-meter 6-el., comp., \$ 6.95, prepaid
6-meter 5-el., comp., 14.95, prepaid

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MORE SIGNALS PER DOLLAR
From Money Invested in an Antenna

Self Supporting
STEEL TOWERS
For Rotary Beams, FM, TV



You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5 1/2 ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower — and saves you money, too!

ATTRACTIVE — NO GUY WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

Width of Base Equal to 1/5 Height

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Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'—\$104, 28'—\$127, 33'—\$149, 39'—\$182, 44'—\$208, 50'—\$239, 61'—\$339, 100'—\$895.

Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now! Send check or money order . . . or write for free information. Cable address: "VESTO"

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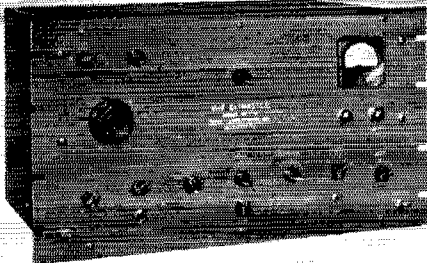
The U. S. Government has a continuing requirement for single and married men with radio operator-technician experience. Individuals with less than minimum required experience can qualify for training. Persons with past applicable experience, who for some time have been out of touch with this type of activity, will be refreshed. Assignments are overseas at interesting foreign posts.

A variety of foreign posts are available. Rotation of the employee and his family from post to post is accomplished in accordance with standard government regulations and usually involves tours of 24 months duration at each post followed by Stateside leave between assignments. Work is challenging and varies from post to post. If you are in good health, will not be subject to military draft under selective service regulations for at least one year, and are interested in the above openings, please write —

DAVID R. RINGLAND
U. S. Government Personnel
Post Office Box 6478
"T" Street Station, Washington, D. C.

Starting annual salaries, which will be determined by the applicant's experience and ability, range from \$3670 (GS-5) for trainees to \$4970 (GS-8) for fully qualified men. Normal promotional progress within this salary range may be expected when quality of performance dictates. Beyond this latter level, advancement possibilities exist on a selective and competitive basis. Standard government allowances are paid in addition to the salary.

When writing please give us the following information: 1. Name, address, telephone number, and hours when you can be reached; 2. Date of birth; 3. Military history including dates, schools, experience, grade or rank, and MOS (primary and others); 4. Civilian training and experience; 5. FCC license if any; 6. CW speed; 7. Typing speed; 8. Marital status and dependents. If your letter indicates that you have the required qualifications, a local interview will be arranged in the near future.



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**NEW! CLEGG VHF 3-BAND,
150 W AM/200 W CW XMITTER**

10-6-2 meters — completely band switched

**Only equipment of its kind
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- 100 watts AM — 150 watts CW output on all 3 bands

See your jobber, or write
for complete information



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HAM NET \$159.00

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117 VAC
\$47.00

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PSR-117 features built-in "S" meter, optional on PSR-612. Both supplies completely filtered and regulated. IN STOCK!

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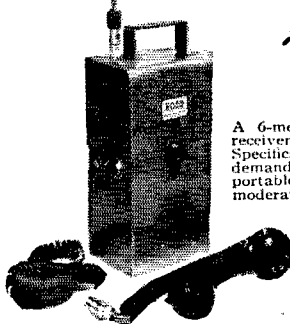
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Announcing
THE NEW
ECCO ER-6

A 6-meter portable transmitter/receiver at a new *low, low* price. Specifically designed to meet the demand for an efficient amateur portable transmitter/receiver at a moderate price. Also practical for hunting and fishing trips and other outdoor activities. Ideally suited for emergency and disaster operation, handy for beam antenna tuning, etc. The receiver may be fixed tuned to any frequency in the 6-meter amateur band. Designed for head-

phone operation. Transmitter uses carbon microphone input, high level plate modulation, with power input of .5 watts. Uses two, 45V "B" batteries and two, 1.5V "A" batteries. Range, ground wave, two to ten miles depending on terrain. Push-to-talk operation using miniature relay for antenna switching. Battery life approximately 10 hours. Dimensions: 4" x 6" x 13". Antenna: stainless steel whip, base loaded, 3' long.

ER-6 with tubes and antenna..... \$49.95

Accessories: V6 transmitter crystal for 6-meter operation (specify frequency)..... \$5.50

NOTE: (Transmitter and receiver will be tuned to crystal frequency at factory if ordered with unit.)

M-4 military type mike complete with coiled cord and connector..... \$16.00

P5-Headset..... \$3.85

MP7 hand set with cord and connector..... \$25.50

Space is provided on cabinet for a push-to-talk switch in the event a headset is used which has no switch.

25% deposit required on C.O.D. orders

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Stores: 44 Canal St., Boston, Mass. 60 Spring St., Newport, R. I.

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ALSO IDEAL FOR: ♦Antenna Hardware ♦Terminal Connections ♦Rotor Housings ♦All metal parts

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No. E101 Antenna Coat
Enough to protect one full-size 20 meter beam or several TV antennas.
NET PRICE \$1.94
No. E46 Antenna Coat
Solvent ½ pint can \$.69

opens, and it must cool off before it can be reset. Also, the voltage appears across the exposed ends, so if the circuit breaker is mounted on a panel, for which it was apparently designed, it should be provided with an insulated cover. It also places some resistance in the circuit.

It is available in most hobby shops as the Mantua Metal Products Co. Kit No. 708.

— Julian N. Jablin, W2QPQ

FEEDBACK CURE

IF YOU are plagued by feedback — acoustical or I. r. f. — here is one way to get rid of it for good without fiddling around with ground leads or microphone cords.

The circuit is shown in Fig. 6. The only parts needed are a 115-volt a.c. s.p.s.t. relay and a

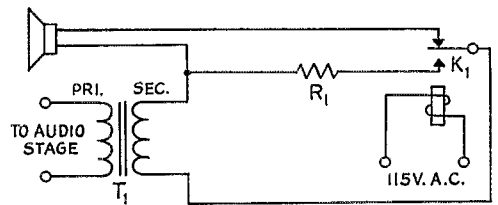


Fig. 6 — W5AXI/MM uses this simple circuit for curing feedback.

2-watt resistor, R_1 . The resistance of R_1 should be approximately equal to output impedance of the audio transformer and the relay may be actuated by the same power source used for the antenna relay.

When the transmitter is on, and the relay closed, the speaker is disconnected from the receiver and the resistor, R_1 , is connected across the secondary of the receiver output transformer, T_1 . The relay disconnects the resistor and restores the speaker to operation whenever the transmitter is turned off.

— Arthur E. Hutchins, W5AXI

VARIABLE-FREQUENCY CRYSTAL HOLDER

A RECENT ARTICLE, "A Variable-Frequency Crystal Holder," *QST*, February, 1956, suggested the use of a flexible brass electrode as one means of varying the frequency of a crystal. Unfortunately, none of my surplus rocks would oscillate when the holders were modified in this manner. However, by using the original electrodes, and by removing the pressure springs from the holders, I find that frequency deviation can be obtained by exerting pressure on the crystal by means of screw compression.

(Continued on page 152)



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A Service of Radio Corporation of America
350 West 4th St., New York 14, N. Y.

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**FOR OPTIMUM RESULTS...
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BEAMED POWER—PERFECT MATCH—
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YOU'RE THERE!

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TELREX
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"BEAMED POWER" ROTARIES

By popular demand! World's most technically perfected communication arrays
Heavy-Duty Beam Rotator—Model R-200
Control Box and Indicator—Model A
Available as a complete set: R-200A

"BEAMED POWER" ROTARIES for 2, 6, 10, 15, 20 and 40 meters or combinations. Custom designs for commercial installations. Write for Bulletin H-25.



