

QST

July 1955

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55c in Canada

devoted entirely to

amateur radio



THE STANDARD OF COMPARISON FOR OVER 20 YEARS

HIGH FIDELITY TRANSFORMERS

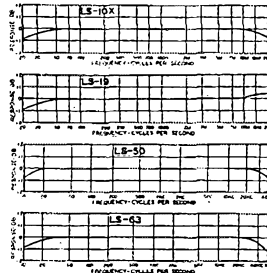
FROM STOCK... ITEMS BELOW AND 650 OTHERS IN OUR CATALOGUE B.



TYPICAL UNITS

LINEAR STANDARD series

Linear Standard units represent the acme from the standpoint of uniform frequency response, low wave form distortion, thorough shielding and dependability. LS units have a guaranteed response within 1db. from 20 to 20,000 cycles. Hum balanced coil structures and multiple alloy shielding, where required, provide extremely low inductive pickup. These are the finest high fidelity transformers in the world. 85 stock types from milliwatts to kilowatts.

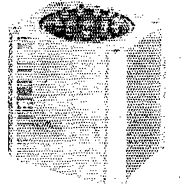


LS-10X Shielded Input
Multiple line (50, 200, 250, 500/600, etc.) to 50,000 ohms... multiple shielded.

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

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

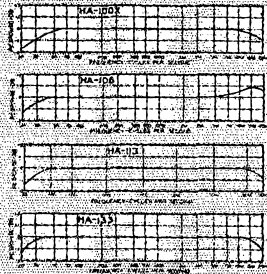
LS-63 P.P. Plates to Voice Coil
Primary 10,000 C.T. and 6,000 C.T. suited to Williamson, M.F. ul-linear circuits.
Secondary 1.2, 2.5, 5, 7.5, 10, 15, 20, 30 ohms. 20 watts.



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

HIPERMALLOY series

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

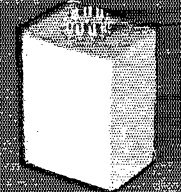


HA-100X Shielded Input
Multiple line to 60,000 ohm grid... tri-alloy shielding for low hum pickup.

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

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

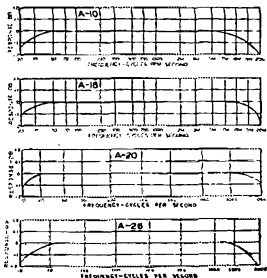
HA-133 Plate (DC) to Line
15,000 ohms to multiple line... +15 db. level... 8 Ma. DC in primary.



CASE HA-100X HA-106 HA-113 HA-133
Length 3 1/2" 3 1/2" 3 1/2" 3 1/2"
Width 3 1/2" 3 1/2" 3 1/2" 3 1/2"
Height 3 1/2" 3 1/2" 3 1/2" 3 1/2"
Unit Weight 3 lbs. 3 lbs. 3 lbs. 3 lbs.

ULTRA COMPACT series

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

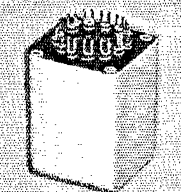


A-10 Line to Grid
Multiple line to 50,000 ohm grid.

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

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

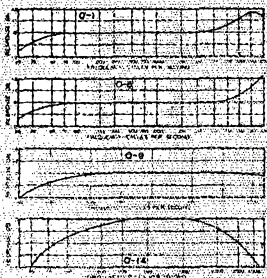
A-26 P.P. Plates to Line
30,000 ohms plate to plate, to multiple line.



A CASE
Length 1 1/2"
Width 1 1/2"
Height 1 1/2"
Unit Weight 1/2 lb.

QUINCEY series

UTC Quincey units are ideal for portable, concealed service, and similar applications. These units are extremely compact, fully impregnated and sealed in a drawn housing. Most items provide frequency response within 1 db. from 30 to 20,000 cycles. Maximum operating level 0 db. These units are also available in our stock P series which provide plug-in base. The U-16 is a new line to grid transformer using two heavy gauge hipermalloy shields for high hum shielding.

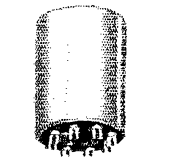


Q-1 Line to Grid
Primary 50, 200/250, 500/600 ohms to 50,000 ohm grid.

Q-6 Plate to Two Grids
15,000 ohms to 95,000 ohms C.T.

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

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

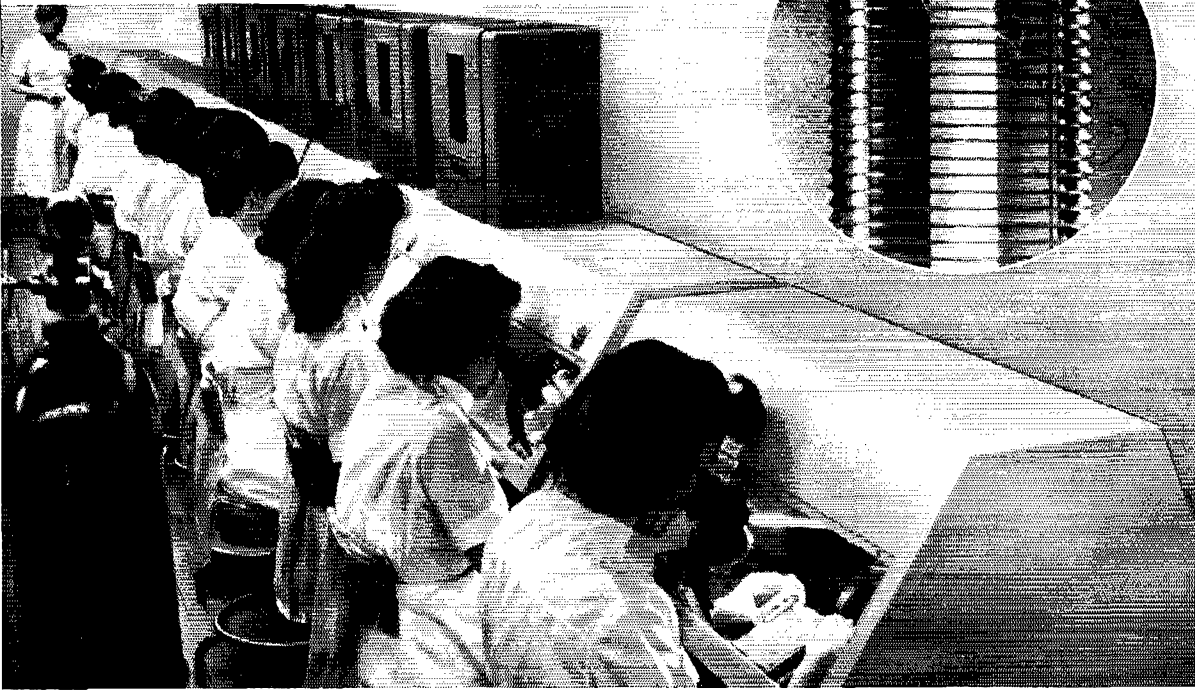


QUINCEY CASE
Diameter 7/8"
Height 1-3/16"
Unit Weight 1 oz.

UNITED TRANSFORMER CO

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

• Right: the "why" of G-E "Operation Snow White". Unretouched micro-photograph of tube grid, shows a strand of lint which can easily cause an inter-electrode short-circuit. Dust particles have similar effect.



• Glass-paneled hoods for General Electric 5-Star Tube assembly and microscope inspection, assure working conditions of optimum cleanliness. Employees wear rubber finger cots,

to avoid contaminating tube parts with dirt or moisture. The entire "Snow White" area is air-conditioned and pressurized, and all garments are made of lint-free Nylon and Dacron.

G-E "Operation Snow White" further increases 5-Star Tube high reliability!

Inoperatives among 5-Star Tubes have been cut two-thirds by measures G.E. has taken to provide lint-free, dust-free assembly and inspection. 100% 5-Star factory tests prove this gain in *built-in* tube dependability.

Most tube inoperatives are the result of intermittent "shorts" from lint and dust. G-E "Operation Snow White", by means of pressurized, filtered, and de-humidified air, plus numerous other steps to accent working cleanliness, cuts down on short-circuits at the source. Result: 5-Star Tubes are the most trust-

worthy types that you can install!

Use them in civil-defense work, where dependable communications are a "must"! Specially designed, built, and tested, they're your foremost protection against rig and receiver failures.

Your G-E tube distributor stocks 5-Star high-reliability tubes. See him for full information! *Tube Department, General Electric Co., Schenectady 5, N. Y.*

Progress Is Our Most Important Product

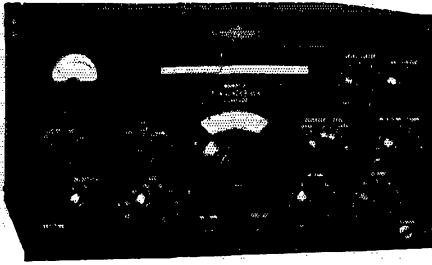
GENERAL  ELECTRIC

166-184

SSB

**ease of operation
exclusive with**

Collins 75A-4



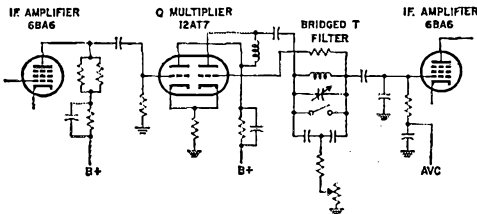
Advanced design features of Collins new 75A-4 receiver provide the greatest ease in SSB, AM, or CW operation ever offered to the amateur. Proven circuitry of the earlier 75A receivers such as crystal controlled first injection oscillator, hermetically sealed VFO and mechanically filtered IF selectivity are retained.

PASSBAND TUNING

The receiver BFO is mechanically ganged and tracked with the main tuning dial. Once a SSSC signal is tuned in, it can be moved around in the passband to tune out interfering signals, and it also allows selection of either sideband for SSB operation. In CW reception the desired signal can be moved around in the passband without changing the received beat note, and at the same time, interfering signals can be pushed off the edge of the steep sided mechanically filtered passband.

REJECTION TUNING

A combination "Q" multiplier and bridged-T rejection notch filter, are used. The filter has a deep, narrow notch and is effective anywhere in the passband. Conventional crystal filters become inoperative at frequencies several hundred cycles on either side of the resonant frequency. The "T" filter does not distort the IF passband seriously as does the crystal filter. Heterodynes are effectively eliminated with little loss of intelligibility.



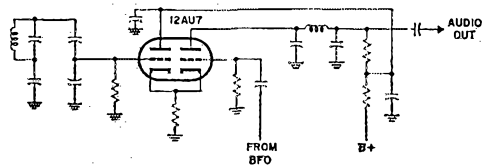
Rejection Tuning Circuits

AVC

A fast attack, slow release AVC system is employed in the 75A-4. It will respond to the first few cycles of a sideband transmission and does not require the presence of a carrier for operation. Fast and slow release times are selectable by means of a panel mounted control. The fast is used normally for AM reception. The slow is used during sideband and CW reception and prevents the receiver from opening up during words and characters.

SEPARATE AM AND SSB DETECTORS

Separate detectors are used for double or single sideband signals. The single sideband detector is a mixer type, which generates much less distortion than a conventional diode detector on a SSSC signal. A diode detector is used for conventional double sideband signals.



AM and SSB Detector Circuits

See your nearest
Collins distributor



QST

JULY 1955

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The enemy attack will allow *no time* for the development of advanced communications systems . . . *no time* to further perfect electronic equipment for defense or swift retaliation . . . *no time* to produce more of the vital and dependable equipment made by Hallicrafters during World War II and Korea. Hallicrafters, with a background of over twenty years of electronic "know how," is perfecting and producing secret equipment *now* being used by our Air Force and other branches of the service. The American "edge" over the enemy depends upon Hallicrafters and other "Primary Producers" for the United States Armed Forces.

*World's leading exclusive manufacturers
of communications radio*

hallicrafters

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HALLICRAFTERS FACILITIES ARE NOW BEING USED FOR THE DEVELOPMENT AND PRODUCTION OF: GUIDED MISSILE CONTROL EQUIPMENT • COMMUNICATIONS EQUIPMENT • COUNTER-MEASURE EQUIPMENT • COMBAT INFORMATION CENTER • HIGH FREQUENCY ELECTRONIC EQUIPMENT • MOBILE RADIO STATIONS • MOBILE RADIO TELETYPE STATIONS • PORTABLE TWO-WAY COMMUNICATIONS EQUIPMENT • RADAR RECEIVERS AND TRANSMITTERS (ALL FREQUENCIES) • RADAR EQUIPMENT.

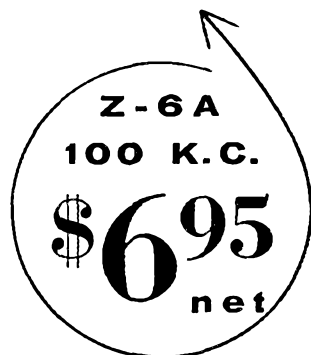
Calibration on the nose ...



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.



PR

Crystals



USE **PR** AND KNOW WHERE YOU ARE

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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 (or 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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* Official appointed to act temporarily in the absence of a regular official.

ABOUT SINGLE SIDE BAND THESE ARE THE FACTS

"talk power" equivalent to 1 Kw. AM in the new Hallicrafters Linear Power Amplifier Model HT-31

• MORE COMPLETE • MORE RUGGED • MORE RELIABLE

More complete—Engineered with a wider range of antenna impedance—50 to 600 ohms.

More rugged—Components surpass even the most rigid commercial specifications. Heavier transformers for less heat, and an exclusive Hallicrafters feature, a blower to further reduce heat!

More reliable—on-the-air factory tests assure you of dependable performance. Here in one compact package is a full band switch power amplifier covering 80-40-20-15-11 & 10 meters that's easy to drive, highly stable, extremely versatile, and engineered to Hallicrafters world-famous quality.

SPECIFICATIONS

Plate Power Input—500 - 510 watts.

Power Output—330 P.E.P. on 80 meters with slightly less on 10 meters.

Drive Power for 80 meter input 10 watts P.E.P. maximum on lowest frequency.

FEATURES

1. Continuous frequency coverage from 3.4 Mc. to 30 Mc.
2. Pi-network output for efficient harmonic and T.V.I. suppression.
3. Major T.V.I. suppression built in.
4. Does not require an antenna tuner as will feed loads from 50 to 600 ohms.
5. Full power capabilities available on CW because high stable, time proven circuitry does not require trick overload protective devices.
6. No special selection of R.F. amplifier tubes required.
7. Total tube replacement cost including high voltage rectifiers, amateur net only \$14.20.
8. Full metering of all important circuits.
9. Power input in watts shown on meter.
10. May be mounted in relay rack.

CIRCUIT DETAILS

This power amplifier employs two 811-A zero bias triodes in parallel. The input system is designed to be fed from a 50-70 ohm unbalanced line and requires a maximum of 10 watts drive on 80 meters. The grid tank circuit is balanced to provide all band neutralization. The output tank circuit is a continuously variable pi-network which provides a high degree of harmonic suppression.

TUBES

2—811-A Triode amplifiers

2—866-A Rectifiers

POWER OUTPUT

P.E.P.—330 watts

CW—275 watts

PLATE POWER INPUT

P.E.P.—500—10 watts

CW—450—9 watts

FRONT CONTROLS

Grid Range

Grid Tuning

Meter—Plate/Grid/Power Input
Watts

Plate Voltage On/Off

Power On/Off

PA Tuning

Antenna Loading—Fine

Antenna Loading—Coarse

Physical details:

Grey black steel cabinet and brushed chrome control knobs. Piano hinge top. 10 $\frac{3}{4}$ " x 19 relay rack panel—over all size 20", wide x 12 $\frac{1}{4}$ " high x 17 $\frac{1}{4}$ " deep —shipping weight 100 lbs. approx.

POWER

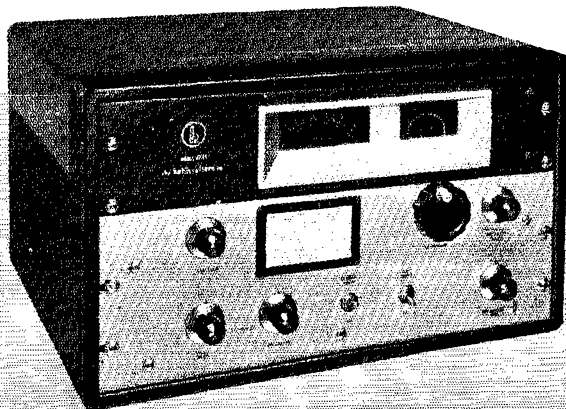
105/125 V—50/60 cycle AC

hallicrafters

Chicago 24, Illinois

Engineered to performance, not to price!

Model HT-31 Linear
Power Amplifier \$395.00



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..."

PUBLIC RELATIONS

The instances are fortunately rare, but every now and then an item in a newspaper will carry an account of amateur radio which can be classified as uncomplimentary. The subject is usually amateur interference. Occasionally the item is directly antagonistic; more often the disparagement is implied, or conveyed by an inaccurate headline.

In some of these few cases amateurs will write the League asking that a retraction be demanded. In our experience, this is entirely the wrong approach, for two reasons: Too much time is wasted (any effective action must be immediate); and generally speaking the editor is more impressed with a protest from his local readers than one from a distant organization. Usually, an alert local ham or club will take immediate action by contacting the paper or writing a letter to the editor in an attempt to obtain clarification and set the record straight. While this is the preferable procedure, it still has the disadvantage of again mentioning interference and amateurs in the same breath, and thus tends to accentuate the association of ideas.

There's a much better basic approach.

What is needed is full, complete and accurate accounts of all *other* amateur doings, so that any localized interference problems will seem minor in comparison to the good that can be and is being accomplished by public-spirited hams. In other words, a good long-range public relations program. To paraphrase the song title, you eliminate or neutralize the negative by accentuating the positive.

Naturally, any emergency activities of amateurs should be promptly and fully reported to the newspapers and radio stations. But in any one community emergencies are few and far between. You can't create a disaster, but you can be alert to participation in civic projects, or to initiation of some of your own, to maintain and improve the local standing of your amateur group. We'd like to mention here several such special projects, simply to suggest angles which you might use.

"Must" reading for those concerned with the state of our public relations is the article in November *QST*, describing Maryland Amateur Radio Week activities of the Baltimore Amateur Radio Club. It's full of project ideas.

A number of clubs have cooperated in fund-raising drives. One helped out in an all-night Telethon on behalf of the March of Dimes. Persons wishing to contribute called the TV station, whereupon an amateur net control installation directed a mobile to the address, where civic club members performed the leg-work of actually calling on the donors. Another amateur club undertook a similar project in a cerebral palsy drive, enriching it to the tune of \$50,000 — and doing themselves a world of good in public relations.

In a city famous for its huge parades, hams offered their services to the grand marshal. The marshal reluctantly accepted, and ended up immensely pleased — the parade started on schedule for the first time in the city's history! Needless to say, hams are now a fixture whenever they "strike up the band."

But you don't need to wait for fund drives or parades; except in the larger cities, a great many amateur occurrences are considered newsworthy. The local club receiving its charter of ARRL affiliation; a local amateur making DXCC; an emergency coordinator being appointed; participation by the club members in a contest, Field Day, or hamfest; delivery of a message from a serviceman in Alaska to his mother — all these and a host of other activities, however common they seem to us, can mean an inch or two in the Daily Bugle or 30 seconds on "The Voice of Podunk."

What else? Well, is your PTA putting on a hobby show? Be in it! Kiwanis looking for a speaker? Volunteer! Does your company have a "house organ"? Its editor would probably be delighted to have a feature story on the hams in the company.

Publicity helps are available at League Headquarters to make it easier for you, too. A sample speech, interview, radio broadcast program, and TVI script with slides are available. So are reprints of outstanding amateur stories, which have appeared in nationally-known magazines, to explain our hobby to interested BCLs.

Good public relations are important to nearly every society, corporation, or charity, but especially important to us — our very licenses depend on our activities being "in the public interest, convenience, or necessity." We must leave no doubt in the minds of the public that we meet this requirement.

HAMFEST CALENDAR

ILLINOIS — The Central Illinois Radio Amateur Picnic will be held Sunday, July 17th, at Spider Woods State Park, six miles southeast of Decatur on State Route 121. Registration will open 11 A.M. CDT. There is no charge for admission to anyone interested in amateur radio. Lively contests for the kids; it will be a real family affair. There will be a ham auction and a swap table. Bring the family and a basket lunch. Drive east of Decatur on Highway U.S. 36 and watch for Ham Picnic signs.

INDIANA — The Annual Turkey Run V.H.F. Picnic will be held on Sunday, July 31st, at Turkey Run State Park under the sponsorship of the Wabash Valley Amateur Radio Association. The route in the park will be posted. There will be a swap table and games. Bring your family and a lunch basket and meet the v.h.f. gang. For further information write to Charles Hoffman, W9ZHL, Picnic Chairman, P. O. Box 186, North Terre Haute, Ind.

MICHIGAN — The annual Upper Peninsula Hamfest will be held on Sunday, July 31st, in the Houghton area, under the sponsorship of the Lake Superior Radio Club. The election of the UPEN NCS will take place at this time. Further details of the program will be given on local bulletins. There will be a potluck lunch, with coffee, pop, and ice cream provided by the host. A registration fee of one dollar will be collected at the grounds to cover expenses.

MICHIGAN — Sunday, July 31st, at Warren Dunes State Park, 15 miles south of St. Joseph, Michigan, on U. S. Hwy. 12 — Annual Picnic and Hamfest of the Blossomland Amateur Radio Association. Bring the family, a basket lunch, and swimming gear; also usable radio equipment for swap and shop. Ten-meter transmitter hunt. No admission charge to the park or picnic. Registration fee \$1.00 in advance or \$1.25 at the park. Please make reservation in advance through R. T. Hatch, W8JFW, 3225 Cleveland, St. Joseph, Michigan.

MICHIGAN — The first annual Adrian Amateur Radio Club Hamfest will be held Sunday, July 10th, at the Adrian, Mich., Fairgrounds. The program will consist of various contests of acquired skills, and will include activities of interest to XYLs. The following bands will be monitored for mobiles: 2 meters at the low end; 10 meters at 29,640; 75 meters at 3910 and 3960; and 160 meters at both ends of the band. Gov. G. Mennen Williams of Michigan is expected to speak briefly. There will be a "swap and shop" party throughout the day. Representatives of leading manufacturers of electronic equipment of interest to amateurs will be present to discuss their products with the group.

MONTANA — The Glacier Waterton International Peace Park Hamfest will be held at Apgar Camp Grounds in Glacier Park on July 23rd and 24th. All welcome.