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PREMAX

Mobile Mountings

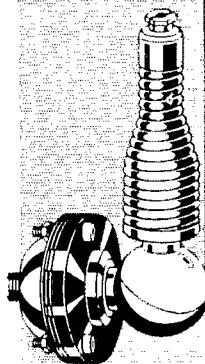
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**Universal
Spring Mounting
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Stainless steel spring on solid aluminum split ball fixture mounts at any angle. Insulator mounting has grounding backplate and two gaskets for dust and moisture-proof coax connection. Split ball mount or spring adaptor also available individually.

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**LAMPKIN 105-B MICROMETER
FREQUENCY METER**

Heterodyne type, measures crystal-controlled transmitters on the bench 0.1 to 500 mc. Price \$220.00 net.



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Measures peak deviation ± 25 kc. Tunable 25-500 mc. in one band. Price \$240.00 net.

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PHONE AND CW

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KIT
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Design proven through actual signal reports.

★ Only top-quality components used throughout.

★ 5-point TVI suppression, and pi network output to match 50 to 600 ohms.

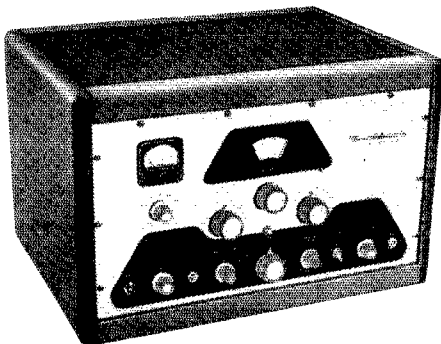
★ Detailed construction manual for simplified assembly.

★ 100 watts output on 160, 80, 40, 20, 15, 11, and 10 meters.

★ Attractive and functional physical design.

The Heathkit Model DX-100 Transmitter is rapidly becoming the "standard" ham rig in its power class. The high quality and outstanding performance it offers can be matched only in equipment costing many dollars more. It features a built-in VFO, modulator, and power supplies, and is bandswitching for phone or CW operation on 160, 80, 40, 20, 15, 11, and 10 meters. The kit includes a detailed construction manual, the cabinet, all tubes, pre-wound coils, and all other parts necessary for construction.

Push-pull 1625 tubes are used to modulate parallel 6164 tubes for RF output in excess of 100 watts on phone, and 120 watts on CW. May be excited from the built-in VFO or from crystals. Features pi network output circuit, illuminated VFO dial and meter face, and 5-point TVI suppression. High grade, well-rated parts supplied. Schematic diagram and technical specifications on request.



MODEL
DX-100

\$189⁵⁰

Shpg. Wt. 107 Lbs.

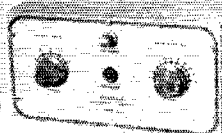
Shipped Motor Freight unless otherwise specified. \$50.00 deposit required on all C.O.D. orders.

HEATHKIT
antenna coupler
KIT

MODEL
AC-1

\$14⁵⁰

Shpg. Wt. 4 Lbs.



In addition to matching a low power transmitter to an end-fed long wire antenna, this antenna coupler incorporates a 3-section low-pass filter, to attenuate output above 36 mc and reduce TVI. Handles up to 75 watts, 10 through 80 meters. 52 ohm coaxial input—tapped inductor and variable capacitor—neon RF indicator. Ideal for use with the Heathkit AT-1 Transmitter.

HEATHKIT
grid dip meter KIT

The Model GD-1B is a time-proven instrument. It will enable you to accomplish literally hundreds of jobs on all types of equipment. Frequency range is from 2 mc to 250 mc. A 500 ua meter is employed for indication, and a sensitivity control and headphone jack are provided. Includes pre-wound coils and rack. Indispensable for the ham, serviceman, and engineer. Extra coils available to extend frequency down to 350 kc.



MODEL
GD-1B **\$19⁵⁰**

Shpg. Wt. 4 Lbs.



HEATHKIT

antenna impedance meter KIT

MODEL AM-1

\$14⁵⁰

Shpg. Wt. 2 Lbs.

Used with an RF signal source, the AM-1 will enable you to match your antenna-receiver-transmitter system for optimum operation. Will double as a phone monitor or relative field strength meter. Uses 100 ua meter, and covers 0 to 600 ohms. Frequency to 150 mc.

**HEATH
COMPANY**

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BENTON HARBOR 9, MICHIGAN

HEATHKIT communications-type all band receiver KIT

Slide-rule dial — electrical bandspread — ham bands marked. Slug-tuned coils and efficient IF transformers for good sensitivity and selectivity. Transformer-operated power supply for safety and high efficiency.

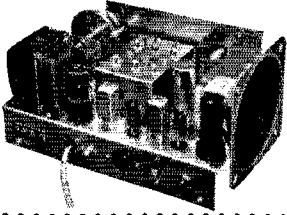
The Model AR-3 receiver features new high-Q slug-tuned coils, new layout, and new-type IF transformers. The result is high sensitivity and selectivity and better image rejection on all bands. Transformer-type power supply, electrical bandspread, RF and AF gain controls, antenna trimmer, AGC, BFO, headphone jacks, socket for Q multiplier, 5½" PM speaker and illuminated dial.



SPECIFICATIONS:
 Frequency Range—550 kc to 30 mc on four bands.
 Tube Complement—1—12BE6 oscillator and mixer • 1—12BA6 IF amplifier • 1—12BA6 second detector, AVC, first audio amplifier and reflex BFO • 1—12A6 beam power output • 1—5Y3 full wave rectifier

\$27.95 (Less Cabinet)
MODEL AR-3
 Shpg. Wt. 12 Lbs.

CABINET: Fabric-covered cabinet available. Includes aluminum panel, speaker grille, and protective rubber feet. Measures 12¼" W. x 6¾" H. x 7¼" D. No. 91-15. Shpg. Wt. 5 Lbs. \$4.50.

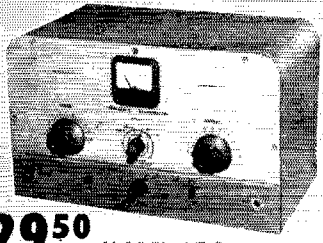


HEATHKIT CW amateur transmitter KIT

Single-knob bandswitching for 80, 40, 20, 15, 11, and 10 meters. Panel meter monitors final grid or plate current.

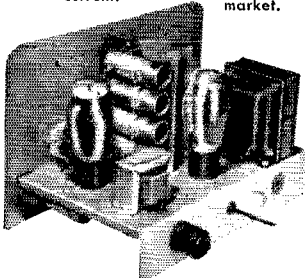
Plate power input 25-30 watts. Best dollar-per-watt buy on the market.

The AT-1 is complete with its own power supply, and covers 80, 40, 20, 15, 11, and 10 meters with single-knob bandswitching. Designed for crystal or external VFO excitation. Incorporates key-click filter, line filter, copper plated chassis, pre-wound coils, 52-ohm coaxial output, panel meter, and high quality components throughout. Easy to build, even for the beginner. Employs 6AG7 oscillator and 6L6 final. Up to 30 watts power input.



\$29.50
MODEL AT-1
 Shpg. Wt. 15 Lbs.

SPECIFICATIONS:
 RF Amplifier Power Input... 25-30 watts
 Output Connection... 52 ohms
 Band Coverage... 80, 40, 20, 15, 11, 10 Meters
 Tube Complement: 6AG7... Oscillator—Multiplier
 6L6... Amplifier—Doubling



OA2 voltage regulator tube for stability.

6AU6 electron-coupled Clapp oscillator.

Covers 160-80-40-20-15-11-10 meters.

Copper plated chassis—aluminum case—profuse shielding—ceramic coil forms, switch wafers, and tuning condenser insulation.

Smooth-acting, illuminated and pre-calibrated dial.

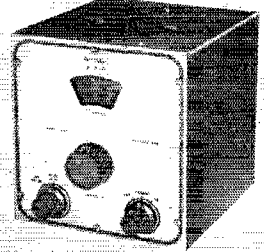
HEATHKIT vfo KIT

The Model VF-1 features illuminated and pre-calibrated dial scale. Cable and plug provided to fit the crystal socket of any modern transmitter. Covers 160-80-40-20-15-11 and 10 meters with 3 basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Derives operating power from transmitter power supply. Has VR tube for stability. Go VFO for more operating enjoyment.