WYOMING — Saturday and Sunday, July 23rd-24th. The Annual Wyoming Hamfest at the South Fork Camp ground and Inn, in the beautiful Big Horn mountains 18 miles west of Buffalo, Wyoming. The Sheridan Radio Amateur League is sponsoring the event. A full program including banquet and Wyoming Trading Post is planned. Registrations, including banquet, \$3.50. Tourist mobiles in Yellowstone Park area welcome; watch for mobile antennas on Highway 16. Register with Robert B. Miller, President, SRAL, 362 E. Loucks St., Sheridan, Wyoming, or contact any Wyoming ham for information.

COMING A.R.R.L. CONVENTIONS

July 30th-31st — Canadian Division, St. John, New Brunswick
August 12th-14th — Roanoke Division, Old Point, Va.
September 3rd-4th — South Dakota State, Yankston, S. D.
October 15th-16th — Central Division, South Bend, Ind.
October 22nd-23rd — Midwest Division, Omaha, Neb.

A.R.R.L. CANADIAN DIVISION CONVENTION Saint John, N.B. — July 30th-31st

The New Brunswick Amateur Radio Association is sponsoring the 1955 ARRL Canadian Division Convention to be held in Saint John, N.B. on July 30th-31st, with the Loyalist City Amateur Radio Club as host. Every effort is being made to make this convention a most interesting, informative and enjoyable affair. It will be held in the YMCA building, commencing at 6 P.M. ADT, Saturday, July 30th. Registration is from 2 to 6 o'clock.

The program will include a banquet, special speakers, presentation of the VE1 Contest cup, and contests. There will be a 75-meter hidden-transmitter hunt, picnic, games, etc., on Sunday, July 31st. Alternative plans are being arranged in case of poor weather on Sunday. There will be special programs for the ladies.

The rates, including banquet and picnic, are \$4.00 for men and \$3.00 for ladies. Send advance registrations to R. B. Nichols, VEIGE, 153 Rodney St., West Saint John, New Brunswick, Canada.



July 1930

... Describing the annual meeting of the ARRL Board of Directors, the Editor states that a lively advance interest was displayed by the members in regard to important topics scheduled for discussion. Comments were also made concerning various problems confronting phone men and measures the Board feels necessary to make voice operation more effective and enjoyable.

... Adventure and ham radio are combined in "Hamming with a Portable in Africa," by Clyde De Vinna, W6OJ-W6ZZK.

... "Naval Reserve Holds Its First National Emergency Drill," by William J. Lee, is a detailed report of that organization's latest operating activity. Main objectives of the drill were to determine speed, completeness of district representation, accuracy and circuit discipline.

... VE2CA, operated by Mr. and Mrs. Earle H. Turner, is the station of the month. With two transmitters, each employing UX-852 oscillators, the Turners emit healthy signals on both 7 and 14 Mc. Two receivers are in operation: one, a four-tube with an r.f. stage, detector, and two audio stages; the other, a conventional Hartley with a two-stage audio amplifier.

... RCA announces the production of three new tubes. One is a general-purpose tube known as the UX-230; another is a screen-grid tube, the UX-232; and the remaining is an UX-231 audio power amplifier featuring low distortion.

... Some good hints on key click elimination can be found in the Experimenters' Section of this month's issue. An excellent filter is described. It utilizes old Ford spark coil primaries and two 0.006- μ f. capacitors.

... In the same section, A. E. Harrison, W6BMS, describes a receiver for 3.5 and 7 Mc. using a variometer for the tuning inductance. The set uses a Type '22 untuned r.f. stage, a Type '99 detector and two Type '01As as audio amplifiers.

OUR COVER

"Oh! my aching back. . . I almost got that W7 . . . That #&%* generator!" These are familiar post-Field Day expressions. Yes sir, if you weren't out with the gang this year you just haven't lived!

A Four-Band S.S.B. VFO

Single Fundamental Range for Use with Conversion-Type S.S.B. Exciters

BY GORDON LAUDER,* W9PVD

MOST of the VFOs used in s.s.b. work with the Central Electronics exciters and others using a 9-Mc. master oscillator cover one, or at the most, two bands: 75 meters, or 75 and 20 meters. This is because the same 5-Mc. injection frequency can be used in the mixer stage for both these bands, but not for others. However, the injection frequencies for 40- and 160-meter operation are harmonically related to this same 5-Mc. injection frequency. The beautiful part of this is that the oscillator can always be calibrated against the 5-Mc. signal of WWV. Thus a VFO with a fundamental tuning range of 5.0 to 5.5 Mc., plus a bandswitched buffer/multiplier stage, will furnish outputs on all four bands.

Using two miniature tubes and slug-tuned coils, a complete unit can be built horizontally on a 3½-inch rack panel, as indicated by the accompanying photographs of the one used at W9PVD. The tuning is done with a National type MCN dial which has been equipped with a National type HRT knob for ease of tuning.

The circuit uses two 6AK6 tubes, one as an electron-coupled oscillator and the other as a buffer/multiplier stage. The plate coils of the buffer/multiplier stage are shorted out electrically, when not in use, by a Centralab switch that connects all unused contacts, thus connecting B-plus to both sides of unused coils. Shorting the coils allows mounting them in close proximity. All that is necessary is to wire B-plus voltage to any unused contact on the switch.

An 0B2 VR tube is used to stabilize plate and screen voltages of both tubes. Each stage uses 10 ma. of cathode current. The Central Electronics exciters furnish 300 volts at 25 ma. through the accessory socket in the rear. The

*134 Marquette St., Park Forest, Ill.

• No doubt there would be more s.s.b. activity on 7 and 1.8 Mc. if it were not generally thought that a separate VFO is needed. Here's how to make one VFO unit serve for both the popular 4/14-Mc. combination and the above two bands as well.

0B2 dropping resistor is adjusted until a current of 23 ma. is drawn with the 6AK6s out of their sockets. This allows a margin of insurance against loss of ignition in the VR tube. At these current and voltage settings, sufficient VFO injection is developed to give stable operation on all four bands.

Construction

The author's VFO was built on a homemade chassis. Room was reserved on the left side of the panel for mounting a 2-inch 'scope monitor, as described in the 1954 ARRL *Handbook*.

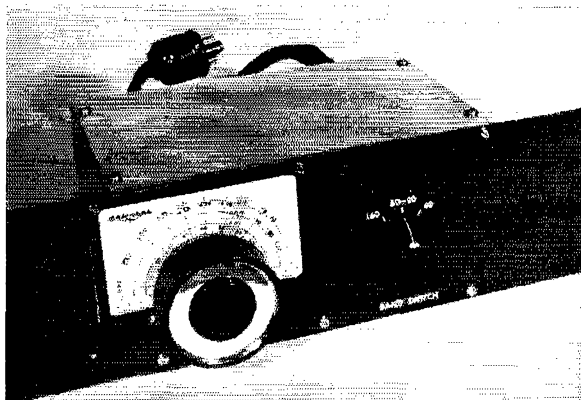
The best size in commercially available chassis would be the 5 × 10 × 3-inch with bottom plate. The dimensions of the chassis at W9PVD are 5 × 7 × 3 inches. The chassis is mounted with the top down and even with the bottom of the panel, to allow clearance for the bottom of the National MCN dial mechanism. The dial is mounted with the top flush with the top of the panel. The tuning condenser, C_1 , is mounted on an aluminum bracket so as to line up with the dial drive.

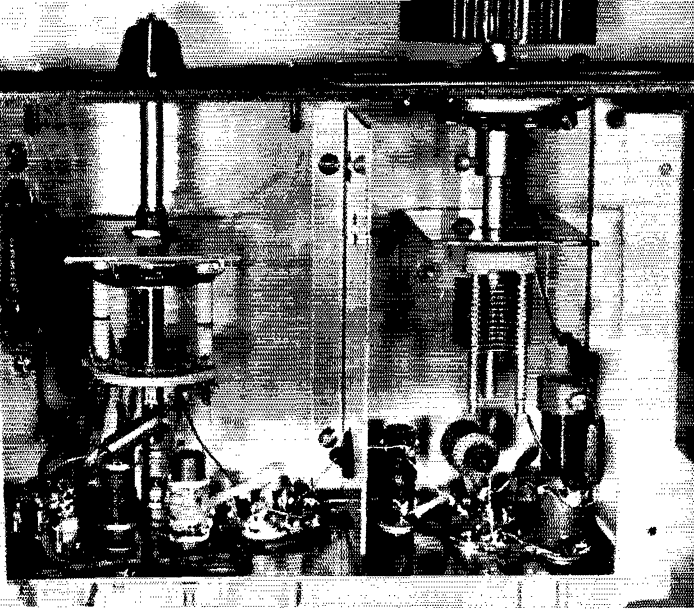
The switch S_1 is mounted on another bracket with the end of the 2-inch shaft projecting through a 3/8-inch hole in the panel to allow mounting the knob. This switch is mounted to be

◆

The four-band s.s.b. VFO fits readily on a 3½-inch relay rack panel. By choosing the proper fundamental tuning range and using appropriate harmonics, four bands can be covered with exciters using a 9-Mc. s.s.b. generating frequency.

◆





Oscillator circuit is at the right in this view, frequency-multiplying coils and bandswitch at the left. The two resistors alongside the switch add up to the 10,000 ohms specified in Fig. 1 for the dropping resistor to the VR tube.

symmetrically placed with respect to the operation switch of the 10-A exciter, which is mounted directly above the VFO in the rack.

Viewed from the rear, the components mounted from right to left on the center line are L_1 , V_1 , L_2 , and the plate coils for V_2 , these coils being mounted in a roughly triangular grouping to give minimum lead length to S_1 . L_5 should be positioned for the shortest leads as it is the highest-frequency coil. After these come V_3 and the jack, J_1 . A 6-prong Jones chassis-type male connector was used for J_1 because it was available in the junk box. However, any male connector having 5 or more prongs will do the job.

The two stages are shielded to reduce the possibility of feed-back when the buffer/multiplier is operated at the oscillator frequency. The coupling capacitor, C_6 , is mounted inside a $\frac{1}{4}$ -inch rubber grommet, both for mechanical stability and insulation.

Only two of the coils, L_1 and L_5 , need to be wound by the constructor. The total number of turns for L_1 was wound on the XR-50 coil form, then $5\frac{1}{2}$ turns were backed off before cutting and soldering to the ground end. The enamel is carefully scraped off with a knife, and the tap is made by wrapping the bared wire around a small diameter nail and then twisting once to

(Continued on page 110)

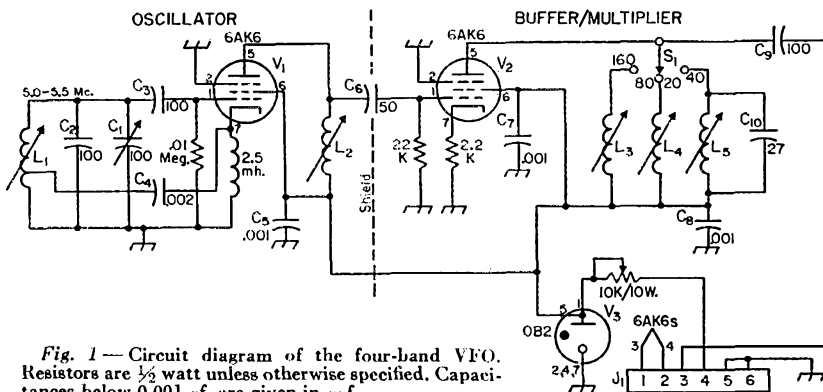


Fig. 1—Circuit diagram of the four-band VFO. Resistors are $\frac{1}{2}$ watt unless otherwise specified. Capacitances below 0.001 μ f. are given in μ f.

- C_1 — 100- μ f. variable (Hammarlund HF-100 or equivalent).
- C_2, C_3 — Silver mica.
- $C_4 - C_8$, inc. — Ceramic.
- C_9 — Mica.
- C_{10} — Low-temp. ceramic.
- L_1 — Approx. 8 μ h.; 37 turns No. 26 enam. on $\frac{1}{2}$ -inch diam. slug-tuned form (National XR-50) tapped $5\frac{1}{2}$ turns from ground end.
- L_2, L_4 — Slug-tuned (CTC LS-3 5-Mc. coil).
- L_3 — Slug-tuned (CTC LS-3 10-Mc. coil).

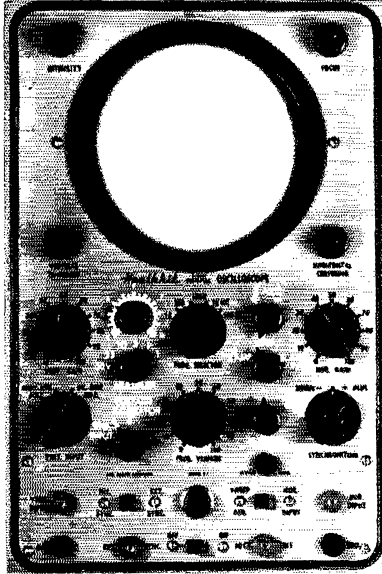
- L_5 — 25 turns No. 26 enam. on $\frac{3}{8}$ -inch. diam. slug-tuned form (CTC LS-3).
- NOTE: See text for data on resonating slug-tuned coils to proper frequencies. Inductance required depends on stray circuit capacitance and length of coax cable to s.s.b. exciter.
- S_1 — Rotary switch, 1 pole, 3 positions, unused contacts shorted (Centralab PA-18 with PA-300 index. Use all spacers furnished to mount section near rear of index).
- NOTE: The 2.5-mh. choke in the oscillator cathode circuit should be of the small type such as National R-33.

Versatilize Your Oscilloscope

Adding a Z-Axis Amplifier and Voltage Calibrator

BY LYLE E. SHARPE,* W6FSC

THE addition of a Z-axis amplifier and voltage calibrator to any 'scope provides a useful asset and is not a difficult job. The oscilloscope pictured in this article is a Heathkit model 0-7, but the same technique may be applied to



Front-panel view of the 'scope with the additional controls.

* % Engineering Dept., J. B. Rea Co., Santa Monica, Calif.

• This article describes the circuitry and construction involved in adding a Z-axis amplifier and voltage calibrator to any oscilloscope lacking these refinements. The Z-axis amplifier may be used for trace brightening, Z-axis modulation, or retrace blanking and, with the voltage calibrator, the measurement of any waveshape on the screen is available at the flick of a switch.

any 'scope, providing necessary space for mounting the parts can be found. In this case, very little space was available immediately behind the front panel, so two small subchassis were fabricated and set back on the main chassis with extension shafts run through panel bushings for the control knobs. As shown in the front-view photograph, the added rows of controls are placed midway between the existing controls with the voltage calibrator on the left side, and the Z-axis amplifier on the right.

Voltage Calibrator

The voltage calibrator (Fig. 1) consists of a free-running symmetrical multivibrator (V_1) operating at approximately 1500 c.p.s. Its output is taken off the plate of V_{1B} through C_1 to the top of the diode load resistor, R_1 . V_{2A} is connected as a diode and functions as a clipper to square the waveshape. The plate of V_{2A} is direct-coupled to the grid of cathode follower, V_{2B} , and the output

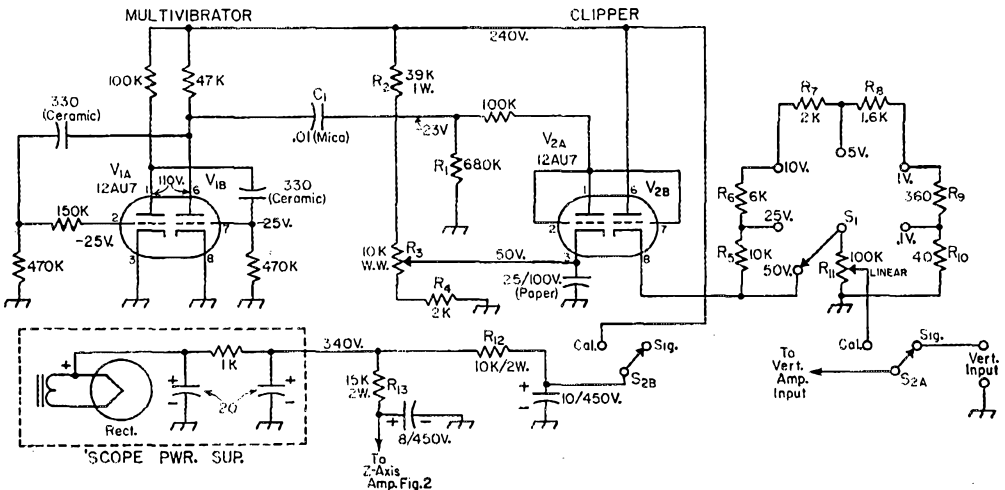
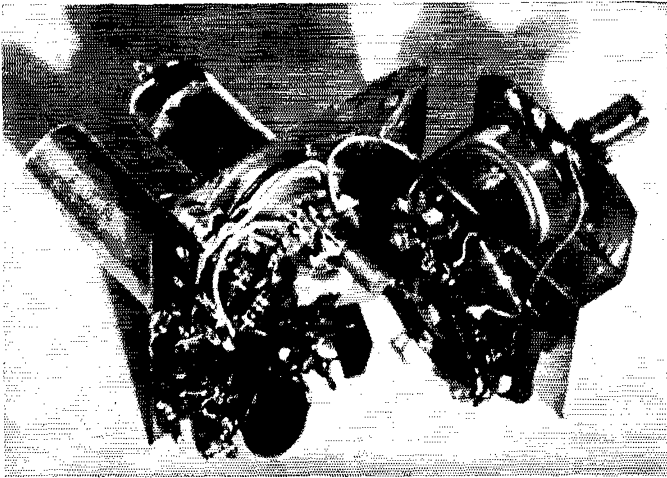


Fig. 1 — Circuit of the voltage calibrator. All resistors $\frac{1}{2}$ watt, unless otherwise specified. R_{11} — Ohmite CU-1041. S_1, S_2 — Rotary switch,



Voltage-calibrator sub-chassis wired and ready for installation.

voltage of the calibrator appears across the cathode-resistor string, R_5 to R_{10} . The maximum peak-to-peak voltage in each position of S_1 , as indicated, may be taken from the arm of the switch and attenuated through the gain-control potentiometer R_{11} .

Potentiometer R_3 in the voltage divider, $R_2R_3R_4$, controls the bias on the cathode of V_{2A} which, in turn, controls the output voltage of the calibrator. Output voltage is taken from the arm of R_{11} to the calibrating position of S_{2A} for comparison with the signal being measured.

Z-Axis Amplifier

The first tube in the Z-axis amplifier (Fig. 2) is a 12AU7 duo-triode acting as a phase inverter. The cathodes of both sections are tied together using the same cathode resistor, R_{14} . The second section operates as a grounded-grid amplifier. Signals from the plate of each section to the ends of the center-tapped potentiometer R_{15} are equal and 180 degrees out of the phase. This potentiometer must be linear, with 25,000 ohms

each side of center tap. The tube gives a gain of four for each phase.

The signal is then taken from the arm of the gain-and-phase-control potentiometer, R_{15} , through C_2 to the input grid of V_4 . V_4 is a triode voltage amplifier with a gain of 12, thereby giving a total gain of 48 through the amplifier in either a positive or negative direction. From the plate of V_4 , the signal is passed on to the top of R_{16} and through C_3 to the grid of the cathode-ray tube. Positive signals at this point brighten the trace, while negative signals bias the tube toward cut-off. C_3 must be a high-voltage capacitor to withstand the negative d.c. voltage on the grid of the tube.

Blanking

The pulse for blanking is taken from the oscilloscope horizontal-sweep oscillator and differentiated through C_4 and R_{17} . During the slow rise time of the sawtooth sweep, no voltage is developed but the rapid fall in voltage at the end of the sawtooth develops a pulse at the junction

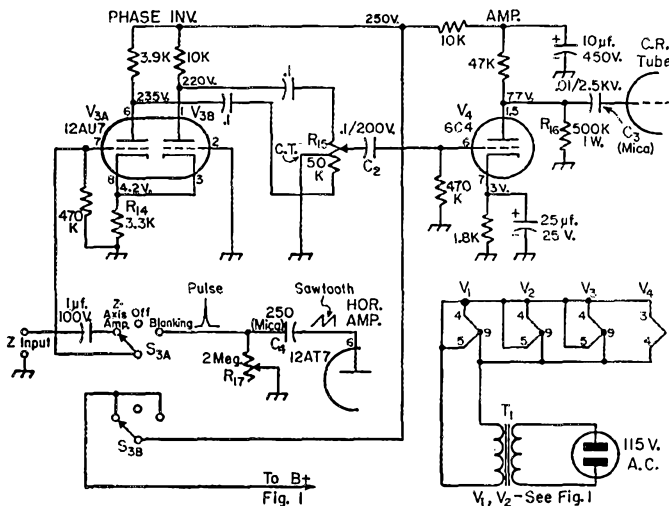


Fig. 2 — Schematic of the Z-axis amplifier. All resistors $\frac{1}{2}$ watt unless otherwise specified.

R_{15} — Centralab BT-33.

S_3 — Rotary switch.

T_1 — 6.3 volts, 2 amp.

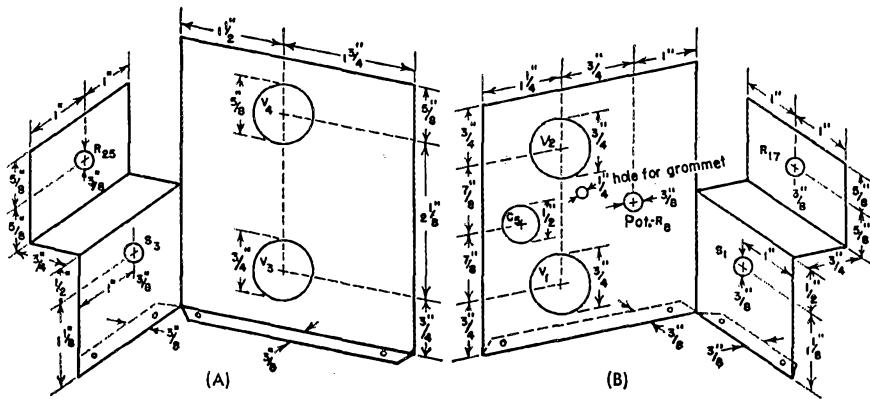


Fig. 3—Sketch showing dimensions of the two subchassis. The one to the left is for the Z-axis amplifier; the one to the right is for the voltage calibrator.

of C_4 and R_{17} , which is impressed on the grid of V_{3A} through S_{3A} when in its blanking position. The size and width of this pulse is adjusted by R_{17} , and R_{15} is adjusted toward its positive position, putting a positive pulse on the grid of V_4 which, in turn, puts a negative pulse on the grid of the cathode-ray tube, thus biasing the grid to cut-off, and blanking during the retrace.

Construction

The material used in the construction of the two subchassis is 0.026-inch copper sheet, since it is easily worked. They were cut out, drilled and bent to shape in a small vise, as shown in Figs. 3A and 3B.

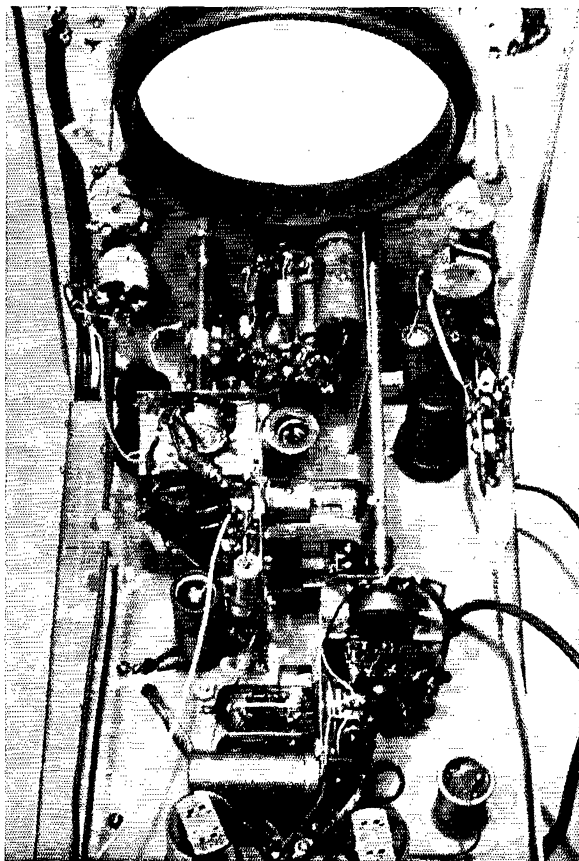
A photograph shows the voltage-calibrator chassis with the components mounted and wired. The calibration potentiometer, R_{11} , is shown mounted on the lip of the chassis, with the multiplier switch (S_1) just below. The Z-axis amplifier chassis is bent in the opposite direction, with the gain-and-phase potentiometer, R_{15} , mounted on the lip, and the selector switch S_3 below. These four controls are reached with extension shafts through panel bushings, the remaining controls being mounted on the front panel.

In the photograph of the voltage calibrator, the potentiometer shaft, R_3 , may be seen extending through the chassis where it is available after assembly for adjustment of the voltage-calibrator output. The potentiometer is mounted between the tubes on the top side of the chassis, its leads being fed through a small grommet to the underside.

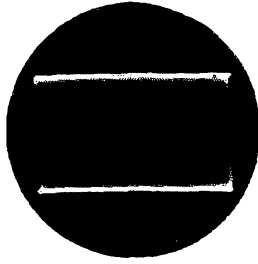
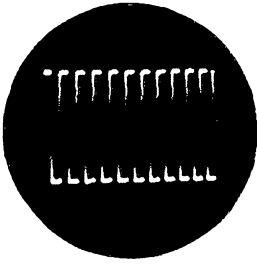
Both amplifiers should be completely wired according to the schematics, leaving signal, B+ and heater leads long enough to reach their connections. Wiring is not at all critical and point-to-point wiring was employed to conserve space.

The holes in the front for the added

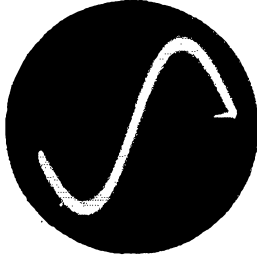
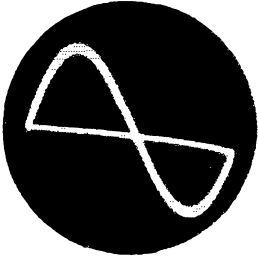
controls are all $\frac{3}{8}$ -inch diameter. The hole for the shaft of the voltage-calibrator gain potentiometer, R_{11} , is centered $2\frac{1}{4}$ inches above the main chassis, and midway between the oscilloscope vertical-gain and frequency-selector controls. The hole for the shaft of the multiplier switch, S_1 , is $1\frac{1}{8}$ inches below.



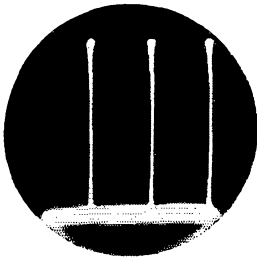
Rear view of oscilloscope with the cathode-ray tube removed, showing the added subassemblies. The voltage calibrator is in the foreground, and the Z-axis amplifier above and to the left.



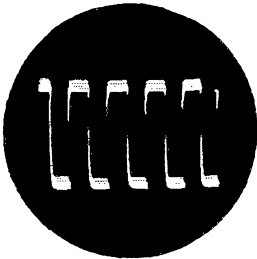
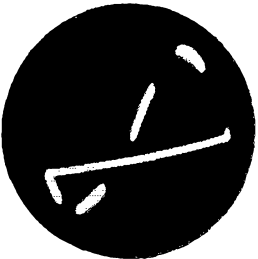
« Fig. 4 — (Left) Voltage-calibrator square wave with low horizontal sweep frequency. (Right) Same signal with high-speed sweep.



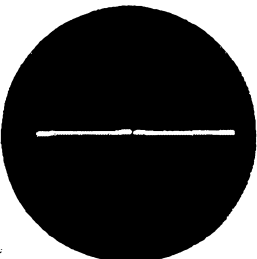
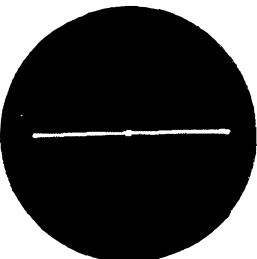
« Fig. 5 — (Left) Sine wave before return-trace blanking. (Right) Sine wave after return-trace blanking.



« Fig. 6 — (Left) Intensity modulation of 2-microsecond positive pulse. (Right) Z amplifier used for trace brightening.



« Fig. 7 — (Left) One cycle of sine-wave input to vertical modulated by 4 cycles of square wave (right).



« Fig. 8 — (Left) Marker-generator signal on baseline. (Right) Marker-generator signal putting a hole in baseline.

The voltage-calibrator switch, S_2 , is mounted on the panel in the most available position between the oscilloscope vertical-input attenuator switch and the vernier frequency control.

The hole for the shaft of the Z-axis gain and phase control, R_{15} , is centered $2\frac{1}{4}$ inches above the main chassis, and midway between the frequency-selector switch and the horizontal-gain control. The hole for the shaft of the selector switch, S_3 , is $1\frac{1}{8}$ inches below. The blank-phase potentiometer, R_{17} , is mounted on the panel midway between the frequency-vernier and synchronizing controls. The Z-axis input jack is located just above the horizontal input switch.

The placement of the two subchassis, with their extension shafts through the panel bushings, is shown in the rear-view photo of the 'scope. The Z-axis amplifier chassis is on the left side of the photograph, just behind the 'scope horizontal-sweep-amplifier tube (6J5) and the voltage-calibrator chassis is on the right in front of the power-supply rectifier tubes.

The Z-axis amplifier draws only 8 ma. in operation, and the voltage-calibrator requires 10 ma., so they may be operated from the oscilloscope power supply, as shown in Fig. 1. The power-supply output voltage is 340. This potential is dropped to 240 volts through R_{12} for the voltage calibrator, and to 250 volts through R_{13} for the Z-axis amplifier. In the calibrate position, S_{2B} puts plate voltage on the calibrator, and S_{2B} has the same function for the Z-axis amplifier. It is necessary to provide another filament source for the tubes, so a small filament transformer, T_1 in Fig. 3, is mounted alongside the power transformer, under the main chassis.

After the units were installed and the wiring completed, switch positions on the front panel were labeled with decals as shown. The voltage-calibrator multiplier switch shows maximum output voltages of 50, 25, 10, 5, 1 and 0.1. These voltages may be attenuated at each position with the gain potentiometer, R_{11} , which is calibrated in tenths on the front panel.

The only adjustment necessary after completion is to set the output level of the voltage calibrator. This calibration is in peak-to-peak volts which is equal to 2.88 r.m.s. voltage. Dividing the maximum output voltage of 50 by 2.88 is equal to 17.4 volts r.m.s. Turn on the oscilloscope, put S_1 in the 50-volt position, and turn up the gain pot, R_{11} , to maximum output. A square wave should appear on the screen, as shown in Fig. 4 (left), if the horizontal sweep is at a slow rate. However, if the sweep speed is increased, an image such as Fig. 4 (right) will appear. Connect an a.c. voltmeter to Pin 8 of V_2 and adjust potentiometer R_3 so the r.m.s. output voltage reads 17.4 volts. The calibrator is now ready for operation.

Turn S_2 to the signal position, and feed a sine wave into the 'scope input. Adjust the trace to any convenient height between selected lines on the screen mask. Turn S_2 to the calibrate position and adjust the multiplier switch, S_1 , and gain pot,

R_{11} , till the square wave on the screen is at the same height between the previously selected lines. The sine-wave peak-to-peak voltage may now be read by noting the position of the multiplier switch and the percentage of the gain pot used. For example: If the multiplier switch reads 5 and the gain pot 7, there would be an indicated voltage of 0.7×5 , or 3.5 volts peak-to-peak or, dividing by 2.88, 1.22 volts r.m.s.

Turn S_2 to the signal position, put the sine wave back on the 'scope screen and turn up the intensity control so both the sine wave and retrace are visible as at 5 (left). Turn S_3 to the blanking position, advance the Z-axis gain control, R_{13} , to its positive position, and advance the blanking-phase pot, R_{17} , until the retrace just disappears as at 5 (right). The small bit of retrace left on 5 (right) would be eliminated by increasing the gain of the blanking control. At low frequencies most of the resistance in R_{17} will be needed for blanking, but this becomes successively less as the frequency (speed) is increased.

Z-Axis Amplifier

Set the Z-axis pot, R_{15} , to zero (midposition). Turn S_3 to the Z-amplifier position. Take the sine-wave injection out of the vertical input and put a sine-wave signal of approximately 1 volt, 1000 c.p.s. into the Z-axis input jack. Set the 'scope horizontal sweep at approximately 100 c.p.s., and advance the Z-axis gain control toward either positive or negative polarity, readjusting the sweep rate at the same time until the baseline becomes a series of dashes. The number of dashes will show the frequency ratio of the sine-wave input to the sweep frequency and is a handy way to check frequency rate.

Turn the Z-axis pot to zero position. Leave the sine-wave signal on the Z-axis input, and inject the same signal into the vertical input of the 'scope, placing several cycles on the tube screen. Turn down the 'scope intensity control until the trace disappears, and advance the Z-amplifier gain control toward positive. The trace should appear similar to Fig. 6 as the cathode-ray-tube grid is driven positive from cut-off by the positive part of the Z-axis signal.

Fig. 6 (left) shows a series of two-microsecond positive pulses which were barely visible on the screen before brightening with intensity modulation, accomplished by injecting the signal into both vertical-input and Z-axis terminals. Fig. 7 shows one cycle of sine wave into the 'scope vertical input with four cycles of square-wave input to the Z axis, and is another method of checking frequency rate.

Fig. 8 (left) shows the horizontal baseline with a marker-signal input to the Z-axis amplifier. The Z-axis gain control is advanced toward positive phase, giving a bright marker on the baseline. Turning the gain control toward negative phase puts a hole in the baseline, as at 8 (right).

Further information on the possible applications of the Z-axis amplifier may be found in Rider's *Encyclopedia on Cathode-Ray Oscilloscopes*.

Band-Scanning — The Easy Way

A Simple Means of Automatic Receiver Tuning

BY K. R. JONES,* W7OSL

• This simple gadget should appeal to many, both as a novelty and as a utility. It lets you sit back and hear the sigs go by. The lazy man will find it just the thing for watching for band openings. It requires no alterations of the receiver, and can be connected or disconnected in a second or two.

HAVE you ever spent valuable time tuning across the 10-, 15-, or 20-meter bands without finding a single signal? Then you must have wished for an easier way to catch the band openings which are so rare in this period of the sunspot cycle. Perhaps what you need is an automatic tuner to operate the receiver while you sit in an easy chair reading *QST*.

Of course, any well-equipped machine shop could attach an assortment of gears, cranks and motors to your receiver that would do the job, but most hams would prefer to get the results without altering their receivers. It can be done. Most of the needed parts may even be in your junk box now.

The theory is easy. All you have to do is vary the tuning of the receiver's high-frequency oscillator at a slow rate. A motor-driven capacitor clipped on in parallel with the h.f. oscillator tuning capacitor will do the trick, and the only disadvantage is a temporary shift in dial calibration during the time the motor-driven scanning capacitor is in use. Theoretically, the r.f. and mixer tuning should also be varied, but most receivers in the lower-price brackets have only one r.f. stage and the front-end passband is so broad that little loss in gain can be noticed over a small frequency range when only the oscillator is tuned.

The unit illustrated was assembled for use with an NC-57 receiver. An old electric clock motor was used as the base and a scrap of aluminum was bent to form a mounting for a ball-bearing butterfly capacitor, as shown in the photograph. The shaft coupling was made from a small block of plastic. An APC-type padding capacitor was fastened on top and connected in series with the butterfly capacitor to vary the bandwidth scanned. The whole unit is small enough to fit inside the receiver near the tuning-capacitor gang.

Although the unit scans only about 200 kc. on the v.h.f. amateur bands, it has proved very satisfactory in detecting band openings. It has

also been very interesting to operate it on bands where there is plenty of activity. At a rate of two scanings (one complete revolution of the capacitor shaft) per minute, the tuning is covered so slowly that several words can be heard from each station as it is passed, and familiar voices can be recognized.

Construction

Specifications are listed with the schematic, but as identical parts may not be available, several points in construction should be stressed. First, and most important, is keeping stray

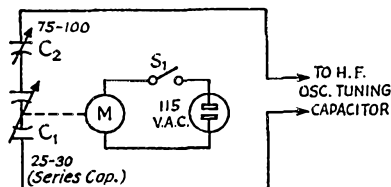


Fig. 1 — Circuit of the simple band-scanner.

- C₁ — 35- μ f. (stator to stator) ball-bearing butterfly variable (Burstein-Applebee Cat. No. 18B1027). Also see Addendum.
- C₂ — APC type air trimmer (see Addendum).
- M — Synchronous clock motor, 1 r.p.m.
- S₁ — Toggle.

capacitance at a minimum since this will have a considerable effect on how far the r.f. stage must be detuned from normal.

Second, the butterfly capacitor must turn very easily. The ball-bearing type shown is ideal, but with some ingenuity in loosening and lubricating the bearings, a plain-bearing type might be satisfactory. A capacitor with a stop cannot be used, of course.

Third, the capacitor shaft should be very carefully aligned with the motor shaft to prevent excessive bearing friction and overloading of the motor during constant use. If the alignment cannot be done accurately, a flexible shaft coupling should be used.

Fourth, any different type of motor than a clock motor should be checked for radio interference before construction is begun. The synchronous clock motor shown caused no interference while operating inside the receiver, but other small motors could generate a great deal of noise.

Fifth, the 115-volt wiring to the motor should be carefully insulated. Every amateur should realize that 115 volts a.c. is potentially just as dangerous as the higher d.c. plate voltages found in power supplies.

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Adjustment

Adjusting the scanner for operation is not difficult with the following procedure:

1) Set the butterfly capacitor to approximately the center of its capacitance range by running the motor through part of a revolution.

2) Attach the lead clips in parallel with the receiver oscillator tuning capacitor. On the NC-57 this is the capacitor section next to the front panel. The lead from the APC padder should attach to the stator, and the other lead to the capacitor frame.

3) Use a VFO, crystal oscillator, or signal generator to obtain a strong signal in the middle of the desired band. Tune in this signal with the receiver tuning dial. Since the scanning unit adds capacitance in parallel with the tuning capacitor of the receiver, the setting may be one to several hundred kilocycles higher than the normal dial setting.

4) Peak the signal with the antenna-trimmer control if the receiver has one.

5) Run the butterfly capacitor to its maximum and minimum settings and check these frequencies with the VFO or signal generator. Then adjust the APC trimmer to more capacitance for a wider scanning range or to less capacitance for narrower scanning range. (The total capacity added by the unit is of course equal

to $\frac{C_1 \times C_2}{C_1 + C_2}$ so, by decreasing C_2 , the total capacitance and the scanning width are reduced.)

6) Repeat Steps 3, 4, and 5 until the desired range is covered.

The amount of receiver tuning capacitance in use is different on each amateur band, so the scanner must be readjusted for each band.

To restore normal receiver operation, just unclip the scanner, lift it out, and reset the antenna trimmer. This scheme is, of course,

not useful with receivers whose tuning ranges are restricted to the amateur bands.

Addendum

The scanning capacitor used by the author, being of the butterfly type, goes through its capacitance range four times for one complete revolution of its shaft, and therefore the band is swept four times — twice in each direction. The butterfly type with ball bearings may not be generally available on the market. However, the standard-type Hammarlund VU-30 should make a satisfactory substitute, although it will take twice as long to sweep the band (twice per revolution instead of four times). The VU-30 has a maximum resultant capacitance (two sections in series) of 31.5 μmf .

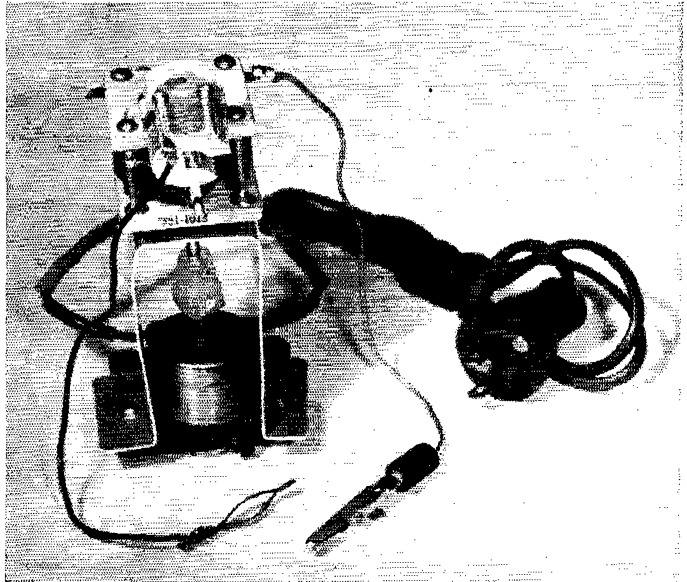
To obtain an idea of the range to be expected on the various lower-frequency bands, the arrangement of Fig. 1 was tried on a Hallicrafters SX-71, with a Johnson 27- μmf . capacitor at C_1 , and a 100- μmf . unit at C_2 .

With C_2 set at minimum, the band-set on the SX-71 had to be readjusted about 200 kc. higher, and the tuning range of C_1 was approximately 40 kc. With C_2 set at maximum, the band-set had to be set about 300 kc. higher, and the range of C_1 was about 300 kc.

On 40, the band-set was adjusted about 200 kc. higher, C_2 at minimum, and the tuning range was about 40 kc. With C_2 at maximum, the band-set was about 250 kc. higher, and the range slightly over 300 kc.

On the 20- and 10-meter bands, the band-set adjustment was only slightly different than normal. On 20, the bandspread range of C_1 could be varied from about 30 kc., with C_2 at minimum, to about 300 kc. with C_2 at maximum. The range on 10 was about 2 Mc. with C_2 at minimum, and with C_2 set at about half capacitance, the entire band was covered.

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This simple band-scanner can be thrown together in a few minutes. The ball-bearing capacitor driven by the clock motor is mounted, with its shaft in line with that of the motor, on a scrap of aluminum. The range-adjusting capacitor, C_2 , is suspended from C_1 on stiff leads connecting it to the latter.
◆



A Tripler for the 1215-Mc. Band

Crystal-Controlled Output with 420-Mc. Drive

BY RUSSELL W. ROBERTSON,* W6DQJ

• Most of the work done so far on 1215 Mc. has been with oscillator-type rigs, which leave much to be desired in the way of stability and efficiency. Here is a solution in line with more modern techniques: a tripler that can be driven with a low-powered 420-Mc. stage.

Now that the design of stable equipment for the 420-Mc. band is fairly well standardized, experimentally inclined hams are thinking of going higher in frequency. Most of the work done so far on 1215 Mc. and higher bands has been with oscillator-type transmitters. This can be fun, but experience has shown, as on all lower bands, that if we are to accomplish any real good it must be with something more stable and reliable in performance.

Choice of tubes for use as frequency multipliers or r.f. amplifiers is limited enough at 420 Mc. When we go to 1215, there is practically no choice at all. The lighthouse types such as the 2C40 and 2C43 work well at very low power, but if we want to go over the milliwatt level we have only the 2C39A to look to. There are bigger tubes, of course, but their cost puts them out of the reach of most hams.

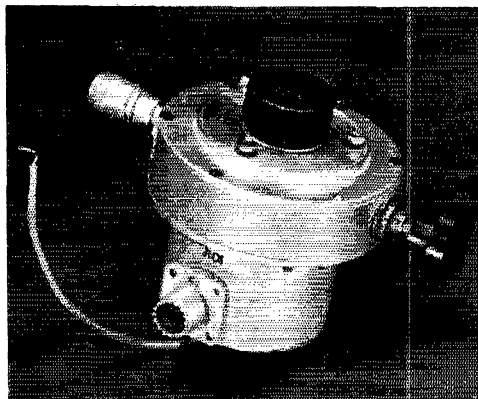
Tank-circuit design definitely leaves the coil-and-condenser field when we move up from 420 Mc. This shift from coils to lines to cavities leaves the average ham with the feeling of having entered another world, but construction of suitable cavities can be managed without too much in the way of machine tools. The tripler described here is a combination of modified surplus and home-made tank circuits that should not be beyond the ability of many experimenters.

The photographs show the tripler in both assembled and knocked-down form. The input circuit was made from a coaxial tank circuit of an r.f. amplifier from an ASB-series receiver designed for 450 to 500 Mc. Enough detail is apparent so that a near duplicate could be made, if the surplus variety is not available, though having the ASB cavity makes the job quite a bit simpler. The original amplifier was designed for use with a 446A lighthouse tube, but most of the parts can be salvaged for this application with the 2C39A.

Making the Cavities

The ASB cavity, if used, should be cut apart carefully so that it is $1\frac{3}{4}$ inches long. The inside diameter is $2\frac{7}{8}$ inches. The original cathode ring is salvaged for use as a plate contact for the 2C39A. The grid ring is used for the grid contact

for the 2C39A, also. Both these are spring-contact finger stock and are probably the most difficult parts to make if suitable materials are not at hand. The plate line of the 446A is cut to a length of $1\frac{7}{8}$ inches, and then slotted to take the cathode sleeve of the 2C39A. The insert that originally held the plate contact to the plate line is slotted to a depth of about $\frac{3}{8}$ inch, and then pinched together slightly to fit into the heater connection on the 2C39A. Heater voltage should be fed through shielded wire. Insert the



The tripler for 1215 Mc. uses a 2C39A tube. The small cylinder at the bottom of the assembly is the 420-Mc. cathode tank circuit, and the 1215-Mc. tank is a radial cavity. Air should be blown across the plate fins in normal operation.

heater connection in the end of the tube before putting the tube into the cavity.