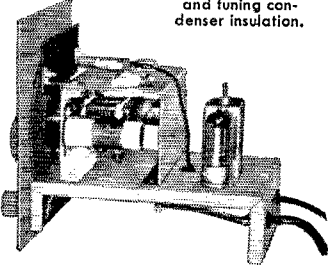
MODEL VF-1

\$19.50

Shpg. Wt. 7 Lbs.



SPECIFICATIONS:
 Output Frequencies—1750-2000 kc, 7000-7425 kc, 6740-6808 kc. Calibrated Bands—160-80-40-20-15-11-10 meters. Tube Complement—6AU6 Oscillator OA2 Voltage Regulator. Power Requirements—250-350 VDC @ 15-20 ma. and 6.3 VAC @ .45 A.



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All K-W 'UNIVERSAL' fittings to which tools are applied are hexagonal to fit standard wrenches . . . All are nickel-chrome plated . . . All have standard 3/8-24 S.A.E. threads . . .

BASE/EXTENSION SECTIONS — Light weight . . . low wind resistance . . . fabricated from sturdy 3/8" steel tubing . . . special Jam Nut, one supplied with each section, permits removal of parts without damage to finish . . .

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12"	2.35	30"	4.05
18"	2.95	36"	4.55

Additional JAM NUTS each \$0.15

COUPLING — Female threads thru. \$0.75

COLLET — For plain-end 3/16" Dia. antenna rods . . . used to provide adjustable height or to resonate antenna . . . fits any extension listed. \$2.35

STUD — Male threads both ends with solid hex for wrench. \$0.90

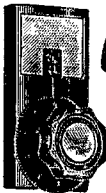
WHIP-HOOK — Solid brass, nickel-chrome plated . . . fastens to rain molding with set screw. \$1.00

K-W's 'DYNA-Q' LOADING COIL — Highest efficiency base or center loading . . . handles over 100-watts without arcing . . . one coil operates all bands 10-thru-75 . . . unshielded . . . all power radiated. \$14.95

AT YOUR JOBBERS' — Circulars on request

K-W ENGINEERING WORKS

3145-A North 48th Street • Milwaukee 16, Wisconsin



Groth

TURN COUNT DIAL

Registers Fractions to 99.9 Turns
FORK roller inductances, **INDUC-TUNERS**, line tuning gear reducers, vacuum and other multivibrator variable condensers. One hole mounting. Handy logging space. Case: 2" x 4". Shaft: 3/4" x 3". TC 2 has 2 1/2" dial — 1 1/2" knob. TC 3 has 3" dial — 2 1/2" knob. Black bakelite.
 TC 2 \$4.20 — 1 C 3 \$4.75 — Spinner Handle 75c extra
 Add 8c for Parcel Post

R. W. GROTH MFG. CO.

10009 Franklin Ave. Franklin Pk., Illinois



Founded in 1909

RADIO TELEPHONY RADIO TELEGRAPHY RADAR & TELEVISION

Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$48.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details. New: Advanced TV Engineering Course.

PORT ARTHUR COLLEGE PORT ARTHUR TEXAS

Approved for G. I. training

(Continued from page 148)

Small ceramic compression-type trimmer capacitors have a fine-thread adjustment screw and a threaded bushing which may be used as a vernier control for exerting pressure on the crystal. After the bushing has been broken loose from the capacitor, crimp it into a hole drilled in the center of the cover for the crystal holder.

If the adjustment screw bears directly on the crystal electrode, it seems to introduce quite a bit of drift. The drift may be reduced by separating the screw and the electrode with the insulating plate to be found in many types of holders.

A large supply of crystals is not on hand for making extensive checks on this particular modification. But I can report that the method provided a frequency deviation of approximately 11 kc. when applied to a 4190-kc. rock and that some 75-meter phone crystals "moved" at least 6 kc. merely by increasing pressure from the spot where the crystals began to oscillate.

— Steven L. Gabil, W9UBW/W8QHA

V.F.O. CALIBRATION FOR HAM BANDS

OFTENTIMES hams are perplexed with the problem of accurately adjusting a v.f.o. when no secondary frequency standard is available.

Zero beating harmonics of your v.f.o. with WWV will give very accurate spotting of certain frequencies. Accuracies of within a few cycles can be obtained in this manner. The following are a few fundamental frequencies whose harmonics can be heterodyned against WWV:

Frequency	Harmonic	WWV Frequency
2000 kc.	5th	10 Mc.
3.75 Mc.	4th	15 Mc.
4.0 Mc.	5th	20 Mc.

— Lowell E. Robertson, W0UUP

THE HEATHKIT GRID-DIP OSCILLATOR AS A 144-MC. TRANSMITTER

IF YOU are interested in having a lot of fun with flea power and f.m. at 144 Mc., try getting out with a Heathkit Model GD-1B grid-dip meter. Plug a crystal mike into the phone jack of the unit, couple an antenna to the tuned circuit — and you are ready to go.

After the initial thrill of playing around with flea power, I constructed a 4-element 2-meter beam for use with the dipper. With this antenna in use, I have enjoyed some very fine contacts with K2EHL. In fact, I'm having so much fun with the g.d.o. transmitter that my low-frequency gear is starting to gather dust!

— A. J. Castellano, jr., W1ZMB

AN/APR-4 TUNING UNITS WANTED

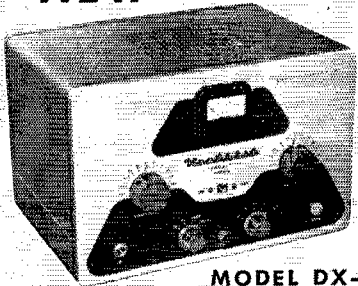
TOP PRICE PAID. Also Frequency Meters TS-173, 174, 175, and 323, and other good quality surplus equipment; General Radio, L&N and other standard laboratory equipment and instruments, Weston meters, etc.; technical manuals.

ENGINEERING ASSOCIATES

434 Patterson Road

Dayton 9, Ohio

HEATHKIT **DX-35** phone and cw transmitter KIT



MODEL DX-35

\$56.95

Shpg. Wt. 24 Lbs.

- Built-in modulator for phone operation.
- Bandswitching on 80, 40, 20, 15, 11 and 10 meters. Pi network output coupling.
- Switch selection of three crystals—provision for external VFO excitation.
- Attractive and functional physical design.

This brand new transmitter model provides phone and CW operation on 80, 40, 20, 15, 11, and 10 meters. Plate power input to 65 watts on CW and controlled carrier modulation peaks to 50 watts on phone. Completely bandswitching.

Employs two-stage 12AX7 speech amplifier, 12AU7 modulator, 12BY7 oscillator, 12BY7 buffer, and 6146 final. The buffer stage assures plenty of drive to the final on all bands. Pi network output coupling employed for easy antenna loading. Switch selection of crystals. Crystals changed without removing transmitter cabinet. Husky power transformer and choke are potted, and the circuit is well shielded. Meter indicates final grid or plate current.

Truly a remarkable transmitter package for the price. Ideal both for the novice and for the more experienced operator.

Send for free 1956 Heathkit Catalog describing more than 65 interesting "build-it-yourself" projects.

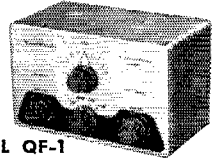


A Subsidiary of Daystrom, Inc.

BENTON HARBOR 9, MICHIGAN

HEATHKIT "Q" multiplier KIT

Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of 4,000 for sharp "peak" or "null." Tunes any signal within receiver IF. Operates with 450 to 460 kc IF. Will not function with AC-DC type receivers. Requires 6.3 VAC at 300 ma, and 150-250 VDC at 2 ma.



MODEL QF-1

\$9.95

Shpg. Wt. 3 Lbs.

CANADIANS! We have large stocks of nationally advertised Ham parts. Write for Free catalog.