The radial plate cavity is made of thick-wall aluminum tubing, 3 inches inside diameter and $2\frac{5}{8}$ inch long. Silver-plated brass would be fine, if you can manage it. Top and bottom covers are $\frac{3}{8}$ -inch aluminum, fastened to the cylinder with six No. 4 screws each. The bottom cover is drilled and countersunk to take four 6-32 flat-head machine screws that hold the cathode line onto the assembly. The ears into which these screws thread are integral parts of the ASB tank circuit.

Both grid and plate contact rings are insulated from the case for d.c., but there must be capacitance to the case to make the cavities function properly. The rings are separated from the cavity by sheets of Teflon, though any good insulation that will stand heat may be used. The grid contact ring is held to the cathode side of the bottom cover by a round sheet of flashing copper, $2\frac{1}{4}$ inches in diameter. The screws that hold this in place must, of course, be insulated from either the copper plate or the cover. In the photograph, a short insulated lead for the grid leak is shown

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attached to a lug under one of the nuts that holds this assembly together. The screw is insulated from the cavity. The other three screws are insulated from the copper plate, but not from the cavity. The plate contact ring, on the top of the cavity, is treated in like manner, except that only three screws are used. One of these makes contact to the ring and is used for a plate-voltage terminal. The other two are insulated from the ring, but not the cover.

Inductive coupling is used for both input and output. Details of the coupling loops should be clear from the photographs. The cathode cavity is tuned by means of a disk capacitor, the fixed plate of which is part of the cathode line. The movable plate is mounted on a fine-thread screw, which runs through a threaded fitting attached to the inner wall of the cavity. The end of the screw is slotted to permit adjustment from outside the cavity. Coupling out of the cavity can be varied by turning the Type N coaxial fitting. Maximum coupling is with the loop vertical. This position is indicated with a dot of red paint on the sleeve so placed that it lines up with the slot in the fixed portion of the fitting when the loop is vertical. Normal coupling is about 15 degrees from the vertical position. Tuning is done with a $\frac{1}{4} \times \frac{5}{8} \times \frac{3}{8}$ -inch piece of copper, fastened to a $\frac{1}{4}$ -inch polystyrene rod that is brought out through a shaft bearing. Pulling the rod out raises the tuning range higher in frequency. Normal tuning is done by rotating the rod.

Operation

Drive for the tripler is furnished by a 9903 tripler to 432 Mc. With a 10,000-ohm grid resistor, grid current in the 2C39A is about 12 ma., dropping to 10 under load. So far the tube has been operated at no more than 450 volts, as no cooling has been used. At this voltage the plate current dips to 35 to 40 ma. at resonance.

No means of measuring output is available, but the appreciable dip indicates that fair efficiency can be expected.

Sufficient cooling for low-power operation may be obtained by blowing air across the tube's plate fins. If anything approaching the maximum rating for the tube is to be run, a cowling should be used around the cooling fins, to confine the air flow where it will do the most good. Air should also be blown through the cathode cavity. Holes should be drilled in this cavity for ventilation, even at low power levels. Air flow should be increased as the plate dissipation is raised. With no cowling, a flow of 10 cubic feet per minute will take care of up to 40 watts plate dissipation. With a cowling just larger than the plate fins, 10 c.f.m. will allow up to 85 watts dissipation. Running the maximum of 100 watts dissipation raises the air requirement to about 13 c.f.m. There should be a forced air flow through the cathode cavity if more than about 25 watts dissipation is anticipated.

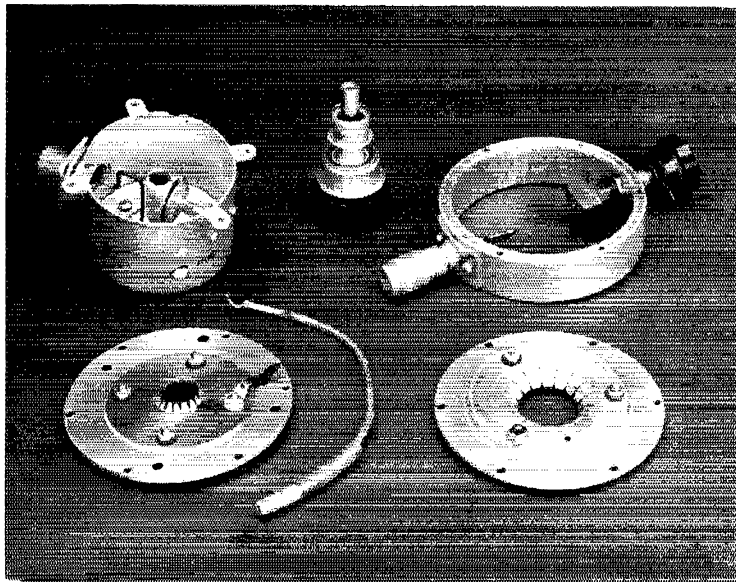
The 2C39A should be inserted into and removed from the cavity with care. The grid plane is held to the glass seal with only a ring of cement; it can be broken loose very easily if any strain is applied to the grid, cathode or heater terminals. Remember, too, that the top plate is hot for d.c. Do not attempt to handle the cavity when plate voltage is applied.

In a cavity very similar to the one described here, it was found that the tube could be made to oscillate by reducing the capacitance in the cathode circuit. The grid resistor was reduced to 1200 ohms for this purpose. The oscillation frequency was around 1280 Mc., but by some re-tuning of the cathode cavity the frequency was changed to about 960 Mc. Obviously some accurate method of checking frequency should be available before operation of the unit as an oscillator is attempted.

◆

Components of the 1215-Mc. tripler. Lower left: bottom plate of the 1215-Mc. plate cavity, showing grid-contact ring and capacitor plate. Right front: top cover, with plate-contact ring and bypass element. Upper left shows interior of the cathode cavity, with the radial plate cavity in the upper right. The 2C39A and the heater contact lead are in the center of the picture.

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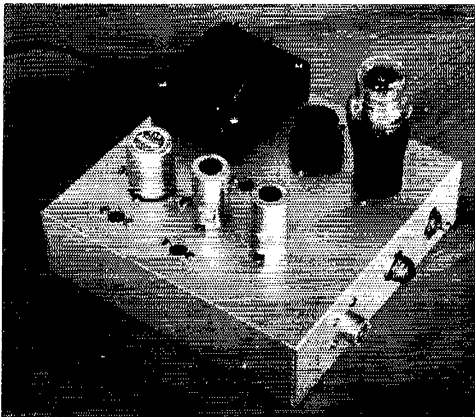


Subinterval Markers from a 100-Kc. Crystal

More on Simple Secondary Standards

BY W. C. SMITH,* K6DYX

BEING in possession of an old and uncalibrated receiver, the article, "50-Kc. Markers from a 100-Kc. Crystal," *QST*, July, 1954, was of particular interest to me. If this circuit would divide a frequency by two, why not by five, or even ten, and yield markers every 20 or 10 kc.?



The crystal calibrator unit complete with power supply.

With this possibility in mind and, with the help of H. Minor, KN6JIE, the circuit of Fig. 1 was assembled. We carried out extensive tests and

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• This article is supplementary to one that appeared in the July, 1954, issue. K6DYX shows how additional markers at intervals as small as $6\frac{2}{3}$ kc. may be obtained from a 100-kc. crystal. Included is a series of graphs that help to explain the manner in which the circuit works.

think the results would be of interest to other hams.

Circuit Operation

It was immediately apparent that the explanation offered in the original article is incorrect. The grid resistor has little effect on the frequency of the subharmonics. The cathode by-pass capacitor is likewise ineffective, although there is an optimum range for both these components in their effect on the stability of operation.

The proper explanation seems to be that the relaxation pulse from the screen circuit is fed to the LC network composed of L , C_1 and C_2 through the crystal operating at near its series resonant frequency. A transient oscillation is excited in the tuned circuit which, for 50-kc. markers, has a frequency of 350 kc. Thus the grid signal consists of the resonant frequency of the crystal with the frequency of the tuned circuit superimposed upon it (Fig. 2A). The

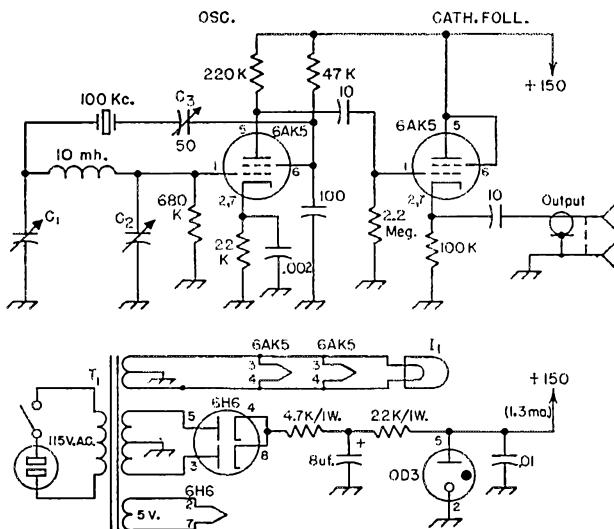
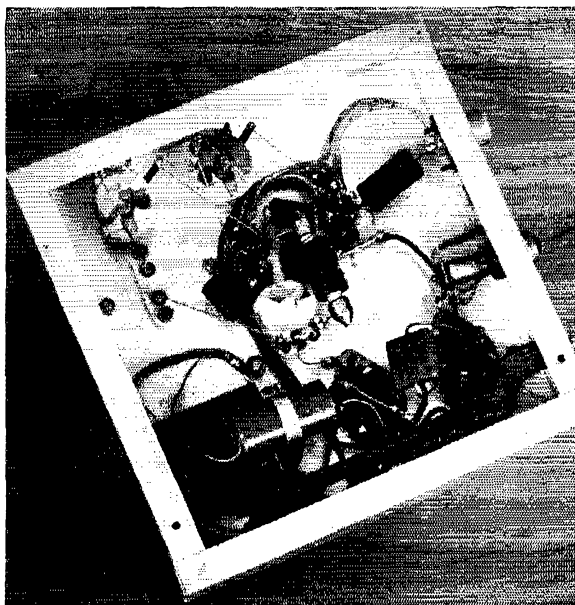


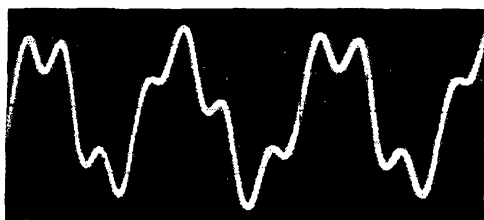
Fig. 1 — Circuit for obtaining subinterval markers from a 100-kc. crystal. All capacitances less than 0.001 μ f. are in μ f. C_1 and C_2 are 50- μ f. air trimmers. All resistors $\frac{1}{2}$ watt, unless otherwise noted. T_1 — Power transformer: 750 v.c.t., 40 ma.; 5 volts, 2 amp.; 6.3 volts, 2 amp.

Bottom view of the crystal calibrator.



positive crests of this complex wave trigger the tube in such a way that the screen voltage appears as in Fig. 2B, and the output voltage as in Fig. 2C. There is little or no synchronizing action, since the crystal does not feed back any of the 350-kc.

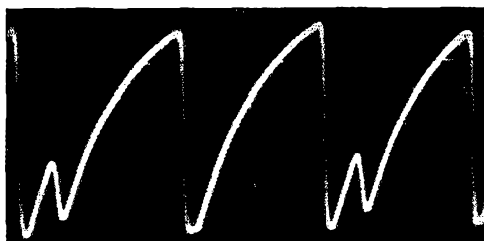
frequency present in the screen voltage. The cathode bias is important, because the tube triggers as its grid returns from beyond cut-off, but the capacitor across the cathode resistor serves only to stabilize the bias, and has no direct effect on the frequency. The time constant of the screen circuit should be less than the period of the crystal for strong relaxation pulses. In this case it is $47K \times 100 \mu\text{f.} = 4.7$ microseconds, whereas the period of the crystal is 10 microseconds.



(A)



(B)



(C)

Fig. 2—Oscillograms when circuit is adjusted for 50-kc. markers. A—Grid voltage. B—Screen voltage. C—Output voltage.

Other Subharmonics

The existence of 50 kc. and harmonics thereof in the output voltage is obvious from Fig. 2C. Here every second one of the 100-kc. sawtooths is distorted. According to the theory of operation given above, it should be possible to distort every third tooth by tuning the LC circuit to $333\frac{1}{3}$ kc. and obtain markers every $33\frac{1}{3}$ kc. This was found to be the case. In fact, it was possible in our set-up to distort the sawtooths at any periodicity up to the 15th, yielding markers every $6\frac{2}{3}$ kc. A series of frequencies to which the LC circuit was tuned, the ratio of these frequencies to the 100-kc. fundamental, and the separation of the marker frequencies is shown in Table I. This is not the only series that will produce subharmonic distortion in this way. A ratio of $3/2$, $5/2$, $7/2$, $9/2$, etc., will result in $1/2$ frequency harmonics. A formula giving the frequency of the tuned circuit, L with C_1 and C_2 in series across it, is:

$$F_t = nF_1 \pm F_h$$

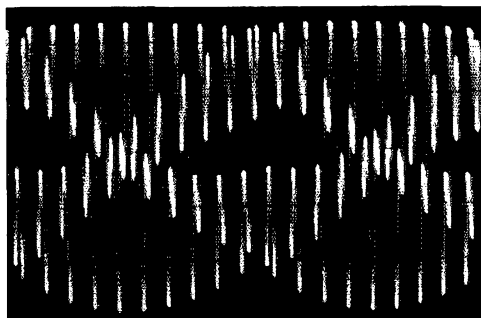
Where n takes on integral values, F_1 is the fundamental frequency, and F_h is the frequency separation of the harmonics it is desired to produce. This formula was verified in our experimental work, but the frequencies shown in Table I seemed to work out best.

Fig. 3 shows the grid-voltage wave and the

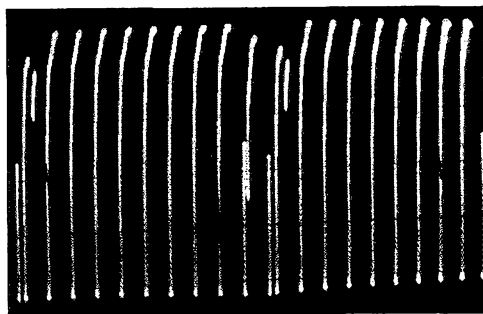
output-voltage wave when the circuit was adjusted for 10-kc. separation of the markers. Note that the frequency ratio in Fig. 3A is clearly 31 to 10. The adjustment of either C_1 or C_2 is rather critical because the frequency of the tuned circuit must be within a few hundred cycles of 310 kc. We found it advisable to use a cathode-follower buffer after the oscillator circuit to avoid detuning when we changed loads. Adjusting the fundamental to exactly 100 kc. is also critical, because tuning the LC circuit pulls the crystal a little and it is necessary to readjust C_3 .

Adjustment Procedure

For our experimental work we had available rather ideal equipment in the way of synchroscopes and frequency counters, but the unit has been adjusted from scratch and used in the home station with very satisfactory results. The best procedure is to establish oscillation, and adjust either or both C_1 and C_2 until clean markers are heard on the station receiver at 100-kc. intervals.



(A)



(B)

Fig. 3—Oscillograms obtained when circuit is adjusted for 10-kc. markers. A—Grid voltage. B—Output voltage.

Then tune the receiver to the approximate point where the subinterval marker is desired and adjust either or both C_1 and C_2 until a clear, clean marker is heard. No difficulty at all was experienced in getting markers every 20 kc., but for closer intervals one should check that there are the required number between the 100-kc. points previously noted. After the marker intervals have been established, zero-beat with WWV by adjustment of C_3 .

Frequency of Tuned Circuit, Kc.	Ratio of Tuned Circuit and Crystal Frequencies	Separation of Markers, Kc.
350	7 to 2	50
333½	10 to 3	33½
325	13 to 4	25
320	16 to 5	20
316¾	19 to 6	16¾
314½	22 to 7	14.285
312.5	25 to 8	12.5
311.1	28 to 9	11.1
310	31 to 10	10

Construction

The unit shown in the photographs includes a cathode-follower buffer stage and a built-in power supply with voltage regulation. The circuits of these sections also appear in Fig. 1. The components are assembled on a 7 × 7 × 2-inch aluminum chassis. The power transformer, 6H6 rectifier and 0D3/VR150 voltage-regulator tube are lined up along the right-hand edge of the chassis. At the left are the 100-kc. crystal (at the rear), the oscillator tube, and the cathode-follower tube. A coax output connector, pilot lamp and power switch are set in the front edge of the chassis.

In the bottom view, at the top, C_3 is to the left, and C_2 to the right. C_1 may be seen near the center. Clearance holes have been cut in the chassis so that these three variable capacitors can be adjusted from the top with a screwdriver.

Silent Keys

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

- W1AFT, Bernard Seamon, Wiscasset, Me.
- W1BBL, Frank G. Cheever, Manchester, Mass.
- W1UHR, Henry A. Starkel, West Hartford, Conn.
- W2CZV, ex-W2BKG, Joseph D. Braman, Woodhaven, L. I., N. Y.
- W2GLY, George W. Weidman, Haddon Heights, N. J.
- ex-W3BAQ, ex-3BAQ, Theodore Torretti, Trenton, N. J.
- ex-3JJ, Louis J. Kncshaw, Trenton, N. J.
- W3MCF, ex-W8ION, Paul K. Secor, Sayre, Pa.
- W4BYN, Herman Rieben, Memphis, Tenn.
- W4MZN, Everett G. Hemenway, Covington, Va.
- W6LJO, Horace A. Bodine, Los Angeles, Calif.
- W6PBM, Leland M. Anderson, Woodland, Calif.
- W7FT, Wilson P. Boyd, Heyburn, Ida.
- W7IIV, Marvin S. Worthley, Portland, Ore.
- W8HFQ, LeRoy C. Bridgman, Garden City, Mich.
- W8HHF, Maynard A. Nelson, Sylvania, Ohio
- W8PBK, Fred P. Manderscheid, Detroit, Mich.
- W8PTD, Charles W. Woodward, Detroit, Mich.
- W9URC, Wayman C. Herkless, Indianapolis, Ind.
- E17U, Dick Murphy, Dublin
- G5HU, ex-G15HU, Robert S. Holden, Sheffield, Yorkshire
- H89DQ, Otto Disteli, Sainte-Croix, Vaud
- PY7AJ, Joao Baptista de Carvalho, Olinda, Pernambuco
- VK2DG, Keith Rudkin, East Maitland
- VK5CR, C. R. Cheel, Maylands

Modifying 75A-2 and 75A-3 Receivers

Hints on Bringing Two Popular Receivers Up to Date

BY E. A. ANDRADE,* WØDAN, AND E. W. PAPPENFUS,* WØSYF

A PREVIOUS ARTICLE spoke of receiver design in general terms,¹ but this treatment may not have answered the needs of many receiver owners. While it is impossible to discuss each receiver specifically, perhaps a detailed commentary on the 75A-2 and 75A-3, with special emphasis on improving performance, might be in order. Since the production of the first 75A-2 some three and one half years ago, there has necessarily been a number of changes. As pointed out in the previous article, in some respects receiver design is one of compromise of conflicting factors. A change of viewpoint sometimes causes revision of circuits to effect a new compromise. Another reason for modification is the need for improvements to keep a design abreast of the state of the art. Yet another reason for circuit change is lack of consideration of production variations and engineering error, but it is very hard to get any engineer to admit this.

R.F. Stage Changes

The first 75A-2 receivers used a 6AK5 tube in the r.f. stage. This tube is very good from the standpoint of sensitivity but, since it has

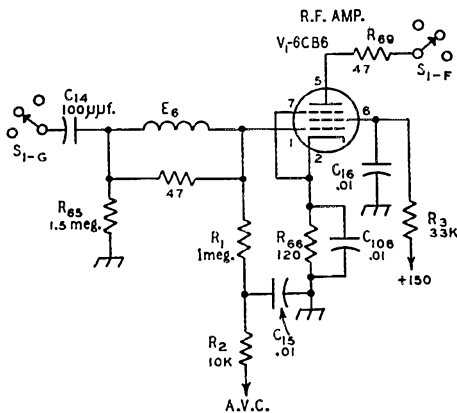


Fig. 1 — Revised 75A-2 r.f. stage circuit when replacing 6AK5 with 6CB6. All resistors = 10 per cent values, ½ watt. See Appendix I.

a sharp cut-off characteristic, it is not suitable in this application if the receiver is subject to strong signals on adjacent channels. It tends to cross-modulate at lower levels than are desirable. By changing to a 6CB6, as shown in Fig. 1, greater freedom from cross-modulation is ob-

* Collins Radio Company, Cedar Rapids, Iowa.

¹ Pappenfus, "A Discussion of Receiver Performance," QST, Jan., 1955.

• During the past several years, the Collins Company has introduced several receiver improvements. In this article two of their engineers tell how these improvements can be applied to some of the older models.

tained. To make this change, see Appendix I.

A recent tube development offers even greater freedom from receiver malfunctioning in the presence of strong interfering signals. This tube is the Type 6DC6 or 6BZ6, which was developed to meet the same problem in television receivers. Adding this tube to the 75A line-up really shows

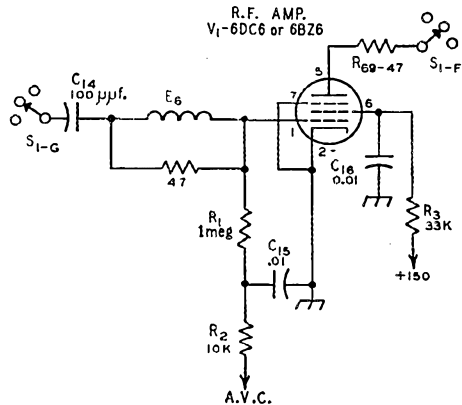


Fig. 2 — Revised r.f. stage for use of low cross-modulation 6DC6. All resistors = 10 per cent values, ½ watt. See Appendix II.

a great improvement. At the present time the 6DC6 as an r.f. stage offers much better performance in a strong-signal area and yet it possesses a good noise figure. The circuit diagram for the 6DC6 or 6BZ6 is shown in Fig. 2, and conversion instructions are given in Appendix II.

R.F. Attenuator

Now that a good front-end tube is available, what is the next step if this is not enough? If the receiver still suffers from cross-modulation, an r.f. attenuator can be used. Try the circuit of Fig. 3 between the antenna and the receiver antenna input terminal. As pointed out in the previous article, if both signals are well above the noise level, the loss in the antenna lead-in will not hinder reception of the desired signal. In fact, a.v.c. will bring up the gain so that it is almost impossible to detect a change in audio

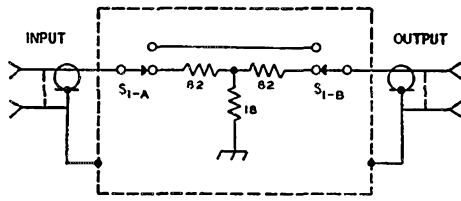


Fig. 3 — R.f. attenuator of 21-db. loss for reducing signals at antenna terminals. All resistors \approx 10 per cent values, $\frac{1}{2}$ watt. S_1 — D.p.d.t. toggle.

level when receiving a.m. signals. Thus the resistive r.f. attenuator can offer improvement in receiver characteristics in most cases. If maximum receiver sensitivity is needed, as in the case of DX reception, there is no satisfactory solution except added r.f. selectivity. R.f. selectivity can come only from large low-loss coils which are not practical in a receiver. The transmitter antenna coupler, however, does meet the requirements for good selectivity because ordinarily high- Q coils are used, to prevent loss of transmitter power. It is logical then to use the antenna coupler for both transmission and reception, if one is available in the station.

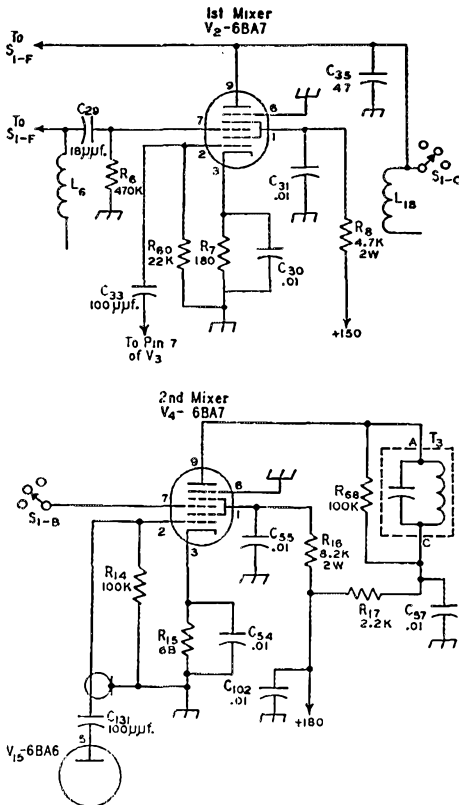


Fig. 4 — Revised mixer circuits for the 75A-2 where replacing 6BE6s with 6BA7s. All resistors \approx 10 per cent values, $\frac{1}{2}$ watt, unless otherwise noted. See Appendix III.

For a better signal-to-noise ratio, generally do not forget the value of a beam antenna. A beam with its high gain and directivity, together with a transmission line of low noise pick-up, provides better signals at the receiver antenna terminals. The front-to-back ratio of the beam antenna also helps to discriminate against strong signals off the rear of the beam. If manmade noise is very bad, a filter in the a.c. line to the receiver may help.

Mixer Stages

One circuit problem facing every receiver designer is mixer noise. In the 75A-2 a 6BE6 was used for both first and second converters, as has been common practice in the past. Upon checking further into mixer noise level, it was found that the 6BA7 pentagrid mixer has less noise than the 6BE6. The tube replacement was made in the 75A, and over-all receiver performance improved. Unfortunately, the 6BA7 requires some blacksmith work on the chassis, since the seven-pin sockets must be replaced by the nine-pin version. See Appendix III and Fig. 4 for this modification. A further modification, resulting from extensive tests, was an increase in mixer bias level by changing R_7 in the V_2 mixer cathode from 68 to 180 ohms. This change refers to the 6BA7 mixer only.

Mechanical Filters

When it became evident that the mechanical filter contributed so much to the amateur receiver performance, it was decided to modify the set to secure the improved selectivity. The revision took the form of an adapter chassis occupying the space previously taken by i.f. transformers T_4 and T_5 . This simple adaptation permits amateurs in the field to take advantage of the better selectivity now available through the use of a mechanical filter, without a difficult rebuilding job. See Fig. 5 for the new circuit and Appendix IV for modification instructions. The adapter chassis was designed with an added amplifier tube, V_{18} , to compensate for the 23-db. insertion loss of the original mechanical filter. The loss in the mechanical filter upset the gain distribution of the set so that V_{18} tended to add noise to the set, and a slightly degraded noise figure was present on some sets. By removing R_{78} and grounding the cathode of V_{18} , a reduction of internal receiver noise results.

When the new Collins mechanical filter with 10-db. insertion loss became available, loading resistors R_{81} (across the grid circuit of V_6) and R_{83} (82,000 ohms across the output of T_6) were added. The filter tuning capacitors were also changed when the low-loss filter replaced the high-loss element. See Fig. 5.

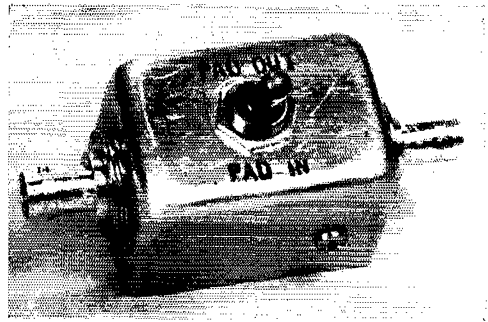
If your receiver has been in use for some time, it is wise to check the tubes and touch up the trimmers as explained in the instruction book. These routine tests will insure that peak performance of the receiver is maintained. This is, of course, a good practice in any communications receiver.

Selectivity

It was found that the shape of the 75A i.f. selectivity curve could be somewhat improved by stagger tuning the i.f. transformers. This effectively peaks the corners of the i.f. passband, resulting in less rounding of the corners of the passband than afforded by the mechanical filter and transformers peaked at the midfrequency. Instructions for the revision and realignment to accomplish this result will be found in Appendix IV.

It is desirable, from the standpoint of maintaining the audio output level nearly constant during fades, to obtain a flat a.v.c. characteristic, with the a.v.c. threshold occurring at levels of 1 to 2 microvolts. This flat a.v.c. characteristic has the undesirable effect of increasing the audio output when the receiver is detuned from a signal or when the received signal goes off the air. This difference in level is attributable to the noise appearing as a highly modulated signal with a very small carrier component. Because the a.v.c. time constants will not charge sufficiently on noise to hold down the set gain, the over-all result is an increase in audio output over what was obtained with the received signal. To aggravate this situation, many amateur signals are not 100 per cent modulated and, as a result, the difference between the audio output on a signal and noise between signals is further increased.

One solution to this problem is to back down the r.f. gain control to a point where the noise between stations is not objectionable but where there is still adequate receiver gain. It should be noted that when this is done, the S-meter reading for a given signal will not change appreciably unless the signal level approaches the



To prevent receiver overload and cross-modulation on exceptionally strong signals, this simple attenuator can be used at the antenna terminals.

a.v.c. threshold level. However, when tuning signals that are very weak, it is advisable to operate the r.f. gain control wide open, for maximum sensitivity.

It was found that the noise immunity of the a.v.c. system could be improved by rearranging the a.v.c. time constants. This improvement is most noticeable in the presence of sharp pulses such as ignition noise. The necessary changes are shown in Appendix V.

It is hoped that these comments and modification instructions will be of assistance to receiver owners.

Appendix I

Revision from 6AK5 to 6CB6 r.f. amplifier in 75A-2 receiver.

- 1) Connect jumper between Pins 2 and 7 of V_1 socket.
- 2) Revise value of R_{65} from 1 megohm to 1.5 megohms (or add if not present).
- 3) Replace 6AK5 r.f. amplifier tube with Type 6CB6.

(Continued on page 118)

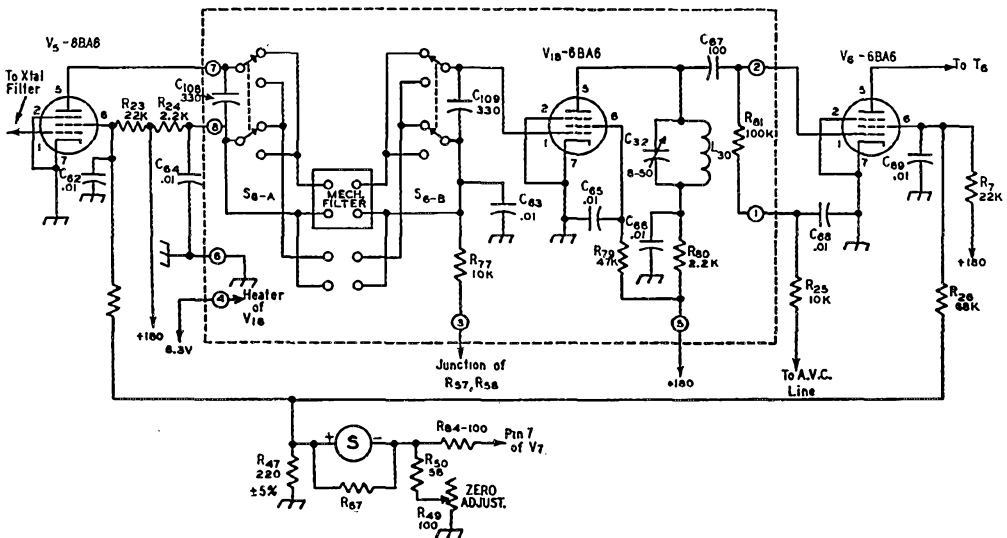


Fig. 5 — Circuit modifications for using 455B mechanical filter. All resistors ± 10 per cent values, $\frac{1}{2}$ watt. R_{67} — 150 ohms. If 455C mechanical filter is used, the following values change: C_{108}, C_{109} — 130 μF . R_{81} — 10,000 ohms.

Selenium Break-In Keying

Another Differential Circuit for Chirp-Free Keying

BY JOHN C. HAYS,* W5QNZ

BEING a firm believer in break-in and keying the transmitter in the final or last buffer, I wanted a system to turn on the first stages of my transmitter fast and have them hold on between letters or words. This eliminates the problems of chirp at the source, and the final keying can be adjusted to any degree of softness.¹

The Good Book was consulted, but relays and tubes were considered not to be the answer. Something was desired that would require few parts and little work. Since I use a vacuum-tube keyer built into the transmitter, I had a negative voltage of around 450 across the key through a high-impedance source. This circuit is very

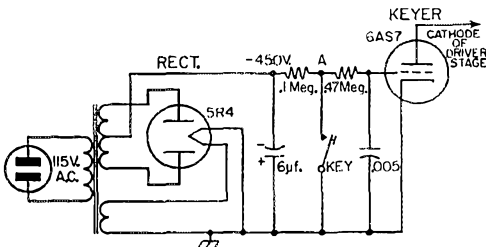


Fig. 1 — The vacuum-tube keyer used at W5QNZ is quite conventional, but differential keying is obtained by additional circuitry at point A.

much like the *Handbook* version (page 236 in 1953 and page 234 in 1954), and is shown in Fig. 1. Point A represents the high-impedance negative-voltage source. I connected this point to a 1- μ f. capacitor through a selenium-rectifier stack, and the voltage appearing across the capacitor is applied to the grid of the controlled stage through a 1-megohm resistor. This resistor serves as an isolating resistance and a voltage divider — the basic circuit is shown in Fig. 2.

Referring to Fig. 2, the rectifier is connected in what may be thought of as "reverse" — the 1- μ f. capacitor charges slowly through the 0.1-megohm resistance and the high back resistance (something over a megohm) of the rectifiers, thus delaying the application of the grid-blocking voltage to the oscillator. This delay permits the oscillator to stay "on" for an appreciable period after the key is opened — about 1 or 2 seconds. For those who worry about the speed with which the first dot or dash can be formed when the key is closed initially, the 1- μ f. capacitor is discharged through the forward resistance of the rectifiers,

* 7609 Prospect Ave. N.E., Albuquerque, N. M.

¹ It is imperative that keying the final or driver stage have no "pulling" effect on the steady-running oscillator, or this or any other differential-keying system will not solve the chirp problem. In such a case, better isolation between oscillator and keyed stage is required. — Ed.

² Carter, "Reducing Key Clicks," *QST*, March, 1949.

• Here is a simple differential-keying circuit that can be applied to practically any transmitter currently using tube or grid-block keying. It makes use of the high back resistance of selenium rectifiers to give two widely varying time constants in a circuit.

which amounts to perhaps 100 ohms and is of no consequence. Even if there was a slight "shortening" effect, this is the first character and all following makes will find the oscillator on. The output keying is determined solely by the shaping of the vacuum-tube keyer stage, unless there is some subsequent clipping.²

At W5QNZ, the stage marked "OSC" in Fig. 2 is actually the output stage of a "silent VFO." One triode of a 12AT7 is used as an 80-meter oscillator running all of the time, followed by the other triode as a cathode follower. The output of the cathode follower drives a 6AC7 buffer stage which is the stage controlled through the selenium rectifiers. Since the stages are well shielded and filtered, nothing is heard in the receiver until the 6AC7 is conducting. The same

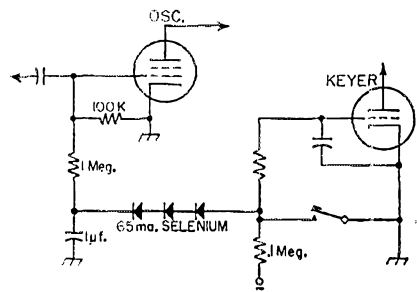


Fig. 2 — The oscillator stage is normally cut off by a negative voltage from the keyer. When the key is closed, the 1- μ f. capacitor discharges immediately via the selenium rectifiers and the oscillator turns on. It stays on for an appreciable time after the key is opened because the capacitor must charge through the high back resistance of the rectifiers.

principle should apply equally well, however, to control of the oscillator stage where a "silent VFO" isn't used. Sharp cut-off tubes like the 6AC7 and 6SH7 are desirable in the oscillator stage; and if a somewhat lower- μ tube is used, it may be necessary to use something smaller than the 1-megohm resistor. With the values given, the 1- μ f. capacitor charges up to about -200 volts, of which about -18 volts appears at the grid of the controlled tube.

(Continued on page 122)

Six Meters for the Beginner

Part III — Transmitting Equipment and Antennas

BY EDWARD P. TILTON, WIHQ

THE 50-Mc. band is attractive to the fellow who is just getting started in that it is still possible to do interesting work on 6 with very low power. Increasing power pays off, of course, but plenty of good stuff has been worked with no more than a few watts. The kind of work you expect to do will determine how much power you will need.

If you want only a rig that will give you a good signal locally, there is little reason to go beyond the receiving tube power level. Something like the rig described here will do the job nicely, and it will help the interference problem markedly if you stick with low power. It may surprise you to learn that a 10-watt rig is quite capable of giving a good account of itself when the band is open, too. When sporadic-*E* skip communication is possible at all, signals are usually quite strong; thus there is not a large difference in results whether high or low power is used. Under borderline conditions, the extra margin over the noise that the high-powered signal enjoys is a major factor in making contacts, but there is probably no field in which low power works out to better advantage than in 6-meter DX. There is no real QRM, and it is unlikely that there ever will be, so we don't need high power to override other stations on the same frequency.

High power does pay off handsomely in one phase of v.h.f. work. To have a wide reliable operating radius you have to lick one enemy: the noise level. The edge of your normal coverage is the point at which your signal disappears into the receiver noise. This is farther out when high power is used, whether you're working on 50, 144, 220 or 420 Mc. (That's why we have super-powered TV stations.) If your signal is running S9 at the receiving point, increasing power from 10 to 100 watts (10 db., or about 2 S-units) won't sound like much. But if you are just a whisker over the noise, that 10 db. will put you right up there in the solidly-readable category.

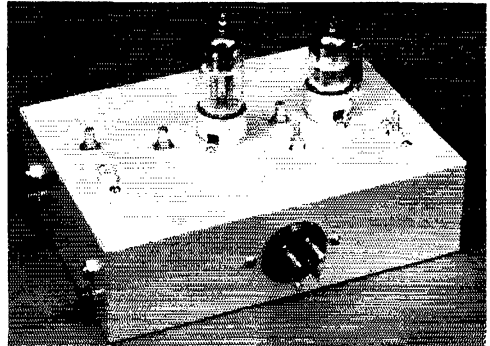
When you're after that additional 10 db. of signal, the first place to go all-out is in the antenna. Decibels come easier and cheaper there than in the transmitter. In v.h.f. work it is approaching the ridiculous to increase power while using an ineffective antenna. On 80 you may have to put up with a makeshift, but on 6 almost everyone can manage an array that will give good results.

With TV antenna components and rotators available at moderate cost, there is little reason for not having a rotatable array. Even a dipole works well if you can aim it in the right direction for every station, and two or three elements will do a real job. If you *have* to, you can make con-

tacts on 6 with an antenna designed for lower frequencies, but the chances are that it won't do nearly as well as even the simplest rotatable antenna system designed for the job. If you can put up a 4-element array of the type described in all recent editions of the *Handbook*, you'll have gained as much, in respect to coverage with a dipole, as would result from increasing your transmitter power from 10 to 100 watts. It will pay a much larger dividend, actually, for it will increase your receiving performance by at least as great a factor.

A Low-Cost 10-Watt Transmitter

The little rig pictured here will take an input of 10 to 15 watts, when used with a 300-volt plate



A 2-tube 50-Mc. transmitter, capable of running 10 to 45 watts input. The 4-pin connector on the front wall of the chassis may be plugged directly into the modulator, or a cable may be run between the two units. Tip jacks on the left end of the chassis are for measuring final-stage grid and cathode current.

supply, and it can be adapted readily to portable or mobile, as well as home-station use. When used in conjunction with the modulator described in *QST* for December, 1954, it makes a complete 'phone-c.w. transmitter that will give a good account of itself on 6. After you've made your start with the rig as described, it may be used to drive higher power stages at a later date.

Two dual triode tubes are used. A 12AT7 serves as an overtone oscillator and doubler, using 8.3- or 25-Mc. crystals. Output is on 50 Mc., driving a 12BH7 push-pull amplifier. The second tube can also be a 12AT7, but the larger tube handles the power more readily. The rig fits a 5 by 7 by 2-inch aluminum chassis, with plenty of room to spare.

Building the transmitter r.f. section and modulator in separate units is highly recommended, as the r.f. section for another band can be plugged into the modulator at any time. If you decide to make changes in either unit, the other can be left

intact, whereas a revamping operation may be rather cumbersome when r.f. and audio are all on one chassis.

Looking at the top-view photograph, it may be seen that the tube sockets and the tuning capacitors, C_4 and C_5 , are mounted along the center line of the chassis. The oscillator-doubler socket, right, is $1\frac{1}{2}$ inches in from the end. The doubler capacitor is 1 inch to the left, and the two tube sockets are $2\frac{1}{4}$ inches apart. The plate tuning capacitor, C_6 , is $\frac{1}{4}$ inches to the left of the amplifier socket. The output jack and series-tuning capacitor are either side of the center line, $\frac{3}{4}$ inch from the left edge of the chassis. The oscillator plate coil screw is seen at the far right, and the crystal socket is in line with it, nearly obscured by the tube. The adjustment screw showing in front of C_4 is the balancing capacitor, C_1 .

Power is brought into the transmitter through a 4-pin fitting on the front wall of the chassis. This plugs into a matching fitting on the adjacent wall of the modulator unit. If it is desirable to mount the r.f. and modulator units separately, the two may be connected by a 4-wire cable of any convenient length. On the left edge of the chassis are two pairs of tip jacks for measur-

ing the final-stage grid current and cathode current. The cathode jacks may also be used for keying the rig for c.w. operation. It will be noted that one jack of each pair is mounted directly on the chassis. Obviously, it is possible to dispense with one of these, using one grounded jack and two insulated ones, if you wish to do so.

In the bottom view the oscillator-doubler tube socket is at the left. The 12BH7 amplifier socket is in the middle, with the tuned circuit and output coupling coil at the far right. At the middle of the picture, just above and below the amplifier socket, are the neutralizing capacitors, C_2 and C_3 . These are plastic TV trimmers, supported by the wires that connect them into the circuit. Note that they are not mounted on the chassis. The 0.001- μ f. by-pass capacitor in the 12BH7 cathode circuit should be connected as close to Pins 3 and 8 as possible.

Photographs of the modulator unit will be found in December, 1954, *QST*, pages 27 and 30. Arrangement of modulator parts is not critical. The complete diagram and parts required are given here, so that the unit may be built without reference to the earlier article, if necessary. Some minor modifications are included, so follow the

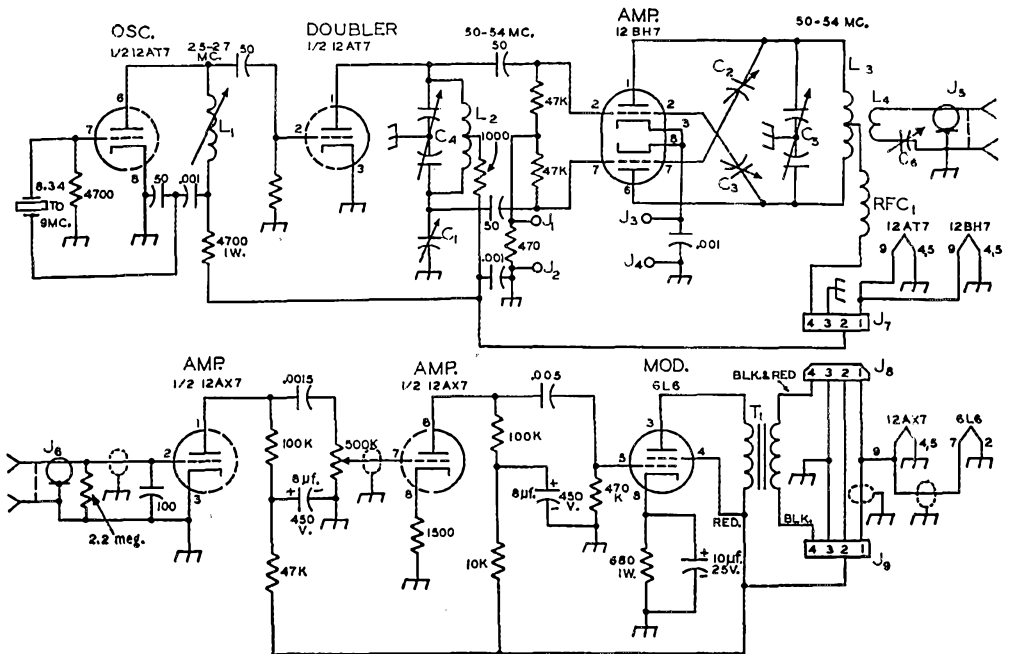


Fig. 1—Schematic diagram and parts information for the 50-Mc. r.f. unit and modulator. Resistors are $\frac{1}{2}$ watt unless otherwise specified. Doubler grid resistor is 47,000 ohms. Capacitors ceramic except as noted. Values below 0.001 are in μ f.

C_1, C_2, C_3 —0.5—5- μ f. plastic trimmer (Erie style 532-080R5).

C_4, C_5 —11- μ f. miniature butterfly (Johnson 11MB11).