THE CRAWFORD RADIO

VE3YR 119-121 JOHN ST., N. VE3JU
"Geo" HAMILTON, ONT. "Bill"

Be a Radio Ham or Commercial Operator. Pass FCC code test in few weeks. Fascinating hobby. Good pay. Interesting work in Commercial field. Same system used by radiotelegraph specialists. FREE book explains how Amateurs and Operators learn code and develop amazing skill and speed. Candler System Co., Dept. 4-H, Box 928, Denver 1, Colo., U.S.A. and 52b, Abingdon Rd., Kensington High St., London W. 8, England

H A M T E N N A

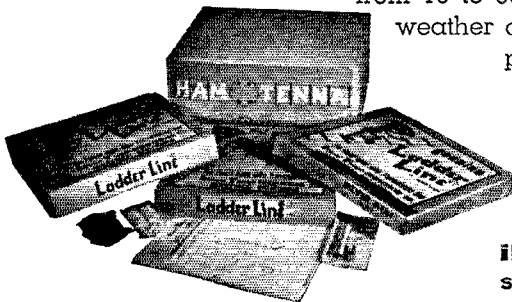
LADDER LINE® FOLDED DIPOLE AMATEUR ANTENNA KIT

A new, inexpensive amateur antenna in kit form.

Three kits are available covering from 10 to 80 meters . . . Will withstand adverse weather conditions. Kit includes all necessary parts, including Silver U-Line lead-in.

Priced from \$6.00 to 11.60.

For illustrated brochure on the Ham-Tenna, air dux coils, and the air dux Balun, write to



illumitronic engineering
sunnyvale california

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 or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor any commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

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(7) Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9YIV, Troy, Ill.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

MICHIGAN Ham's Amateur supplies, standard brands. Store hours 0800 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St. Ann Arbor, Michigan. Tel. NOrmandy 8-8698. NOrmandy 8-8262.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARCL, R5/ARNR, BC610E, BC221 mounts and parts wanted. Highest prices possible paid. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

PANORAMIC Adapter AN/APA-10 Tech. Manuals \$2.75 postpaid in U. S. A. Electronicart, 27 Milburn St., Bronxville 8, N. Y. DX-O-GRAPEL. The DX man's guide for band conditions. Know when, where, and what band. Foremost DXers use it. \$2.50. Request flyer. Box 4596, Winston-Salem, N. C.

RECEIVERS repaired and aligned by competent engineers, using factory standard instruments. Hallcrafters, Hammarlund, National, Collins authorized service station. Our twentieth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

MULTI-BAND Antenna, 80-40-20-10, \$18.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Ky. UFO Patrol data. W5CA.

ATTENTION Mobilizers! Lecce-Neville 6 bolt 100 amp. system alternator, regulator & rectifier, \$45.00. Also Lecce-Neville 12-volt 100 amp. system, alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann Jr., K2PAT, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallcrafters, Hammarlund, Johnson, Lyco Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill. MIAMI and vicinity: Communications receivers repaired. Byrant Electronics, 13341 N.W. 7th Ave. Phone 84-4001.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

FLORIDA Bound? Stop at Tamishaw Motel, a Ham's Haven. North Trail, Ft. Myers, Fla. "Eb" Long, K4GEW.

DELUXE Chart "Amateur Bands at a Glance." All the amateur bands illustrated. Band limits. Privileges, emissions, etc. Send 50¢ to Amband Co., P. O. Box 632, Boston 2, Mass.

RUBBER Stamp: Call, name and address, \$1.00, includes inking pad. Richard's, 2029T Bradley, Chicago 18, Ill.

VAN SICKLE stocks Hallcrafters, National, Gonset, Johnson and other popular gear. Big trades tool W9KJF, Gene, Van Sickle Radio Supply, 1320 Calhoun, Ft. Wayne, Ind.

HAM Guest Register Books \$2.00 in U. S. A.; \$2.25 in Canada postpaid. Gratton George, WAPLU, Clewiston, Fla.

VACATIONS! Ham with my equipment. American plan. Modern cabins. Nice for children. Lighthouse Lodge, Big McKenzie Lake, Spooner, Wis. A. Martorano, W9HZC.

WRITE for list of bargains to Box 575, Church St. Station, New York City.

QSL'S SWLS? State-map? Rainbow? Photographic? Cartoon? Samples 25¢ (refunded). "Rus" Sackers, W8DED, P.O. Box 218, Holland, Mich.

QSL'S-SWLS. Meade W0KXL, 1507 Central Avenue, Kansas City, Kans.

QSL'S—Colorful new designs. Samples free. Rogers, K0AAB, 737 Lincoln Ave., Saint Paul 5, Minn.

QSL-SWLS. 100, \$2.85 up. Samples 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSL'S-SWLS. 1¢ each. R-U-S Printing, Box 7507, No. Kansas City 16, Mo.

QSL'S: Mobiles, Novices, VLS, DX, VL-OM, Gil Cartoons. Samples dime. Robinson, W9AYH, 12811 Sacramento, Blue Island, Ill.

QSL'S-SWLS. Samples dime. Backus, 5318 Walker Ave., Richmond, Va.

QSL'S. Samples, dime. Printer, Corwith, Iowa.

QSL'S: Cartoons, Colors, others. Reasonable. Samples 15¢. Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Illinois.

QSL'S Samples Free. W3EHA, Jones, 840 Terrace North, Hagerstown, Md.

QSL'S beautiful brand new designs in 3 and 4 colors on glossy stock, special low price \$3.00 per 100 or \$5.00 for 200. 48 hour service. Satisfaction guaranteed or your money refunded. Constantine Press, Bladensburg, Md.

QSL'S. Nice designs. Samples. Beseparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

QSL Samples, Dime, refundable. Roy Gale, W1BD, Box 154, Watford, Conn.

DELUXE QSL'S — Petty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

QSL'S-SWLS. Samples free. Bartnoski, W2CVE Press, Williams-town, N. J.

QSL'S of distinction! Three colors and up, 10¢ brings you samples of distinction. Uncle Fred, Box 80, Lynn, Penna.

QSL'S Brownie, W3CJL, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSL'S-SWLS. Samples 10¢. Maigo Press, 1937 Glendale Ave., Toledo 14, Ohio.

WOODY'S QSL'S. Box 164, Asher Sta., Little Rock, Ark.

QSL'S. Western states only. Fast delivery. Samples 10¢. Dauphinee, K6JCN, Box 60009, Mar Vista 60, Calif.

QSL'S. Taprint, Union, Miss.

QSL'S. Postcard brings samples. Fred Leyden, W1NZI, 454 Proctor Ave., Revere 51, Mass.

QSL'S, SWLS. High quality. Reasonable prices. Samples. Bob Teachout, W1FSV, 204 Adams St., Rutland, Vt.

QSL'S Multicolor, all kinds, all prices. Samples dime. Fast service. DX Cards, Kulik St., Clifton, N. J.

QSL'S: Comic, rural, Doctors! Samples 10¢. C. Fritz, 1213 Briar-gate, Joliet, Ill.

QSL'S. Printed Book Matches and memo pads. Free samples. Freimsuth, W2SUN, Bayville, N. J.

QSL'S sharp, 200 one color, three bucks. Multi-color samples dime refunded. Edward Green & Sons, 4422 Marquette Drive, Ft. Wayne, Ind.

QSL'S samples 10¢. Bob Morris, W2IHM, 230 Rose St., Metuchen, N. J.

QSL'S-SWLS, rubber stamps letterheads, bargain prices. Craigprint, Newark, Arkansas.

QSL'S, SWLS, 2-colors, 100 for \$2.00. Bob Garra, W3UQL, Lehigh-ton, Penna.

SILSVNS: Bendix, 115V 60 cy., \$7.95 pair. Wt. 12 lbs. Add postage. Every pair guaranteed. No CODS! Rogers Radio Co., 1745 Arapahoe St., Denver 2, Colo.

FOR Sale: Collins KW-1, perfect condx, like new; 110 ft. special heavy duty Aeromotor tower. All offers considered. K2HLB.