C_6 —20- μ f. miniature variable (Johnson 20M11).

L_1 —20 turns No. 28 enam., close-wound on $\frac{3}{8}$ -inch iron-slug form (National XR-91). Wind near top.

L_2 —12 turns No. 20 $\frac{1}{2}$ -inch diam., spaced diameter of wire, center-tapped. (B & W Miniductor No. 3003).

L_3 —5 turns each side of center, B & W No. 3003, 5/16-inch space at center for L_4 .

L_4 —3 turns No. 20 enam., $\frac{1}{2}$ -inch diam., close-wound. Place between halves of L_3 .

J_1, J_3 —Insulated tip jack.

J_2, J_4 —Tip jack—not insulated from chassis.

J_5 —Single phono-type jack (Cinch No. 81A).

J_6 —Microphone connector (Amphenol 75-PC1M).

J_7, J_8 —4-pin male chassis fitting (Amphenol 86-RCP4).

J_9 —4-pin female fitting (Amphenol 78-RS4).

RFC_1 —Solenoid v.h.f. r.f. choke (Ohmite Z-50).

T_1 —Modulation transformer, 10-watt (Merit A-3003).

Bottom view of the 50-Mc. transmitter. Oscillator and doubler circuits are at the left. The amplifier tube socket is near the middle of the chassis, with the plate and output-coupling circuits at the right.

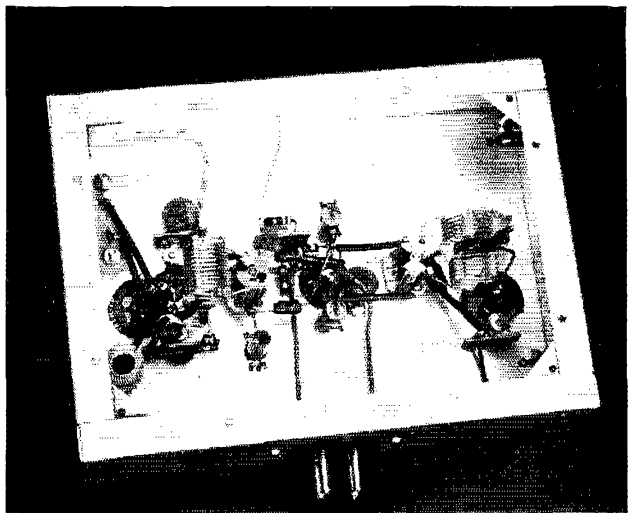


diagram given here, not the earlier one, in wiring the modulator. The power supply may be connected either through the modulator, or directly to the r.f. section. This permits operation of the transmitter on c.w. while the modulator unit is under construction.

The modulator was shown originally with a 6V6GT in the output stage. This may be used with the 50-Mc. transmitter, but more audio can be developed with a 6L6. If the rig is used for mobile work, retention of the 6V6GT would be advisable, in the interest of lower power drain. When the latter is used, the total power drain, with a 300-volt supply, is less than 100 ma., making it very suitable for operation from a vibrator or generator supply.

Adjustment

In hooking up the power supply a cable should be made up with a 4-pin female plug (Amphenol 78-PF4). This will attach to either J_9 or J_7 . The hot side of the 6.3-volt circuit (a.c. or d.c.) should be connected to Pin 1, the cold side and the negative side of the high-voltage circuit to Pin 3. The 300-volt lead is brought to Pin 2. This will energize the oscillator, doubler and audio circuits, but not the amplifier. It will be helpful if the power supply has a separate filament transformer for the transmitter heaters. In this way the tubes can be warmed up before applying the plate power, which will increase tube life. It will also make it possible to operate a 115-volt a.c. antenna relay, connected in parallel with the primary of the plate supply transformer, to switch the antenna to the transmitter when the plate power is applied.

Connect a short temporarily between pin jacks J_3 and J_4 , to close the final stage cathode circuit to ground. Connect a low-range milliammeter, preferably 0-5 or 0-10 ma., in pin jacks J_1 and J_2 , to measure the current developed in the final amplifier grid circuit when drive is applied. The positive terminal of the meter is connected to J_2 . If a low-range meter is not available, a 100-ma.

meter, that will later be used to measure the final plate current, may be substituted. It will be hard to read current accurately on this scale, however.

If a power supply delivering 200 volts or so is available it may be used for initial tests on the r.f. section. If a 300-volt source is used, do not leave it on longer than necessary, until the stages are tuned up properly, as damage to the tubes may result during off-resonance operation. With the tubes hot, apply plate voltage. Have C_4 set near the midpoint of its tuning range, C_1 near minimum, and C_2 and C_3 set with their brass slugs about halfway into the brass sleeves. If the coils are the proper size, and the circuits properly wired, there should be grid current showing on the meter connected to J_1 and J_2 .

Adjust the position of the slug in L_1 quickly for maximum amplifier grid current, and then tune C_4 to see if it can be increased further. Depending on the characteristics of the crystal used, there may be oscillation only over part of the tuning range of L_1 . In this case, grid current in the amplifier will appear suddenly as the coil slug is tuned through the resonance point. With some crystals oscillation may not start every time the plate voltage is applied if the coil is tuned exactly "on the nose" for maximum output. With it set for maximum amplifier grid current, apply plate voltage several times to be sure that the crystal always starts. Should it not do so, detune the coil slightly until easy and reliable starting is obtained.

It will be noted that the plate circuit of the doubler has a center-tapped coil tuned with a split-stator capacitor. R.f. power is coupled from both ends of this circuit into the grids of the amplifier. The output capacitance of the 12AT7 is in parallel with the upper half of the circuit, so some extra capacitance must be added at the bottom to achieve balanced drive. This is done with C_1 , which should be adjusted for maximum grid current in the amplifier, readjusting C_4 each time the setting is changed. It is not critical.

Before going any further, the frequencies in

the two stages should be checked. This can be done with a calibrated absorption wavemeter or grid-dip meter. Output from the oscillator should be on 25 to 27 Mc., the doubler between 50 and 54 Mc. Frequency can also be checked with a receiver that is capable of tuning these ranges, if you can be sure of its calibration. This is a somewhat risky business, however, as many spurious responses may show up in the receiver, and it is often difficult to tell when you have the right signal tuned in.

A listening check should be made to determine that the frequency is crystal controlled. With the receiver b.f.o. on, the signal should have a clear musical tone, and the frequency should show very little change when a metal object is moved near the oscillator plate coil, L_1 .

The next step is neutralization of the amplifier. With no plate voltage on the 12BH7, tune its

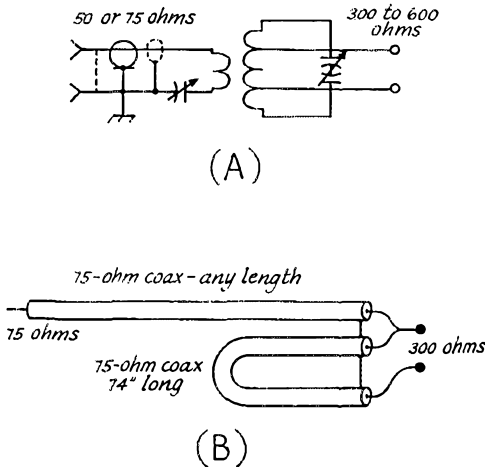


Fig. 2 — Two methods of feeding balanced lines or antennas with coax. The antenna coupler, above, can use components similar to those in the final stage plate circuit. Any impedance coax can be matched to any impedance balanced load, up to 600 ohms. The balun, B, gives a 4-to-1 impedance step-up. The outer conductors may be grounded to the antenna boom or mast.

plate circuit (with C_5) through resonance, watching for variation in grid current. The latter is likely to drop sharply as resonance is reached. Adjust the neutralizing capacitors, keeping them at approximately equal settings, and check for the amount of grid-current dip at resonance, increasing or decreasing the capacitance of C_2 and C_3 until the grid-current dip disappears.

Now we're ready to check the final stage. Connect a 0-100 milliammeter between Pins 2 and 4 of the plug on the power cable. This will apply plate voltage to the final stage, and indicate its plate current. Tune C_5 for minimum plate current, which will be about 5 to 10 ma. Now connect a lamp load to the output. This can be a 10- or 15-watt lamp, or four No. 44 (blue-bead) pilot lamps connected in parallel. None of these lamps will make a good load, but any will do for the initial check. With the load connected, tune the

series capacitor and retune the plate capacitor for maximum brilliance in the load lamp. This should show an output of about 5 watts, with an input of 10 or so. The position of the coupling coil, L_4 , should be at the point of lowest coupling to L_3 that will give the desired loading. Normal plate current, under load, will be about 40 ma., with a 300-volt plate supply.

The modulator is designed for use with a crystal or high-impedance dynamic microphone. The speech amplifier stages provide adequate gain, so long as the operator speaks directly into the microphone, at a distance of not more than two inches. A rough check on the required voice and gain levels can be obtained by watching the load lamp. There should be appreciable brightening of the lamp with ordinary speech.

The final stage may be keyed for c.w. operation by plugging a key into the tip jacks, J_3 and J_4 . With the key open no current will be drawn by the final stage. Stations nearby will hear the oscillator-doubler output, and will report "back-wave" when the key is up, but more distant stations will not hear this radiation to an appreciable extent. The cathode jacks may also be used for a meter, which will read the combined grid and plate currents. If neither key nor meter is connected, a short should be inserted in the jacks to close the cathode circuit. A conventional closed-circuit jack may, of course, be substituted for the tip jacks.

The same is true of the grid-current jacks, J_1 and J_2 , except that a resistor is connected permanently between their terminals, so whether or not a grid meter is connected will make no difference in the operation of the amplifier.

Normal operation of the transmitter, with 300-volt supply, will show approximately the following indications:

- Oscillator and doubler plate circuits — 10 ma. each.
- Final grid circuit — 4 ma.
- Final plate current — 35 to 50 ma.
- Output — 4 to 7 watts.

Coupling to the Antenna

Any recent edition of *The Radio Amateur's Handbook* or *The ARRL Antenna Book* will give you dimensions and construction ideas for 50-Mc. antennas. If you want to feed your array with coaxial line, the feedline may be plugged directly into the output connector, J_5 . In this case no further coupling devices are required, and adjustment involves only tuning C_6 for maximum loading. Retune C_5 each time an adjustment is made, to be sure that the final stage is tuned for minimum plate current. The position of the coupling loop, L_4 , should be set so that 35 to 40 ma. plate current is drawn with the antenna connected.

If a long run of transmission line is required between the rig and the antenna system, lower line losses will be encountered if open-wire line is used. This will require some form of antenna coupler or balun, to take care of the transformation from the unbalanced coax to the balanced open-wire line.

(Continued on page 122)

An Inexpensive Battery Charger for Field Use

BY J. S. REDDIE,* W7FVI

MOBILE and emergency-powered portable stations in the 5- to 25-watt class depend almost exclusively upon the storage battery as the primary source of power. A single, fully-charged 100-ampere-hour battery enables a station to stay on the air continuously for 5 to 10 hours at the 10- to 20-ampere discharge rate demanded of the battery. For operation over longer periods than this, it is necessary to provide additional electric energy in the form of either more batteries or a self-powered battery charger. For mobile installations, charging is readily accomplished by the car generator. However, this method is not practical for stations operated in a fixed location,

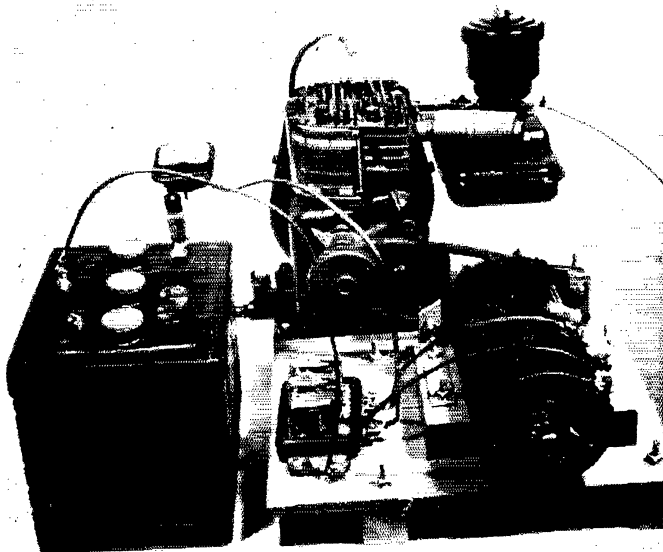
construct the 6-volt 30-ampere charger.

The gasoline engine, generator and regulator were rigidly mounted on a simple wooden frame. The regulator, shown in the lower left-hand corner of the charger, is wired so as to use only the cut-out section of the unit; its only purpose here is to prevent a reverse flow of current at low engine speeds. At normal engine speeds, full power is supplied to the battery.

The drive mechanism utilizes the same system employed in the power mower. At low engine speeds, the automatic clutch on the engine drive shaft is disengaged and no power is supplied to the V belt. As the engine speed is increased,

◆ Only a few hours are required to assemble this 30-ampere charger. If you happen to have a gasoline-powered lawnmower on hand and can dig up an old car generator and regulator, the cost is negligible.

◆



such as is often encountered in Field Day and civilian defense assignments.

A self-powered charger was assembled at this location with a minimum of time and expense. The unit is lightweight (60 lbs.), potent (30 amp.), and is suitable for continuous operation over extended periods of time.

The 1-horsepower 4-cycle gasoline engine was borrowed from my reel-type power lawnmower, an excess car generator was donated by the brother-in-law, and a much-used regulator was supplied by an interested neighbor. The odds and ends of wood, wire and hardware, plus a d.c. ammeter, were supplied from my own junk box. A few hours' time was all that was needed to

* 1918 Lassen, Richland, Wash.

centrifugal force causes the clutch to close, thus enabling the V belt to pick up the load.

Only four bolts hold the engine in place in either the charger or the power mower. Less than five minutes is required to switch the 32-pound engine from one assignment to the other. Those five minutes of time are the only price necessary to keep W7FVI on the air continuously for Field Day and disaster-team commitments.

Strays

W2RWY of Dexter, N. Y., is an active c.w. man on 40 meters. His name—Ken Pound!

What's the Answer?

A Question-and-Answer Quiz for the Beginner

BY LEWIS G. McCOY, WHICP

IN answering correspondence from amateurs around the country, it becomes apparent that certain questions repeat more than others. This would indicate that the same problems are shared by many beginners and that it would be helpful to have an article in *QST* discussing these problems. People seem to enjoy quizzes so we have listed the questions in bold-face type and, if you wish, you can try answering them before reading the explanations. If you get all the answers right it indicates that you have a pretty fair radio IQ for a beginner.

1. What causes key clicks?

There are two types of clicks. One is caused by electrical sparking at the key contacts. This is the same type of electrical noise you hear in your receiver when someone in the house turns on an electric light switch. Depending on the intensity of the spark generated and the associated wiring, the noise can cover quite a wide frequency range. The electrical noise from this sparking won't travel far — probably not more than a few hundred feet. However, it can cause interference to neighbors' radio reception, so the clicks should be eliminated. This type of click is easy to cure; a simple key-click filter (Fig. 1) at the key contacts will usually get rid of it.

The second type of click is that generated by the actual turning on and off of the transmitted signal. If the signal goes on or off too abruptly,

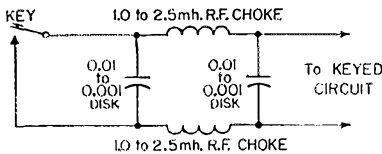


Fig. 1 -- Key-click filter.

a click will be generated. The clicks will be strongest close to the frequency of the transmitted signal but may extend far enough to cause interference across an amateur band. To get rid of this type of click it is necessary to "shape" the keying. The reader should study the keying chapter in *The Radio Amateur's Handbook*, as proper treatment of shaping procedure is beyond the scope of this article.

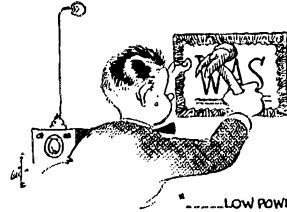
2. What causes chirp?

Chirp is a change in frequency as the transmitter is keyed. There are several possible causes for the frequency change. One is the voltage change on the oscillator stage from the key-up condition to key-down. This can be minimized by regulating the screen and plate voltages of the oscillator stage.

Another common cause of chirp is "pulling" of the oscillator frequency by changing conditions in the next stage or stages as the excitation is applied or removed. Changing voltages and currents in the stages following the oscillator "reflect" a variable load on the oscillator and pull the frequency. When such a condition exists it is necessary to have more or better isolation between the oscillator and the changing stage.

When persistent cases of chirp are encountered with several different crystals, one should look at the circuit adjustment. An overloaded oscillator can make any crystal chirp.

3. How far can one expect to work with a low-powered transmitter of say 5 or 10 watts input?



This is not an easy question to answer because of the many variables involved. It will depend a great deal on the location, type of antenna used, frequency, time of day and year, and band conditions. The condition of the ionosphere, the region above the earth that reflects radio signals, varies with the time of day, time of year, and the sunspot cycle. However, it would be safe to state that with a fair antenna, and exceptional band conditions, the transmitted signal from a 5- or 10-watt station can reach any country in the world. This holds true for any amateur band from 40 through 10 meters.

One amateur using approximately 35 watts input worked over 100 different countries on the 80-meter band. Many Novices have worked all 48 states using very low power.

4. What is the advantage in using the same antenna for transmitting and receiving?

Nearly all antennas will give better performance in certain directions than in others. To illustrate, let's assume we have a transmitting antenna that is good for transmitting in the east-west direction but is poor as far as north and south are concerned. Suppose we have another antenna, used for receiving, that shows good reception on the north-south path. We can call our heads off at stations on the north-south path but because our transmitted signal in this direction is weak, we get no replies. By using

the same antenna for transmitting and receiving, we eliminate this difficulty. It doesn't mean that everybody we call is going to come back but at least we know they *might* hear us. An antenna relay or knife switch can be used to switch the feeders to receiving or transmitting.

5. When tuning the amplifier plate circuit, which indication is the correct setting for resonance as shown by the plate milliammeter, minimum or maximum current?

The tuning setting that gives minimum plate current, or the "dip," is resonance in the plate circuit. Normally, the "dip" is the correct setting for getting maximum output from an amplifier. We say "normally" because in amplifiers using screen-grid tubes, maximum output may occur at a setting slightly different than the "dip." The safest method of tuning is to have an r.f. ammeter, or some similar indicating device, in the feed line and then tune the transmitter for maximum output as indicated by the r.f. ammeter. The final amplifier should not be loaded beyond the rated plate current of the tube in use.

6. What does "crystal-controlled" mean?

This means the frequency of the oscillator stage is determined by a quartz crystal. A crystal will only oscillate or vibrate at a certain frequency, depending on the dimensions and cut of quartz used in the crystal. Using a crystal-controlled oscillator is one method of making sure the transmitter frequency will be stable. In addition, the transmitter frequency will be accurately known.

The FCC requires that Novices use crystal control of their transmitters.

7. What is a harmonic?



A harmonic is a signal that is an integral multiple of the fundamental frequency. It is characteristic of certain types of r.f. generation that when we develop a fundamental signal, we also generate multiples of that frequency. For example, if we generate a signal on 3700 kilocycles, there will also be signals present at 7400 kc., 11,100 kc., 14,800 kc., etc. Normally, these harmonics will be weaker in strength as they go higher in frequency but in many cases they will be strong enough to cause interference to other services unless we do something to attenuate them.

8. Why are filaments and heaters necessary in vacuum tubes?

When an electric current is passed through the filament, the wire heats to incandescence.

In a vacuum, when the wire gets hot enough some of the electrons will fly off the filament and cluster around it. If another element is inserted in the tube and a voltage is applied between it and the filament (+ terminal to the new element), the electrons from the filament will flow to the added element.

The emitter of electrons in a vacuum tube is called the "cathode," and the filament described above is a "directly-heated cathode." Indirectly-heated cathodes are also widely used in vacuum tubes. Here a thin sleeve of metal is coated with a material that emits electrons at relatively low temperatures, and a small heater coil is contained within the sleeve. Indirectly-heated cathodes reduce hum problems in audio work that would be encountered with filament-type tubes.

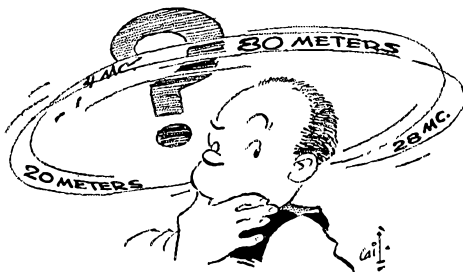
9. How does a rectifier tube act to change alternating current to direct current?

As one can see from the explanation of Question No. 8, the filament or cathode of a tube emits electrons which flow to the positive plate element. If an a.c. voltage is applied between plate and cathode, one half of each cycle of the voltage will be positive, the other half negative. During the positive half cycle, electrons from the filament will flow to the plate. Current will not flow during the negative half cycle. This gives us a pulsating d.c. which can then be run through a filter to smooth out the ripple that will be present.

10. How fast does a radio signal travel?

Radio signals travel at the same speed as light waves, approximately 186,000 miles per second. In this connection, it is interesting to note that recently two amateurs beamed a signal at the moon and then listened for the reflected signal. The signal had to travel a distance of some 440,000 miles to get to the moon and back. With radio traveling at the speed of light, the distance would be covered in about $2\frac{1}{2}$ seconds. You can imagine the thrill the two amateurs experienced when they sent the signal and then a couple of seconds later heard the faint "beep" of the returning signal.

11. What is the relationship of the 80-meter band to the 3.5-megacycle band?



They are the same. Probably one of the most confusing things the newcomer encounters is the reference to amateur bands by either meters or

(Continued on page 124)

Lightning Protection for the Transmitting Antenna

Grounded System for Open-Wire Feeders

BY R. C. CORDERMAN,* W4ZG

An old adage says lightning never strikes twice in the same place. You may not agree with this, but if it strikes you once it won't make any difference whether you do or don't agree.

Radio amateurs for the most part invite destruction by lightning by neglecting to provide any protection against it. The antenna usually associated with amateur radio transmitting equipment is most vulnerable to lightning due to its length and height. To validate your insurance, your antenna installation must comply with the National Board of Fire Underwriters Electrical Code which says:

Lightning Arresters — Transmitting Stations. Except where protected by a continuous metallic shield (coax) which is permanently and effectively grounded, or the antenna is permanently and effectively grounded, each conductor of a lead-in for outdoor antenna shall be provided with a lightning arrester or other suitable means which will drain static charges from the antenna system.