SWAP or sell: M5 generating unit. One and three phase, 125 volts 60 cycles, 3KVA gasoline operated, complete with panel board, skid-mounted. Hardly used. Asking \$500. F.o.b. White Plains, N. Y. or accept countervalue in receivers or xmitters of standard brand. Write W2BFB, P. O. Box 244, Grand Central Annex, N. Y. C. 17.

WYOMING DX QSOs: W7HYW, W7P50, W7UFB monitoring 14050, 21050 daily 1400 and 1915 GMT.

AMATEUR Paradise Vacation Spot! Livingstone Lodge and Log Cabins, Mascoma Lake, Enfield, N. H., swim, fish, boats, sports—100 acres, 11 buildings, churches, recreation building, main dining lodge, 75 and 40 meter rig in lobby, family groups, 27th year, low rates, booklet. At Livingstone, W2QPN, 12-01 Ellis Ave., Fair Lawn, N. J.

MEDICAL Ham's Swap Burdick EK-2 for Globe King, 500-A, C. R. Paulkner, M.D., K4AXE, 106 No. Main, Somerset, Ky.

FOR Sale: BC-221 frequency meter. Built-in 400 cycle modulation. Complete with calibration book; \$65.00. Lewis G. McCoy, 38 LaSalle Rd., West Hartford, Conn.

WANTED: AWT-13 transmitters, ARC-3 equipment, test sets, BC-788 transceivers. Other military and aeronautical surplus. Advice price condition. We pay freight and C.o.d. James S. Spivey, Inc., 3908 Hamden Lane, Bethesda, Md.

OUTSTANDING ham list revised monthly. Our prices are realistic and attractive. Standout values in used Barker & Williamson, Collins, Central Electronics, Elmac, Gonset, Hallcrafters, Hammarlund, Harvey-Wells, Johnson, Morrow, and National units. We deal easy and offer time payments tailored for you. All leading brands of new equipment always in stock. Write immediately for this month's Bulletin and our new exclusively amateur catalog just out. Stan Burghardt, W0BJV, Burghardt Radio Supply, Inc., Box 746, Watertown, S. Dak.

WANTED: Two-way FM equipment. Ronald Phillips, Communications, 1312 McGee, Kansas City, Mo.

VIKING I, TV1-supposed transmitter and Vizing VFO in excellent condx for sale: \$180. John M. Pincomb, W2SIM, 2 Great Oaks Road, Roslyn Heights, N. Y. New York City hams please call 30-0574.

GONSET Converter, with whip. Best offer over \$40 takes it. James Haremore, 4105 Shrewsbury, Shrewsbury 19, Mo. Tel. St. 1-8785.

WANTED: Premier xtal-controlled oscillator Mod. 117. Must be clean, with all xtal and manuals. A. H. Glines, 46 Winter St., Quincy 69, Mass. Tel. MAYflower 9-5152.

CANADIANS: have two new Heathkit DX35 65-watt fone-c.w. xmitters. Will sell one fully assembled and tested, beautiful job. \$60. Walker, VESBN, Shellbrook, Sask., Can.

VIKING II, like new, VFO, LP filter, Matchbox, SWR bridge, SX-42, sprk, recently aligned, beautiful condx. The whole works: \$400 F.o.b. Sacramento, Calif. John Brownston, W6LPN, 1116 Volz Dr.

ANTENNAS and materials. 2 meter 6 element, \$6.95; 6 meter 5-element, \$14.95. "Do it yourself" castings, stampings, tubings, etc. to make your own. Wholesale Supply Co., Lunenburg, Mass.

COLLINS 3ZV7 "like new" transmitter, \$475; Elenco 400-watt PA400SSB amplifier, \$150; factory-wired 20A with QT-1, \$175. Want: Leica M-3. Oser, WIRMS, 193 Euclid Ave., Waterbury 10, Conn.

SELL: "Bandbox" transmitter (1954 Handbook, pp 188-199), \$65; 40 watt modulator, \$18; BC948 receiver, converted 6V, \$16; BC455B, \$0; QST's, 1942-1952, fifteen cents each, Rube Chernikoff, W3HVM, 3704 Southern Ave., S.E., Wash., D. C.

FOR Sale: Elmac A-54-H transmitter, 110V AC supply and 6v. dynamotor. Elmac PMR6A receiver and power supply. Jackson signal generator model 640. W8HPB, Box 205, Canal Winchester, O. WRL 15-meter 3-element beam, brand new: \$16.00. Fred Norton, 1450 Winchester, Muskegon, Mich.

12C-183D, \$269; HQ129X, \$159; Hickok 600A, \$110; Jackson CRO-2, \$149; TVG-2, \$129. All in like new condx. Electronic Labs Station A-21, Lincoln, Nebr.

BIG Bottles: RCA 833A's, used 20 hours, \$37.50 pair; new tubes 813's, \$0.50, 807W/5933, \$2.50; 6BA6's, \$5; 5R4's, \$0.90; 5U4's, \$0.25; 12AT7's, \$2.25; 12AX7's, \$1.25; 12AU7's, \$1.25; 312's, \$1; 6AK5's, \$2.25; 6AL5's, \$1.75; 6CS's, \$1.50; 6SA7's, \$1.10; write for other types. SCR-522 transmitter-receiver, \$35; S-20R receiver, \$35; new Bendix TA-12D transmitter, \$25; new K.W. modulation transformer, \$35; T-14D/TRC-1, FM transmitter \$75; new T-17 carbon mike, \$3.75; new Rion xtal mikes, \$5; Brooks, C-3 HiFi pre-amp, and amplifier, cost \$450. Trade or sell. Neer transmitter or receiver, W4FIV, Box 178, Ellenton, Fla.

SELLING Station: Write for list of receivers, transmitters, power supplies, parts, 10 K.W. power plant. K. Enemark, WINLL, West Acton, Mass.

SAVE, with safety! Come see the World's Greatest Array of good, slightly used Ham equipment! Tremendous assortment, every piece bargain-price tagged. Money-back guarantee. Easy terms. Bring along your old equipment, for our liberal trade-in allowance. Harrison "Since 1925", 225 Greenwich St., New York City. (Big Jamaica Store - Hillside Avenue at 148th St.)

NATIONAL 240-D receiver with Central Electronics SSB alicia, \$80; Stromberg-Carlson (Model 37) 10 watt record amplifier, \$15; Webster automatic record changer 78 and 33 1/2 speeds, \$10; 20 meter 50 watt radio telegraph transmitter with VFO and power supply, \$50. Write Louis M. Gregory, W5FLZ, 3025 Old Mooringsport Rd., Shreveport, La.

SELLING Out! Going sideband. Viking II, push-to-talk D104 mike, VFO, SX-71, TR-4 rotator, 15-mtr. 3-el. beam. Excellent condx, \$695 vna. Take \$495. Terms. Deliver within 250 miles. W5TGT, 915 Classen, San Angelo, Texas.

COMPLETE Station: Rebuilding for higher power. Come work station building. Keger with low pass filter change over relay. NC-98 receiver with speaker. All instruction books. Best offer over \$310. K2HKM, Vic Damora, 56-21 200th St., Bayside 64, N. Y. Phone Bayside 4-2281.

WANTED: Used laboratory type parts and equipment. Write to Clarence Bigelow, 105 North Main St., Bluffton, Ohio.

MOBILE Transmitters, receivers for sale. Good trade-in commercial Two-Way equipment easily converted to ham band. Also Vibrapacks, \$5.00 each. Leece-Neville alternators, etc. Commercial Electronic Service Corp., 4850 Lancaster Ave., Phila., Pa.

HAMMARLUND HQ-120X, looks like new. F.B. condx, with spkr; \$110. John Tate, 205 Simpson Rd., Ardmore, Pa.

VACATIONS! Ham with my equipment, American plan, modern cabins, nice for children. Lighthouse Lodge, Big McKenzie Lake, Spooner, Wis. A. Martorano, W9HZC.

SELL or Trade: Radio magazines. Bob Farmer, Plainview, Texas.

SONAR VFX-680, \$15; Meissner EX Sig Shifter, \$30; BC-348-R \$50; LW-50 xmitter & P.S. with converter LW-61, \$65; 2 Leece-Neville 6-volt 100 amp alternators complete, \$45 each or both for \$75; all equipment in first class condx. C. G. Smith, W8FDE, 183 McLaughlin Ave., Muskegon, Mich.

SELLING Out all ham gear and parts. SX-28 revr, \$60; 522 xmitter & pwr supply, \$28; new factory-built Telectra 2-mtr converter, \$30; HF 4-125A final, \$45. Send card for list of parts for sale or trade for hi-g gear. Frank R. Leins, W4UCF, 2500 Marilyn St., El Dorado, Ark.

WANTED: Receiver R5/ARN-7, MN-62A transceivers, RT18/ARC-1, AN/ARC-3, BC-788C, 1-152C, Collins, Bendix equipment, test sets, dynamotors, inverters. We pay highest prices. Advise quantity, condition, price in first letter. Aircraft Radio Industries, Inc., 15 East 40th St., New York City. Tel. LEXington 2-6254.

SALE: Complete mobile rig Motorola FM-T30 transmitter 10 or 15 meters. Motorola receiver, Gonset 5-band converter; mike, dynamotor, all cables, Master Mobile ant. and 75-mtr. coil. R. T. Bell W4TZE, 76 Georgia Ave., Oak Ridge, Tenn.

TUBES: RK65, new in original cartons JAN, \$5.00 each. F.o.b. Washington, D. C. Ades, 1924 Tulip St., N.W. Wash. 12, D. C.

RARE Bargains: Used, but in perf. condx: Babcock MT-5A, \$50; Gonset Super 6 converter, \$20; Heathkit V.F.O. \$12; Hallcrafters S-3A, only 1 yr. old, \$65; 6V dynamotor, filter, relay 425V, \$75 ap. \$25; Mallory Vibrapak VF55A \$12. Cash with order. Will ship express or parcel post prepaid. N. F. Fogg, W1CFY, Box 895, Rockland, Me.

SELL: Mohawk Midgetape pocket recorder, like new. Best offer takes it. W9PQY, Lloyd Lindell, 1829 E. 7th St., Superior, Wis.

CANADIANS: Complete 300 watt station NC44 with speaker and various pieces of equipment for sale. Wish to sell as unit. Station of late VE2SL. Address all inquiries to Dr. Fraser Farlinger, VE3BUH, New Liskeair, Ont. P., Can.

FREE List! Of reconditioned equipment and Bargains. Write to "Terry", W9DIA, Harris Radio Corp., Fond du Lac, Wis.

SALE: Viking Adventurer, \$40; S-38C, \$32; 25-watt modulation xfrmr with pair 0L6's, \$5; 500-volt 200 Ma. sply, \$10. Want: DX-100, Viking II, Hardy, K4HAV, Tenth St., Titon, Ga.

SELL: New 4D32 tube, \$14; postpaid; Millen 2, 6, 10-meter xmitter, all coil & tubes, \$75; Millen 90281 power supply, \$45; new Telectra CC5-50 and CC5-144 converters, \$28 each; 40-watt modulator with power supply, \$25. Wanted: Communicators, (2 & 6 meters, 6 v.). Roy Sawdye, 5255 Harper, Solon, Ohio.

SELL: Factory-wired Globe Scout 65A with Heathkit VFO, \$85; also Harvey-Wells TBS-50C, \$50. Len Morgan, K5BGG, 327 South Tenth, Baton Rouge 2, La.

BARGAINS Galore! Cleaning shack. 100THs, \$3.00 each; 250THs, \$5 each; tubes unused. Meissner Signal Shifter, \$30; hundreds of other bargains. Send for list. W9JEQ, 124 No. E. St., Monmouth, Ill.

HALLCRAFTERS SX-71 with R-46 speaker; brand new condition; practically unused; \$275 value. Will sell for \$200. E. B. Garrett, W4ACA, Mooringside Drive, Brevard N. C.

WANTED: The following OSTS in good condition: March, April, August, December 1923; February, 1924; June, July, August, 1925; anything 1922 and before. Also want following tubes in good condition: UV-200, UV-201, UV-201-A, UV-202, UV-216, WE-216-A and VT-2. In reply, please give prices and condition. R. Thorn, Bellis Parkway, Oradell, N. J.

PITTSBURGH, for sale: Collins 75A2, \$250, John Leeson, 195 Dell Ave., Pittsburgh 16, Penna. Phone LO 3-3677.

AVIATOR's wrist-watch, Hamilton, 22-jewel, 24-hour dial, sweep-second hand, perfect running order; \$20. Trade BC-946 for a BC-453. WAYN'S, Box 5322, Sta. B, New Orleans 15, La.

FOR Sale: Eldico MT 2 mtr. trans., \$25; Heath WPA-1 preamplifier, \$9; Meissner VFO, \$20; 100W booster amplifier E100, \$40; Browning Preselector, \$12; Meissner 150B, \$150; Viking Ranger, factory-wired, \$200; tubes \$61, \$5.00; \$60; \$1.75; \$3.50; TBM, 150A, \$6; several size of mod. transformers, ART-13 \$5.00, etc. 522 revr, \$15; couple 3200V plate transf. BC-610 tuning units, \$1.50; Meissner sig. booster, \$25; Elmac A54H, \$100; coil from BC375, \$2.00; National 7" TV, \$15; ARC-5 2mtr. trans., \$12. other items. W2OT1, Box 4, Pomona, N. J.

FOR Sale: 2m. Gonset Communicator, 6 vdc, \$150; Viking Adventurer, \$39; Heathkit ant. coupler, \$5; 522 2m xmitter, less pwr supp, \$8. D. Wilson, K6LRN, 1259 15th Ave., San Francisco 22, Calif.

ART-13 with complete AC power supply, excellent, \$300 or best offer. Viking II and Viking VFO with factory new black grid keying, \$50. Subraco 10M mobile xmitter and dynamotor, complete, \$50. W8YMG.

SELL: SX-71, matching speaker, \$150; factory-wired Viking II, VFO, low-pass filter, \$19.95; \$150 adjustable ground plane 20-40 Mc, \$15. Will not ship. K2CQG, Roy Norby, 75 Ganung Dr., Ossining, N. Y.

DUAL Quad beam antenna 10/15 meters, \$49.50; Fiberglass and aluminum construction. Send stamp for specifications. Magagna, W8KWW, 2010 Miller Road, Flint 3, Mich.

FOR Sale: OST's and CQs, 1949-1954 inclusive. Like new condition. No issues missing, complete run. A. Martinka, 3723 Magnolia Ave., Chicago 13, Ill.

MARINE Crystals, transmitting \$2.95; Receiving \$2.50. Aircraft 3023.5 Kc, \$2.95. Specify holder pin requirements. New manufacture. Airmailed. C-W Crystals, Box 2065, El Monte, Calif.

REAL Bargains in new and used gear. AM, SSB, CW, RTTY. High trades. Bonus for cash. Easy budget terms. Lowest finance rates anywhere. Get the whole story from the Yellow Flyer. Free. Write: Marshall Electronics, 855 Burlington, Frankfurt, Ind.

CENTRAL-Electronics "A"-Slicer \$49.95, 10-B \$139.95; Collins 32V1 \$395.00, 32V2 \$450.00, 32V3 \$550.00, 75A2A \$395.00, 75A4 w/2 mech-filters \$545.00; Elenco S-75 \$175.00, PA400 \$199.95 (new); out-post 1000 \$19.95, Triband \$27.95, Super \$34.95, Super-celver \$79.95, Communicator Deluxe \$179.95; Hallcrafters SX-62 \$250.00, S-76 \$139.95, SX-88 \$429.95, SX-96 \$199.95, HT-9 \$89.95; Harvey-Wells TBS-50A \$49.95, TBS-50C \$59.95, TBS-50D \$79.95, VFO \$29.95, T-90 \$149.95, APS-90 \$59.95; Johnson Viking I \$169.95, W/TVI Kit \$199.95, II \$249.95, VFO \$49.95; Lakeshore PM-1r W&T (new) \$69.95, kit \$54.95, PM-De Luxe (new) \$149.95; National NC-183 \$179.95, 183D \$275.00, HRO-50 \$399.95; other used items available. Write for latest list. Evans Radio, Concord, N. H.