A similar requirement is applicable to a receiving antenna should it extend outside the

• Lightning protection for the amateur transmitting antenna, especially when open-wire feeders are used, has been largely neglected. W4ZG points out the dangers involved and offers some simple solutions.

ages can build up on an antenna due to other causes. About 1920, while attending Carnegie Tech, Pittsburgh, Penna., an experience was observed which will be of interest in this connection. The antenna at 8XC consisted of 10 wires 600 feet long, approximately 165 feet above the ground at its center. It ran across a gully, at the bottom of which was a mainline railroad track. When locomotives pulling heavy trains passed under the antenna, the static charge built up was sufficient to cause flash-over of an 8-inch gap. The flash repeated approximately every five

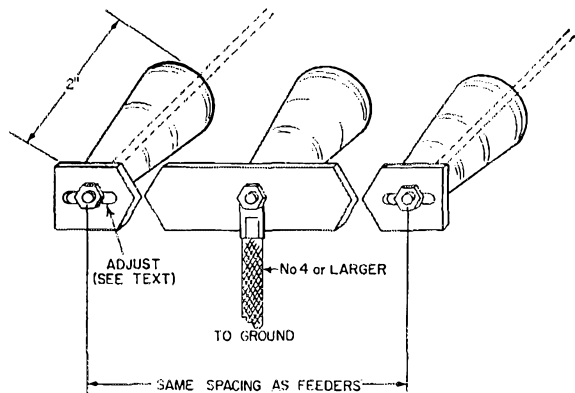


Fig. 1 — A simple lightning arrester made from three stand-off or feed-through insulators and sections of $\frac{1}{8}$ -inch-thick brass or copper bar.

building in which the receiving equipment is located.

Many years ago my antenna was struck by lightning. At that time, there was an insurance requirement which said that a 100-ampere switch should be used for grounding the antenna when the station was not in operation. The lightning completely destroyed most of the antenna wire, burned the wooden base of the lightning switch and burned the insulation off the No. 4 copper grounding wire between the switch and the ground stake. As the switch was in the grounded position, no damage to the house or radio equipment resulted.

Without adequate grounding, hazardous volt-

seconds while the engine was immediately beneath the antenna and less frequently when it was approaching or leaving the area below the antenna.

Lightning Arresters

What steps should we take to protect ourselves and our equipment against these hazards? You will observe that the Electrical Code specifies that the lead-in may be a coaxial cable, the shield of which is permanently and effectively grounded. This means that a ground connection, using No. 4 wire or larger, should be made to the shield of the coaxial cable at the point where it is nearest to the ground outside of the house. If the cable can be run underground, a grounding

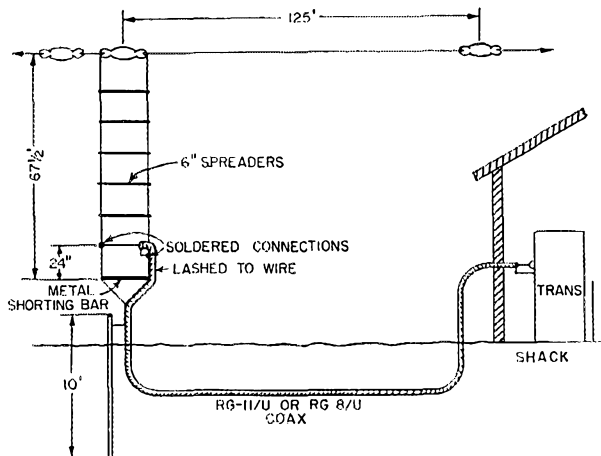
* 792 Oaklawn Ave., Winston-Salem, N. C.

stake should be located at the point where the cable enters the ground. The grounding stake, to be effective in soils of average conductivity, should be not less than 10 feet long, and if possible, plated with a metal which will not corrode in the local soil.

When open-wire feeders are used, a lightning arrester is required. The type of lightning arresters provided for residential broadcast and television antennas may be suitable for very

twelve years these gaps were in use there was never an occasion when a lightning hit came closer to our house than a half block when a neighbor's house was struck. This could have been a happenstance but it is the fact, nevertheless. In the Pennsylvania Dutch country around Lancaster and York, most barns nowadays are protected from lightning by a length of old trolley wire mounted on poles extending about 10 feet above the roof. Both ends of the wire

Fig. 2 — Sketch of coax-fed grounded Zepp antenna. Adjustment is discussed in the text.



low-power installations but where higher power is used, they are inadequate, since the radio-frequency voltage on the transmission line is usually enough to cause them to operate; i.e., flash over.

During the early Thirties, advice was obtained from the Naval Research Laboratory at Washington, D. C., on a suitable grounding arrangement for lightning protection for a 1-kw. installation. It was their suggestion that a spark gap be provided between each of the two open-wire feeders and a center contact, grounded with No. 4 or larger wire. It was recommended that $\frac{1}{8} \times \frac{1}{2}$ -inch flat brass rod shaped as shown in Fig. 1 be used for the gaps. Each of the gaps should be set sufficiently far apart so as to prevent flash-over during normal operation of the transmitter. It was found that because of the standing waves on the open-wire line a gap of approximately $\frac{3}{16}$ inch was necessary.

This device worked very well during thunderstorms as it would start sparking intermittently when a storm was approaching. As the storms passed over the immediate area, the frequency of discharge would increase. During heavy thunderstorms, there was a steady stream of sparks at the gaps. It was possible to operate the transmitter with relatively little effect on its performance even while the static charges were jumping across the equipment, but this was seldom done because of a personal reluctance to be so close to the antenna system. It has been my belief that a properly installed spark gap on an antenna system drains off sufficient static from the immediate area to prevent a direct hit. This view stems from that fact that during the

are grounded and, so far as can be learned, no barn so protected has suffered lightning damage.

Direct Ground Connection

Many of our modern antennas permit relatively simple methods of direct ground connection, which do not interfere with the operation of the antenna. Rotary beams using a T or gamma match may have the center of each of the elements, including directors and reflectors, grounded to the tower on which they are mounted. Two- and six-meter beams should have the supporting pole grounded. If the antenna is mounted on a wooden pole or on the top of a house, a No. 4 or larger wire should be extended from the beam to the ground, using insulators where the wire comes close to the building. The ground wire should be spaced away from metal objects such as gutters, etc., or should be solidly grounded to them. If the connection to such objects is not a good one, but is variable in resistance, it may be a source of spurious signals when excited by the transmitter. This often results in interference with your own or your neighbors' broadcast or television reception.

For the past seven years, the antenna shown in Fig. 2 has been used at W4ZG, Winston-Salem, N. C. It gives what appears to be good lightning protection. It hasn't been hit yet. And best of all, signal reports have been more than satisfactory on power comparisons made with other stations under like conditions.

The antenna may properly be called an end-fed Zepp. Since much of the work done here is on the Tar Heel Net frequency of 3865 kc., the

(Continued on page 124)

Happenings of the Month

ENGWICHT NEW DIRECTOR

Because of a change of employment, Ray H. Cornell, W6JZ, recently became ineligible to continue as a director of the League from the Pacific Division. In accordance with Article 8 of the Articles of Association, the Vice-Director, **Harry M. Engwicht, W6HC**, was thereupon proclaimed director for the remainder of the term expiring at the end of this year. As notice of the change was too late to permit Mr. Engwicht to attend the meeting of the Board of Directors in Hartford May 13th-14th, Mr. Cornell represented the views of the Pacific Division, although necessarily without vote. In its review of the matter, the Board of Directors set March 14, 1955, the date of change of employment, as the effective date of Director Engwicht's office.

7-MC. NOVICE SEGMENT EXPANDED

Three years ago when the Federal Communications Commission proposed a new 7-Mc. band segment of 7175-7200 kc. for Novice use, the League's Board of Directors heartily endorsed the idea but urged that the segment be 50 kc. in width. FCC ruled against the larger band, at the time, suggesting that operating experience with the smaller assignment should be acquired first. At its 1954 meeting the Board found itself precisely of the same opinion as earlier, and voted to recommend an expansion to 7150-7200 kc.; the Commission has now concluded rule-making proceedings in the matter and effective June 22nd amended our rules to authorize the full 50 kc. for Novice use.

R.E.T.M.A. AMATEUR COURSE

Through its Amateur Radio Activities Section, the Radio-Electronics-Television Manufacturers Association has produced a text-and-records course in theory and code instruction aimed at the Novice Class amateur license. The primary interest of the industry association lies neither in the sale of this item, since it is non-profit, nor in sales of amateur equipment, but rather in urging that more people take up amateur radio as a steppingstone to a career — the objective being to make additional trained personnel available to meet the needs of the expanding electronics field. RETMA suggests that its course will have particular interest for civil defense training programs, amateur radio clubs, hobby groups, schools and personnel in all branches of the military service.

The course consists of an illustrated text on basic theory, equipment operation, etc.; an ARRL *License Manual*; and five LP records of code instruction. Its price is approximately

\$10; the course may be secured from RETMA, 777 14th St., N.W., Washington 5, D. C. A brochure describing the course is available free of charge upon request.

"LMS" 25TH

The transcribing initials which, in the past, appeared on countless thousands of letters and bulletins from Hq., far more often than any other, are LMS — which as practically every ham in Christendom knows stands for Lillian M. Salter, currently Administrative Aide in the ARRL Communications Department. On May 12th, "Lil" marked 25 years on the staff —



W1ZJE

being the seventh Hq. member to attain that length of service.

Miss Salter probably knows more about the day-to-day operation of the CD than anyone else. She is the link between policy and practical accomplishment. Employed originally as a stenographer, she soon acquired administrative duties: processing and editing section reports, supervision of SCM appointments and appointee records, field-organization supplies, club affiliations and records, to name a few. She still personally handles the master stencils for the numerous CD bulletins to appointees and clubs. During World War II, with the title of Assistant Communications Manager, she provided an important continuity in the department through a succession of acting communications managers in Mr. Handy's absence on military duty.

Lil Salter managed for over twenty years to keep from becoming a ham, but a surge of enthusiasm for the Novice license a couple of years ago caught her, too; she quickly graduated to General Class, and is now W1ZJE. Don't look for her on the air around the middle of each month, however; it's "copy time" for QST section reports, and evening hamming must be foregone for overtime work in their editing and processing. That is typical of LMS — as loyal and as conscientious and as devoted a worker for amateur radio and the League as has ever graced the Hq. staff.

LICENSE PLATE ACTIVITY

Amateurs in several states have been actively promoting the issuance of call-letter license plates, and the governors of four states and the Territory of Hawaii have recently signed into law the coveted legislation. Thirty-one states now offer this privilege and Headquarters continues to provide information on the subject to individuals or clubs.

In Utah, W7NVY was appointed to head the committee which saw its efforts to a successful conclusion on March 11th, when the Governor put his name to the bill. Maryland amateurs W3EQK and W3PRL were instrumental in their state in having Governor McKeldin sign into law, on April 25th, a bill which authorizes plates for mobile amateurs. Meanwhile, in Pennsylvania, W3s BN QV YA ADF EOZ RSB TBV and VZJ organized a drive that put them over the top on May 3rd when Governor Leader made HB 561 into law. Hawaii joined with the Canal Zone and Alaska on May 5th when the Governor signed Act 67. Sparked by W9EU, W9BHT, W9PVD, and W9UQT, in Illinois, Governor Stratton signed the new law on May 11th; it took three years to get this act through, and a committee of more than thirty coordinated the complete coverage that spelled success in their state. On May 26th Connecticut became the latest State to join the parade when Governor Ribicoff signed SB 23 into law.

EXAMINATION SCHEDULE

The Federal Communications Commission will give Extra and General Class amateur examinations during the second half of 1955 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. (Novice, Technician and Conditional exams are given only by mail. See page 50, May 1954 *QST*, or the *License Manual* for details.)

Albuquerque, N. M.: October 1.
 Amarillo, Texas: September 13.
 Anchorage, Alaska, 53 U. S. Post Office Bldg.: By appointment.
 Atlanta, Georgia, 718 Atlanta National Building, 50 Whitehall St. S. W.: Tuesday and Friday at 8:30 A.M.
 Baltimore 2, Md., 500 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.: Monday through Friday except Thursday only when code test required.
 Birmingham, Ala.: September 7, December 7.
 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.



Oswald G. Villard, jr., W6QYT, was chosen by the Merit Award Committee to receive the ARRL Award for 1954. Presentation was made at the Pacific Division Convention by Director Harry M. Engwicht (center), W6HC; Convention Chairman W6UJU is at left. The plaque states the basis of the award is "for the advancement of the welfare of amateur radio through outstanding technical contributions in the fields of wave propagation, single-sideband telephony, and selective circuits." Better known as "Mike," W6QYT is an associate professor at Stanford University, trustee of W6YX, and well-known *QST* author. (Photo courtesy W6WME)

Columbus, Ohio: Sometime in July and October.
 Corpus Christi, Texas: September 8, December 8.
 Dallas, Texas, 500 U. S. Terminal Annex Bldg.: Monday through Friday, except Tuesday only when code test required.
 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 16, December 16.
 Grand Rapids, Mich.: Sometime in July and October.
 Hartford, Conn.: September 13.
 Hilo, T. H.: October 4.
 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 7, December 7.
 Jacksonville, Fla.: October 15.
 Jamestown, N. D., October 12.
 Juneau, Alaska, 7 Shattuck Bldg.: By appointment.
 Kansas City, Mo., 3100 Federal Office Bldg.: Friday.
 Knoxville, Tenn.: September 21, December 21.
 Lihue, T. H.: October 12.
 Little Rock, Ark.: July 13, October 5.
 Los Angeles, 539 U. S. Post Office and Courthouse: Wednesday, 9 A.M. and 1 P.M.
 Louisville, Kentucky: Sometime in November.
 Memphis, Tenn.: July 15, October 6.
 Miami, Fla., 312 Federal Bldg.: Thursday.
 Milwaukee, Wisconsin: Sometime in July and October.
 Mobile, Ala., 419 U. S. Courthouse and Customhouse: Wednesday and by appointment.
 Nashville, Tenn.: August 5, November 3.
 New Orleans, La., 400 Audubon Bldg.: Monday through Friday except Monday through Wednesday only at 8:30 A.M. when code test required.
 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 12, October 11.
 Omaha, Nebr.: Sometime in July and October.
 Philadelphia, Pa., 1005 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 11.
 Portland, Ore., 433 U. S. Courthouse: Friday, 8:30 a.m. for 20- and 13-w.p.m. code tests.
 Roanoke, Va.: October 1.
 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 16, December 16.
 San Antonio, Texas: August 11, November 3.
 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 14-15, December 7-8, 9 a.m. and 1 p.m.
 Seattle, Wash., 802 Federal Office Bldg.: Friday.
 Sioux Falls, S. D.: September 14, December 14, 10 a.m.
 Spokane, Wash.: Sometime in September.
 Syracuse, N. Y.: Sometime in July and October.
 Tallahassee, Fla.: July 23.
 Tampa, Fla., 410 P. O. Bldg.: By appointment.
 Tulsa, Okla.: July 14, October 13.
 Tucson, Ariz.: Sometime in October.
 Wailuku, T. H.: October 7.
 Washington, D. C., 415 22nd St., 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.
 Wilmington, N. C.: December 3.
 Winston-Salem, N. C.: August 6, November 5.

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**MINUTES OF 1955 SPECIAL MEETING OF THE
 BOARD OF DIRECTORS
 AMERICAN RADIO RELAY LEAGUE
 May 13-14, 1955**

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, Connecticut, on May 13, 1955. The meeting was called to order at 9:37 a.m. EDST, 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
 George V. Cooke, Jr., Hudson Division
 Robert E. Cowan, West Gulf Division
 Gilbert L. Crossley, Atlantic 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
 William J. Schmidt, Midwest Division
 George H. Steed, Delta Division

Absent: Director Harry M. Engwicht, Pacific 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

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.

the invitation of the Board as non-participating observers, were New England Division Vice-Director Clayton C. Gordon and Central Division Vice-Director George E. Keith. There were also present Treasurer David H. Houghton, Technical Director George Grammer, Assistant Secretary John Huntoon, and Quayle B. Smith of the General Counsel's office.

2) On request of the President, Vice President Groves assumed the Chair. Whereupon, on motion of Mr. Dosland, the following resolution was unanimously ADOPTED, by rising vote (applause):

WHEREAS, on January 1, 1955, Alex Reid, VE2BE, completed 25 years of continuous service as a member of the Board of Directors of The American Radio Relay League, Inc., representing the League members in Canada, and

WHEREAS, his fellow directors on the Board are mindful of the benefits which have accrued to the Board as the result of his long experience and wise counsel, and

WHEREAS, it is their desire to make known to Alex Reid their deep affection for him as a respected associate and beloved fellow-amateur, and

WHEREAS, the Board wishes to express to him its sincere best wishes for his continued success and happiness for many years to come

Now, therefore, BE IT RESOLVED, that the Board of Directors, meeting in Hartford, Connecticut, on May 13, 1955, in recognition of Alex Reid's untiring efforts on behalf of the League, does hereby express to him its congratulations and deep appreciation of his quarter century of loyal and intelligent devotion to the best interests of amateur radio and the League.

Whereupon, Mr. Dosland resumed the Chair. Mr. Reid spoke briefly in appreciation.

3) Moved, by Mr. Born, that the Board invites Ray H. Cornell, of the Pacific Division, to attend this meeting as an observer, with the right to participate in discussions, but without the right to vote; and further that the Board authorizes reimbursement of the expenses incidental to his attendance. Moved, by Mr. Maer, to amend the motion to add "and that the Board ratifies the action of the officers of the League in this matter." Moved, by Mr. Brabb, further to amend the motion to add the words "and that all Board members are instructed to review the matter of their eligibility to serve and to resign should they find themselves ineligible by reason of their employment"; but, after discussion, Mr. Brabb withdrew the motion to amend. The question then being on the original amendment, the same was unanimously ADOPTED. (At this point, Atlantic Division Vice Director Charles O. Badgett, General Counsel Paul M. Segal, and Ray H. Cornell, of the Pacific Division, entered the meeting.) Unanimous consent being given, Mr. Cornell discussed the circumstances resulting in his vacating the office of director for the Pacific Division. After further extended discussion, during which the Board heard from its General Counsel, on motion of Mr. Brabb, unanimously VOTED to amend the motion by striking the text of the previous amendment and substituting therefor the following: "And that this Board finds that the Pacific Division Director, by entering in the employ of a firm engaged in the manufacture, sale or rental of radio apparatus on March 14, 1955, thereby effected his resignation as a director on that date." The question then being on the motion as amended, the same was unanimously ADOPTED.

4) On motion of Mr. Roberts, unanimously VOTED that the minutes of the 1954 special meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

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

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

7) Mr. Roberts presented the report of the Finance Committee; Mr. Brabb presented the report of the Planning Committee; Mr. Cooke reported briefly for the Membership & Publications Committee; Mr. Dosland reported briefly for the Public Relations Committee; Mr. Reid presented the report of the Merit Award Committee. Whereupon, without objection, ORDERED that these reports be received and placed on file. Without objection, ORDERED that the report of the Committee for the Handicapped be deferred for consideration later in the meeting.

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

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

10) The Board was in recess from 11:48 A.M. until 11:54 A.M.

11) Moved, by Mr. Brabb, that the Executive Committee, together with the General Counsel, comprise a standing committee for the purpose of determining eligibility of nominees for elective offices and that all rulings of eligibility shall be concurred in by such standing committee; but, unanimous consent being given, Mr. Brabb withdrew the motion.

12) Moved, by Mr. Brabb, that the General Manager investigate the possibility and practicability of publishing a small handbook on the construction and use of test instruments. Moved, by Mr. Rand, that the motion be amended by striking the text and substituting therefor the following: "That the Board express approval of the present policy of the General Manager in the publication of additional books such as 'Single Sideband for the Radio Amateur' and the proposed mobile booklet, and that he continue to explore this field;" but, RULED, by the Chair, that the motion to amend was out of order as not being germane. Whereupon, the question being on the original motion, the same was unanimously ADOPTED.

13) Moved, by Mr. Brabb, that the Technical Department be instructed to investigate and report to the General Manager the feasibility of increasing the scope of the Novice examination in order to insure such licensee's ability to adjust and operate his radio equipment in accordance with current regulations. Moved, by Mr. Cooke, to amend the motion to include a study of the possibility of adding questions on television interference; but there was no second, so the motion to amend was lost. Whereupon, the question being on the original motion, the same was unanimously ADOPTED.

14) Moved, by Mr. Cooke, that there be established a new League official appointment to be called Public Relations Manager, or PRM, to enable the League to draw upon professional public relations and publicity talent within the radio amateur ranks in order that the League and amateur radio generally be more effectively represented to the public. This appointment to be made by Section Communications Managers, but only within rigid requirements

which will insure that PRM appointees have at least one year of professional experience in publicity, public relations or newspaper editorial work, appointed for Section, county and local jurisdiction in similar manner to present EC appointments. The PRM duties shall be to cultivate good amateur relations with the public through publicity and cooperative efforts with other groups, act as a local "Amateur Radio Information Bureau," serve as local outlets for public statements giving local angles to press releases at Headquarters and for public statements aimed at furthering League policies, and that this post be left open by SCMs rather than unqualified personnel be appointed. On motion of Mr. Maer, unanimously VOTED to amend the motion to provide that the Communications Manager is requested to initiate a study of the establishment of such an appointment and report the results of his study at the next meeting of the Board. Whereupon, the question being on the motion as amended, the same was unanimously ADOPTED.

15) The Board was in recess for lunch from 12:28 P.M. until 2:07 P.M.

16) Moved, by Mr. Cooke, that the General Manager be instructed to petition the FCC to revise Part 12.107 (c) and (d) of the Rules Governing Amateur Radio Service, titled "Special Provisions Regarding Radio Teleprinter Transmissions," to permit any shift under 900 cycles while still permitting standard intercommunication with 850 cycle shift as at present incorporated in the Rules. On motion of Mr. Crossley, VOTED to amend the motion by stating that the General Manager is instructed to investigate the feasibility of acting in this manner and, if found feasible, to so petition the Commission to amend. The question then being on the motion as amended, the same was unanimously ADOPTED.

17) On motion of Mr. Rand, unanimously VOTED that the Board congratulates the Headquarters staff for a job well done during the past year.

18) On motion of Mr. Rand, the following resolution was unanimously ADOPTED:

WHEREAS, on March 6, 1955, C. Vernon Chambers completed 25 years of continuous service to The American Radio Relay League as Technical Assistant, QST,

BE IT RESOLVED, that the Board of Directors, meeting in Hartford, Connecticut, on May 13, 1955, in recognition of C. Vernon Chambers' untiring efforts on behalf of the League, does hereby express its deep ap-

The ARRL Board of Directors and League officials at a luncheon recess during the meeting in Hartford on May 13th. Seated, l. to r.: Southwestern Director Joos; Ray H. Cornell, W6JZ, of the Pacific Division; First Vice-President Groves; Northwestern Director Roberts; Midwest Director Schmidt; Vice-President and Communications Manager Handy; Counsel Quayle B. Smith; President Dosland; Secretary and General Manager Budlong; Asst. Secretary Huntton; Treasurer Houghton; Canadian Director Reid; Vice-President Noble; New England Director Rand; Rocky Mountain Director Maer. Standing, l. to r.: West Gulf Director Cowan; Technical Director Grammer; New England Vice-Director Gordon; Great Lakes Director Brabb; Southeastern Director Born; Dakota Director Gowan; Roanoke Director Anderson; Central Director Matthews; Central Vice-Director Keith; Hudson Director Cooke; Atlantic Vice-Director Badgett; Atlantic Director Crossley. Absent from photo: Delta Director Steed, General Counsel Segal.



preciation of his loyalty, fidelity, and intelligent devotion to the best interests of amateur radio.