SWAP Super D Graflex 4 x 5 camera, auto diaphragm, #8 Optar, Graflex 7" Reflector, 1 film pack adapter, 3 holders; lenshood, 3 filters, all in like new condx. Want: clean transmitter, Viking I, II or Ranger type. W4AKR, Box 179, Wilkesboro, No. Carolina.

BUY Heathkit, Johnson Viking, Telectra and other equipment wired and tested. New Heath DX-35 wired and tested, immediate delivery, \$81.95; Novices, Technicians write us your needs, get our package deals. Custom 6 meter 100 watt transmitters available. New Le-EO 6 meter VFO now available. Free list new and reconditioned equipment. J. Lynch, Electronic Co., P.O. Box 54, Glen Oaks Br., Floral Park, N. Y.

FOR Sale: Johnson Viking KW, \$1250. Write W9DIA, "Terry", 168 W. 7th St., Fond du Lac, Wis.

PERFORATED aluminum sheet .051, 5/64", OD holes, 1/2" centers, 11.20 sq. ft. cut to size. Send for listing on beams, aluminum tubing, etc. R. Cliffs, 1720 No. Countyline, Fosteria, Ohio.

WANTED: Premier xtal controlled oscillator, Mod. 117. Must be clean with all xtal and manual. A. H. Glines, 46 Winter St., Quincy 69, Mass. Tel. MAYflower 9-5152.

SELL: Hallcrafters S-40-B, in excellent condx, \$60; Heath AT-1, \$20. Robert Lay, W8BXC, 3100 Indianwood Rd., Lake Orion, Mich.

BC 342-N receiver (with 115 VAC power supply), realigned, in tiptop condx thruout; \$75; \$32 new surplus, \$4.00; two 0-1 Ma. 2" round dials, new \$1.75. W. J. Frazer, spotlights, etc. 15 mm. telephoto lens for comparable BC-221 freq. meter. Simpson, 76 Longfellow Dr. Longmeadow, Mass.

BARGAIN Sale: All units guaranteed: Collins 75A3 \$395.00, 75A2 \$325.00; B&W 5100 Like New \$395.00; Eldico SSB-100 Like New \$395.00; SSB-100 Used \$395.00; Central Electronics 10A \$99.50, 20A and VFO \$199.50; A-1 Super \$49.50; Elenco PA-400 \$185.00; Hallicrafters HT-18 \$75.00, SX-96 \$225.00, SX-76 \$137.50; S-53 \$75.00; National NC-98 \$120.00, NC-125 \$130.00, NC-183D \$235.00, HFO-50 complete with Coils and Speaker \$200.00; RME84 \$85.00, VHF 2-11 RME \$60.00; and many others. Easy terms, write for details; Radio Equipment Company, Inc., 819-823 West 21st Street, Norfolk 10, Virginia.

PHOTO-HAMS: Swap: Kelleicord V, Kelleikin 35, 2 lite strobe, 5 x 7, complete accessories and darkroom. Want: IEX-100, 20-A, etc. Also: SW-54, \$25; AT-1, \$20, AC-1, \$7; S-40, \$60; ATD 100 w fone rig with 3 pwr supp., TVI suppressed, \$90. W9TGH, 320 Greenwood, Greencastle, Ind.

GONSET G66 mobile receiver and Gonset power supply, 115 AC, 6-12 DC, used month: \$170. W1BGW.

MUST SELL: Collins 75A4, latest run used but few hours; 32V3, like new, Eldico SSB 100A, brand new; Panadapter and many other items. Savings at least 20% or more. Send for list. Louis Fischman, 505 Fifth Ave. NYC, N. Y.

LATE Model DB22A, like new, HT-9 in gud condx, with all coils, EX Shf. model Meissner; HQ-129X and matching speaker, Super Pro with LSS spkr; NC2YOD and match spkr; Hammarlund Comet Pro and coils; miscellaneous Comand and other equipment. Will send list. W8MF, 123 Winter St., Battle Creek, Mich.

HIGH Power rotary inductors. Rugged commercial type. Use in pi-network of all-band final. No arcing under load. \$19.00. F.o.b. Clifton, N. J. Send for photo, further details. Paulson Electronics, 138-E 6th St., Clifton, N. J.

WHAT am I offered for an NC-88 in perf. condx? Will consider swaps. W1GFG, c/o ARRL.

WANTED: Collins 75A1; Central California replies only. W6RLP, 32 Willow Road, Menlo Park, Calif.

CLOSE-out on new ICA deluxe cabinet racks; Model 3866, 61 in. panel space. Regular net \$53.95 for only \$35.95. Check or money order. "Electronics", 805 S. Staples, Corpus Christi, Texas.

FOR Sale: Collins 75A1, in top working condx. Orr conversions, \$235. Also, Hy-Lite beam, Plumbers Delight, with "T" match close spaced, brand new, in original unopened carton. Cost: \$24.95. Would like \$20. Make offer. W2FDH, A. Clark, 44 Lewis Lane, Syosset, L. I., N. Y.

FOR Sale: Hammarlund HQ-140-X, w/matching spkr, and in orig. carton, \$200. F.o.b. Hamilton, Mass. Albert Lebel, Box 604.

"S" Meters for Communicators. No cutting, soldering, or disassembling. Also new and used Gonset Communicators, Linear Amplifiers, VFO's, C-60's, transmitters, etc. Graham Co. R. Graham, W1KTY, Stoneham, Mass. Tel. ST. 6-1966.

SWAP: Complete 10-mtr. mobile installation for receiver having RF, s-mtr, 50 Mcs to 30 Mc with bandspread. W6RET, 861 Elm St., Chula Vista, Calif.

SELL: Collins 800-cycle mechanical filter for 75A4, \$25, or swap with \$10 for forthcoming 2.1 Kc filter. W2MZF.

TREMENDOUS bargains: New and reconditioned Collins, Hallicrafters, National Johnson, Elmac, all others. Completely reconditioned with new guarantee: Hallicrafters S38 \$29.00; S40A \$69.00; S40B \$79.00; S85 \$89.00; S70 \$119.00; SX71 \$149.00; SX42 \$149.00; SX96; SX100; National SW54 \$29.00; NC88 \$79.00; NC98 \$109.00; NC125 \$129.00; NC183 \$189.00; Super Pro \$99.00; HQ129X; Collins 75A1; 75A2; 75A3; 75A4; 32V3; Viking Ranger; Viking 11; AF-67; mobile receivers, transmitters, converters, many other items. Easy terms. Shipped on approval. Write for list. Henry Radio, Butler, Missouri.

20-A, factory-wired, \$149.50; BC348, 115 VAC, \$49.50; Millen Grid Dipper, \$29.50; Jackson 640 sig. generator, \$19.50; BC 223AX Multiband VFO xtal transmitter, \$19.50; ARC-5 2-meter transmitter, \$15; ARC-5 marine band, \$9.50; Par-Metal deluxe 6 ft. rack and dolly uncrated, \$19.50; Supreme 563 audio oscillator, \$19.50. All work okay. Jonathan Eddy, W3JMJ, Tughman, Md.

FOR Sale: WRL 500A xmitter, VFO and ant. tuner. Also 75A4 rcvr and 5-band ant. Used 2 months. Will sacrifice for \$1125.00. Joe Sheck, W8W1K, 99 Franklin Blvd., Pontiac, Mich. Tel. FE 8-2748.

COLLINS KWS-1 with 4X250E tubes. Wouldn't sell if I had antenna space, consider \$1,795. Will not ship. Bring your car. H. M. Riddle, #106 Sherbrooke, Toledo 6, Ohio.

PASS Amateur theory exams. Check yourself with sample FCC-type questions & Novice & General Class examinations. All for only 50¢. Ameco Electronics, 1203 Bryant Ave., New York 39, N. Y.

CONVERTER: Gonset Super Six, \$35; Model B noise clipper, \$5; Heathkit KF signal generator, \$15. William Pfaff, R5, Huntington, N. Y.

MUST Sell! Going into Army! 813 final. Ideal foundation for builder of SSB or AM Kw, or can be used as it is. Coils 10-80. Offer or more info. W9GHI, 520 Stanley, Stevens Point, Wis.

100 Kc Hammarlund freq. standard, Biley xtal, \$6.50, xfrmr, 100 Kc Hammarlund freq. standard; Biley xtal, \$65.50; xfrmr, 1465-0-1465, 500 Mc., CS, \$20; 2ufd @ 4KV (2) \$4.75 ea.; 10 ft. aluminum tower, square section, ready for prop pitch, \$15; Thordarson mod. xfrmr 200 watts, \$8; Bi-Net, new, \$7; Weston 697 multimeter with case, \$10. List F.o.b., Jaray, 36 Flower Lane, Roslyn Heights, N. Y. Tel.: RO 3-5167.

WANTED Immediately: S-32 Skyridr rcvr gear train. An SX-28 gear train will work. Ship C.o.d. Ernest Singer, 1401 K St., S.E., Cedar Rapids, Iowa.

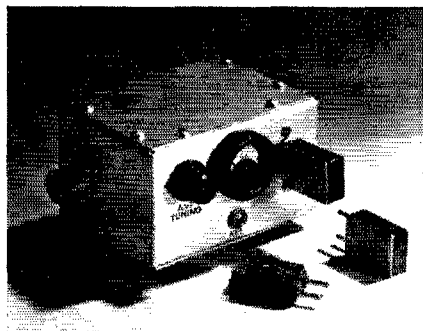
FOR Sale: Hardly used 20A SSB exciter. Make an offer. W2ZWA, 231 Snowden Lane, Princeton, N. J.

FOR Sale: RME-45 receiver, \$75; RME-DB22A preselector, \$40, in gud condx. Want Raytheon pulse inversion xfrms No. UX-9013. W4MDQ.

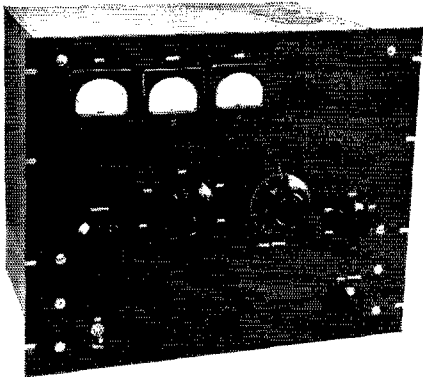
SELL: Johnson Viking Adventurer, 50 watts. In perf. condx. Used 4 months: \$50. Frank Walker, Wheeler, Texas.

FOR Sale: Gonset Communicator II, 6 volt plus Telrex 3-el. 2-meter quick beam plus 8035 Kc. xtal plus carbon mike. All for \$160 W1DBS, John Savonis, 11 Dwight Ct., New Britain, Conn.

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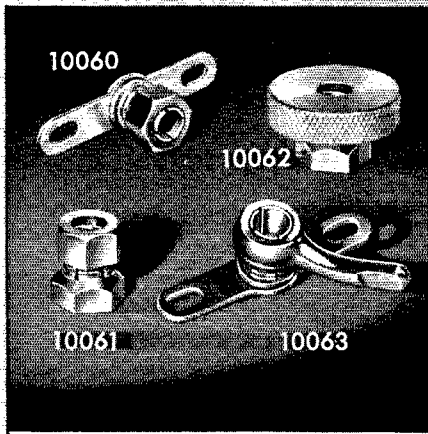
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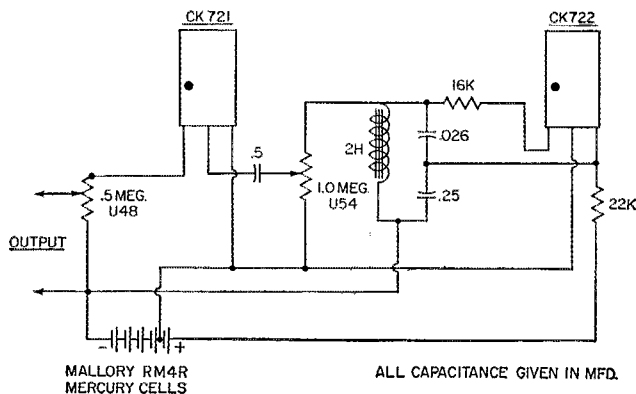
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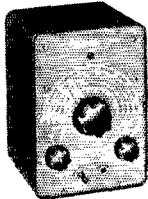


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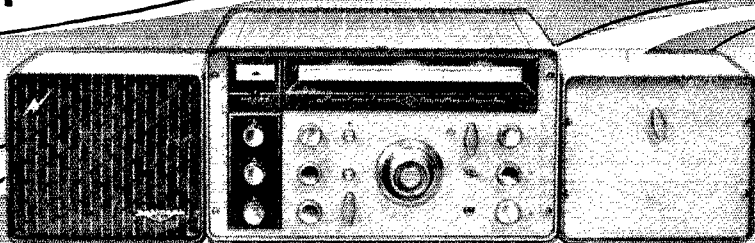
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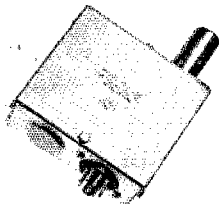
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CRYSTAL CONVERTERS. When fitted into converter cabinet (above), these converters need not be unplugged or shut off to change bands. Can be used with 3 separate antennas, thus eliminating the need for changing antennas when switching bands. Tube complement: 6BZ7, 6AK5, 6AK5, 6U8. Output frequency: 30-35 mc. Input impedance: 50-70 ohms. Output impedance: 50 ohms. Power required: 6.3 volts at 1.2 amps, 150 volts at 25 ma derived from NC-300 receiver. Shipping weight: 2 lbs.

NC-300 C1 Coverage: 220-225 mc.
Noise figure: 5-7 db.

NC-300 C2 Coverage: 143.5-148.5 mc.
Noise figure: 4-5 db.

NC-300 C6 Coverage: 49.5-54.5 mc.
Noise figure: 3-4 db.

Leading Amateur Designs

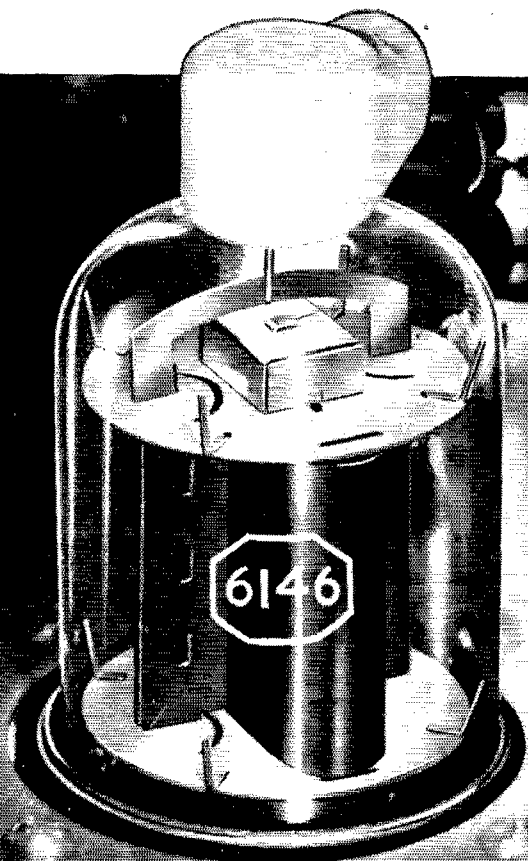
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