19) Moved, by Mr. Rand, that the Board review Items 10, 14, 17, 19, 24, 27, 29, 33, 34, 50, 69, 71, 82, 86 of the minutes of the 1954 Special Meeting of May 14 & 15th to determine whether or not the instructions therein contained were carried out; but, with the consent of his second, Mr. Rand withdrew the motion. Whereupon, the General Manager, in a supplementary report to his earlier oral report, reviewed the action taken with respect to the listed items.

20) Moved, by Mr. Rand, that the Board direct the Editor of *QST* to publish the results of the New England Director's questionnaire in an early issue of *QST*; but there was no second, so the motion was lost.

21) Moved, by Mr. Rand, that the Board instruct the General Manager to use his every effort to have the RACES program made a permanent, instead of a temporary, agency; but there was no second, so the motion was lost.

22) Moved, by Mr. Rand, that the Board instruct the Editor of *QST* to place the primary emphasis on RACES and only secondary emphasis on AREC and to provide ample space each month in *QST* for publishing material on RACES. On motion of Mr. Maer, unanimously VOTED to amend the motion by striking the text and substituting therefor that the Board instruct the Editor of *QST* to continue to emphasize RACES and AREC and to provide ample space in *QST* for publishing material on these activities and to continue efforts to stimulate these activities. Whereupon, the question being on the motion as amended, the same was rejected.

23) Moved, by Mr. Rand, that the Board take immediate and definite steps to raise the overall quality of operating procedures and equipment used on the amateur bands by the following means:

- A. Establish an up-to-date code of ethics for operators.
- B. Establish a minimum set of specs for Ham equipment.
- C. Give all out publicity through *QST*.
- D. Establish a new "Honor Society" for those meeting requirements.
- E. Publish Official Observers Reports on bad operating and bad signals in *QST*.
- F. Feature articles in *QST* on both phone and c.w. equipment which will help insure clean signals.
- G. Conduct a contest each year which will feature operators and stations adhering to the new code.
- H. Appropriate sufficient funds to finance this program.

Moved, by Mr. Roberts, to amend the motion to provide that the Planning Committee shall study the matter; but the motion to amend was rejected. The question then being on the original motion, the same was unanimously rejected.

24) Moved, by Mr. Rand, that the Board direct the Planning Committee to study a method of promoting diversification of operating and use of bands by establishing an annual award for the "Typical Ham" of the year in each Division. This award to be suitable loving cup or trophy; but there was no second, so the motion was lost.

25) Moved, by Mr. Rand, that the General Manager be instructed to modify the publication of the ARRL Radio Amateur's Handbook so that the "how to build it" equipment section will be all new every two years, instead of the present every three years; but there was no second, so the motion was lost.

26) Moved, by Mr. Anderson, that the General Manager investigate the establishment of appropriate awards for mobile operation — both as to physical size and merit requirements. Moved, by Mr. Brabb, to amend the motion so that the Merit Award Committee would investigate the establishment of such an award; but there was no second, so the motion to amend was lost. The question then being on the original motion, the same was rejected.

27) On motion of Mr. Anderson, VOTED, that it be the policy of the Board that each director of the League shall send to all other directors a copy of all bulletins, news letters, questionnaires, etc. he originates in his own division.

28) The Board was in recess from 4:00 P.M. until 4:13 P.M.

29) On motion of Mr. Crossley (on behalf of Mr. Cornell), unanimously VOTED that the Board instruct the Secretary in the name of ARRL to continue to seek a change in the Rules Governing Amateur Service, Part 12, Section 12.111 (5) (k) as it pertains to 420-450 Mc. operation, so that the power limit be removed.

30) Moved, by Mr. Born (on behalf of Mr. Cornell), that the Planning Committee be instructed to work out a practical solution to the matter of mobile log keeping and that it be abolished, or kept to a minimum. It is suggested that as a basis of consideration, that if log keeping by mobile stations cannot be abolished entirely that a "Trip Sheet" log be kept, recording time of starting and ending a trip — route covered, frequency and mode of operation. But the motion was rejected, 4 votes in favor to 7 opposed.

31) Moved, by Mr. Joos (on behalf of Mr. Cornell), that to implement and modernize the DX Section of the ARRL, an unpaid committee be set up, whose recommendations, arrived at by joint agreement of a committee two thirds majority, be carefully considered by the ARRL in its DX policies, particularly as to the following: a) DX contest rules; b) DX country list; c) DX awards. This committee to consist of one member from each of the ten highest scoring clubs in the official ARRL DX contest tabulations annually, club committee membership to begin each year on January first following the publication of the official club scores in *QST*, plus any other important DX group or individual deemed helpful by the ARRL. No committee membership to be longer than one year unless the same club is qualified in each succeeding year by its official score remaining among the top ten. Representative member to be selected by each club from among its members. All communication between the committee members and between the committee and the ARRL to be by means of correspondence. Nothing in this proposal shall preclude any individual or club from making proposals either to the ARRL direct or to the committee for approval if considered of merit. Moved, by Mr. Brabb, that the Board now constitute itself a Committee of the Whole for the purpose of considering this matter; but there was no second, so the motion was lost. On motion of Mr. Brabb, unanimously VOTED that the matter is laid on the table.

32) On motion of Mr. Maer, after extended discussion, unanimously VOTED that the salary of the General Manager is increased, effective this date, to \$18,000 per annum. (Mr. Maer requested that the minutes show that all Headquarters personnel in attendance, some of whom are members of the Board, requested leave to absent themselves from the meeting during the discussion of salaries and so absented themselves.) During the absence of Secretary Budlong, in the discussion of this matter, the Chair appointed Quayle B. Smith to record the proceedings of the meeting.

33) Moved, by Mr. Joos, that the General Manager investigate the feasibility of a questionnaire similar to that recently sent out by the New England Division Director to all League members for information purposes; but the motion was rejected.

34) Moved, by Mr. Joos, that the Board instruct the General Manager to print in *QST* quarterly a simple earnings and balance sheet; but there was no second, so the motion was lost.

35) Moved, by Mr. Crossley, that the League, through its General Manager, request the Federal Communications Commission to make a restriction in the 2-meter band (144-148 Mc.). That c.w. operation be restricted to the lowest 100 kc. of the band. But there was no second, so the motion was lost.

36) Moved, by Mr. Crossley, that the Secretary hereafter shall give informal notice to the directors that, on (date) the official notice for the special meeting of the Board will be made. That, if there are any matters which relate to the Articles of Association, notice of these changes must be filed with the Secretary, in his office at West Hartford before that time to be legally included in the Call for the Special Meeting. But there was no second, so the motion was lost.

37) The Board was in recess for dinner from 6:16 P.M. until 8:47 P.M.

38) Moved, by Mr. Crossley, that the Board instruct the General Manager of ARRL to write, edit, and publish a Novice Technical Handbook or Manual, which shall include the fundamentals of electricity and radio, as applied to the level of technical knowledge of the Novice amateur so that he may advance to be better able to read and understand the higher level Handbook; but, after discussion, the motion was rejected.

39) Moved, by Mr. Crossley, that the Board establish a "Student Grade" of ARRL membership much like the similar grade established by the Engineering Societies.

This membership to be available to 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 amateur 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 membership, of course, is not to be denied, if eligible, but while a Student Grade the member shall have no voting

and conditions set up in paragraph (52) of the minutes of the 1953 Special Meeting of the Board of Directors. For the purpose of defraying incidental costs such as the necessary meals or one night in a hotel, if a meeting is over 50 miles from the SCMs home, or highway tolls involved, for example, reimbursement in excess of mileage may be made in a reasonable amount per SCM organization meeting, this to be approved by the Communications Manager, provided that each miscellaneous expenditure be itemized and submitted with the travel claim.

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.

rights in ARRL or Affiliated Clubs. But there was no second, so the motion was lost.

40) On motion of Mr. Groves, the following resolution was unanimously ADOPTED by rising vote (applause):

WHEREAS, on August 26, 1954, George Grammer completed 25 years of continuous service to The American Radio Relay League as Technical Director and Technical Editor of QST,

BE IT RESOLVED, that the Board of Directors, meeting in Hartford, Connecticut, on May 13, 1955, in recognition of George Grammer's untiring efforts on behalf of the League, does hereby express its deep appreciation of his loyalty, fidelity, and intelligent devotion to the best interests of amateur radio.

41) On motion of Mr. Roberts, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1955 in the proper administration of ARRL affairs in their respective divisions up to amounts as follows:

Canadian Division Director	\$ 550
Atlantic Division Director	1250
Central Division Director	1000
Dakota Division Director	700
Delta Division Director	900
Great Lakes Division Director	800
Hudson Division Director	900
Midwest Division Director	900
New England Division Director	1000
Northwestern Division Director	1000
Pacific Division Director	1200
Roanoke Division Director	600
Rocky Mountain Division Director	700
Southeastern Division Director	1200
Southwestern Division Director	1200
West Gulf Division Director	1000

42) On motion of Mr. Schmidt, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1955, but not to exceed amounts as follows:

Planning Committee	\$2000
Finance Committee	1500
Merit Award Committee	250

43) On motion of Mr. Gowan, unanimously VOTED that the General Manager is hereby authorized to reimburse, in the continental limits of the United States and Canada proper, the Section Communications Managers and QSL Managers of the League, in a total amount not to exceed \$5000 for the year 1955, under the provisions

44) On motion of Mr. Brabb, unanimously VOTED that as part of the 1955 SCM/QSL Manager authorization, the General Manager is also authorized to reimburse the SCMs of Alaska, Canal Zone, Hawaii and the West Indies their actual travel expense for attendance, each within his own Section, at major or considerable group meetings where time is scheduled for promotion of League operating organization at Section level. Hamfests may be included only where sponsor schedules such ARRL Section meeting in advance. Travel allowance for shortest feasible route shall, in addition to actual rail or bus fare, or 7 $\frac{1}{2}$ ¢ per mile if SCMs personal transportation is used, be subject to approval by the Communications Manager of a report submitted with the itemized request for reimbursement. This report shall cover attendance, representation of ARRL, meeting discussions, recommendations and progress. When such meeting is over 50 miles from the SCMs address, reasonable incidental costs such as necessary meals, or one night in a hotel not to exceed \$7, for example, may be itemized and also submitted for approval as part of the travel claim. No specific limit is set to the number of trips in the Sections that are reimbursable, but in lieu thereof, an applicable limit of \$150 per annum is hereby established as the maximum that may be reimbursed to each SCM under this authorization.

45) On motion of Mr. Born, unanimously VOTED that to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel, the General Manager is hereby authorized to pay during the year 1955 a total amount not to exceed \$3500 under the provisions and conditions specified in paragraph (58) of the minutes of the 1952 Special Meeting of the Board of Directors. For the purpose of defraying incidental costs such as necessary meals or one night in a hotel if a meeting is over 50 miles from the SECs home, or highway tolls involved, for example, reimbursement in excess of mileage may be made in a reasonable amount per SEC organization meeting, this to be approved by the Communications Manager, provided that each miscellaneous expenditure must, to be reimbursed, be itemized and submitted with the travel claim. In the case of the SECs of Alaska, Canal Zone, Hawaii and the West Indies, no specific provisions as to the number of trips reimbursed shall apply but reimbursements will otherwise be guided by customary provisions, with the applicable limit of \$150 per annum as a maximum that may be reimbursed to each such SEC under this authorization.

46) On motion of Mr. Crossley, unanimously VOTED that the General Manager is hereby authorized to pay, during the period between January 1, 1956 and the 1956 meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amounts than 1955 authorized amounts.

47) On motion of Mr. Roberts, 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, 1955 to June 2, 1956: Arthur L. Budlong, George Grammer, and David H. Houghton.

48) On motion of Mr. Noble, the following resolution was unanimously ADOPTED:

WHEREAS, on May 12, 1955, Lillian M. Salter completed 25 years of continuous service to The American Radio Relay League as Communications Department Administrative Aide,

BE IT RESOLVED, that the Board of Directors, meeting in Hartford, Connecticut on May 13, 1955, in recognition of Lillian M. Salter's untiring efforts on behalf of the League, does hereby express its deep appreciation of her loyalty, fidelity, and intelligent devotion to the best interests of amateur radio.

49) On motion of Mr. Brabb, unanimously VOTED that the Board go on record as commending the Field Engineering and Monitoring Bureau of the Federal Com-

munications Commission for its assistance and cooperation rendered amateurs over the past year.

50) 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.

51) Mr. Maer reported for the Committee for the Physically Handicapped; whereupon, without objection, the Chair ordered that the report be received and placed on file.

52) On motion of Mr. Schmidt, affiliation was unanimously GRANTED to the following radio clubs:

Peoria-Area Amateur Radio Club...	Peoria, Illinois
Tri-County Radio Club.....	Dresden, Tenn.
Mansfield Amateur Radio Club...	Mansfield, La.
Kaw-Blue Radio Club.....	Manhattan, Kans.
Fairfield High School Amateur Radio Club.....	Fairfield, Iowa
Luther College Amateur Radio Club.....	Decorah, Iowa
Yampa Valley Radio Club.....	Craig, Colorado
Penn. Central Radio Club.....	Falls Creek, Penna.
Watertown Radio Club.....	Watertown, N. Y.

53) On motion of Mr. Cooke, the following resolution was unanimously ADOPTED:

WHEREAS, the radio amateurs of the United States, its possessions, and Canada are aware of the cooperative actions taken by IARU Societies and their memberships in many international competitions, and

WHEREAS, these same IARU Societies have contributed to the advancement of peaceful international relations by the exchange of amateur radio communications between themselves, the United States, its possessions, and Canada,

BE IT RESOLVED, that the Board of Directors and the Staff of The American Radio Relay League extending their hands in friendly greeting to all IARU Societies, demonstrate their appreciation and faith, created by such operations, in international harmony and the advancement of amateur radio worldwide for the good of all peoples, and

BE IT FURTHER RESOLVED, that the President of the ARRL convey to all IARU Societies a copy of this resolution together with his letter of greeting and appreciation.

54) On motion of Mr. Rand, at 9:54 P.M., the Board recessed under orders to reassemble at 8:30 A.M. on the morrow. The Board reassembled at the same place on May 14, 1955, and was called to order by the Chair at 8:42 A.M. with all directors and other persons hereinbefore mentioned in attendance, except Mr. Engwicht.

55) Moved, by Mr. Rand, that pursuant to Article 7 of the Articles of Association, Percy C. Noble is designated and appointed a member of the Executive Committee. Moved, by Mr. Matthews, to amend the motion to throw the appointment open to election, and to include the name of John H. Brabb as a candidate. Moved, by Mr. Cooke, to further amend the motion to include the name of R. Rex Roberts as a candidate; but Mr. Roberts withdrew his name. The question being on Mr. Matthews' amendment, the same was ADOPTED. The question then being on the motion as amended, the same was unanimously ADOPTED. The Chair appointed Messrs. Rand and Groves as tellers. The tellers announced the result of the first ballot as follows: Mr. Noble, 9; Mr. Brabb, 6. The Chair thereupon declared Mr. Noble designated and appointed as a member of the Executive Committee.

56) Mr. Maer moved the adoption of the following resolution:

BE IT RESOLVED that, pursuant to Article 7 of the Articles of Association, R. Rex Roberts is hereby designated and appointed a member of the Executive Committee, to serve as such for the period ending May 15, 1956, and

BE IT RESOLVED 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 as such for the period ending May 15, 1956, and

BE IT RESOLVED 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, 1956.

The yeas and nays being ordered, upon request, the ques-

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.

tion was decided in the affirmative: Whole number of votes cast, 15; necessary for adoption, 8; yeas, 15; nays, none. So the resolution was ADOPTED.

57) Moved, by Mr. Born (on behalf of Mr. Cornell), that it is the sense of this Board that DX activities within the League receive equal emphasis with other activities of the Communications Department which receive full-time consideration, and that the General Manager be requested to make such administrative changes as may be possible to implement this request; but the motion was rejected, 4 in favor to 11 opposed.

58) Moved, by Mr. Crossley, that the Secretary be instructed to contact the FCC requesting that the T prefix be used with the Technician license, similar to the present Novice. On motion of Mr. Maer, unanimously VOTED to amend the motion to read that the General Manager is requested to make a study of the problem of adding the letter T to the Technician prefix and to report his conclusions to the next Board meeting. The question then being on the motion as amended, the same was unanimously ADOPTED.

59) At this point, the President announced the following committee appointments for the following year:

Finance Committee:

Mr. Roberts, Chairman
Mr. Anderson
Mr. Gowan

Planning Committee:

Mr. Brabb, Chairman
Mr. Born
Mr. Cooke

Merit Award Committee:

Mr. Reid, Chairman
Mr. Rand
Mr. Budlong

60) Moved, by Mr. Rand, that the Secretary read all motions which have been passed by the Board at this meeting; but there was no second, so the motion was lost.

61) On motion of Mr. Maer, the following resolution was unanimously ADOPTED:

RESOLVED, that the Board of Directors hereby compliments the staff of QST for its fine work in producing the 1954 volume of QST and urges the continuation of this high standard.

62) Moved, by Mr. Crossley, that the Board do now resolve itself into a Committee of the Whole to make an informal investigation of the ARRL DX Countries List, used in connection with the DX award, consider the methods used by ARRL and others in selecting those lists and that the results of this meeting be reported back to the Board in meeting with recommendations; but there was no second, so the motion was lost.

63) On motion of Mr. Anderson, the following resolution was unanimously ADOPTED:

WHEREAS, Hugh L. Caveness, W4DW, had for many years served The American Radio Relay League and amateur radio as Director of the Roanoke Division, and

WHEREAS, the institution of amateur radio is deeply grieved by his passing on December 18, 1954

Now, therefore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League meeting in Hartford, Connecticut on May 14, 1955, on behalf of amateur radio hereby expresses its deep sense of loss at his passing.

(Continued on page 123)

Hints & Snarls – GVZ Style

BY J. P. JESSUP,* W2GVZ

THE HANDBOOK has it all wrong. It is chuck full of dope on what to do but there's not a dern word about what *not* to do. For 34 years in ham radio I've needed a book that starts off, "Listen, Stupid, don't ever do it like that." To be a ham you've eventually got to be a plumber, steeplejack, ditchdigger, electrician (not a libel on a respectable profession) and many other things. I can louse up any of those specialties with practically no effort. Let me show you what I mean.

Now take porcelain insulators. They are useful gadgets with a breaking point of one ounce less pressure than I always exert. Wonder if it's tight enough? One more turn and C-R-U-N-C-H. They should have said, "Go easy, you big dope." In ye good ol' days I used to paint panels with a graphite mixture shorting everything; now I put plastic spray on everything, connecting nothing.

I am the kind of guy who can talk to a local with the final turned off and then forget and call DX -- minus final -- for two hours afterward. It isn't enough to tell me how to wire the switch -- you've got to tell me to turn it on!

Oh yes, I really have a penchant for pulling plate caps off 807s when removing the safety caps, even when I accidentally let them cool off first. But my real triumph was a 4-125A. Thinking it was shot anyway, I yanked the safety cap off while it was still hot, thereby pulling off the plate cap and breaking the glass. Then I find out it was OK! Charge off twenty-five bucks more to experience.

When I was your age, I used to put the trickle charger on reversed polarity, cooking the storage battery to a smelly crisp. Now I drop hot solder in my shoe while up a ladder. The tattoo on my wrist? That's where I once laid down the soldering iron.

Connecting both sides of a capacitor to the same terminal, putting high voltage on the filament, drilling through a panel and into a hardwood floor -- elementary. Only GVZ could get his hands on a blinker socket and wire it into the primary of the high-voltage circuit. You think you've got troubles? One guy topped me, though. He accidentally left his beam turning all night



*337 Hamilton Ave., Glen Rock, N. J.

and couldn't understand the QSB reports he was getting.

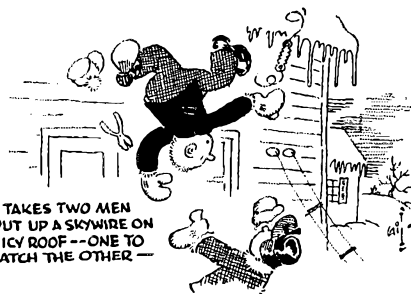
The *Handbook* I need (and brother, so do you) should go something like this:

Inside Construction Techniques

- 1) Never drop pliers on the 866s. You are apt to bend the pliers or melt them in the resulting arc.
- 2) If you must use a razor blade, wipe the blood off the wire. Corrosion, you know.
- 3) When tacking up 300-ohm line in the attic flatten the thumbtack, not . . . YOW!
- 4) Pick out nonconductors to drop in the rig, you old butterfingers!
- 5) Always wait two months before using any diagrams in radio magazines. That gives the editors time to sneak in the inevitable correction: "Connection 6 should have been made to this gimmick instead of that one."
- 6) Never dislocate a knee by crouching down working on the rig. For the sake of my various insurance records, that one shows up as crouching down to change a tire.
- 7) Never use celluloid coil forms. Maybe you ain't got big enough lungs to blow out the flames in one mighty puff.
- 8) Don't ever sit on the floor for hours stuffing beam elements with rock wool using the XYL's broomstick, only to find out that some big brain invented insulating pellets that you can simply pour in.
- 9) Bounce a tube on the floor with impunity but never toss it six inches onto a featherbed -- that's fatal!

Outside Construction Techniques

- 1) It takes two men to put up a skywire on an icy roof; one to catch the other as he slips over the



edge. Any ol' timer will tell you no antenna will work unless it's erected in temperatures below 15 degrees. It helps to leave hunks of your hide sticking to it.

- 2) If you must stand on a 12-foot ladder and chop through a limb as thick as your thigh to clear the beam, get the heck down pronto when she starts to go (one jump recommended).
- 3) When throwing a rope with rock attached up over a limb, remember Newton's Law of Gravity. This goes, too, for "Ol' Slippery Mitts" on top of the pole with block and tackle while you are trust-

(Continued on page 188)

• Technical Correspondence —

LOW-NOISE RECEIVER DESIGN

1645 Cameron Drive
Lemon Grove, Calif.

Technical Editor, *QST*:

In the March issue the article on "Low-Noise Receiver Design" by Longerich and Smith was to me both interesting and profitable, since it enabled me to bring my receiver up to an acceptable level. I have an old HQ-120-X which I bought a couple of years back for \$65. My first attempt at improving the performance involved changing the grid-cap tubes for more modern single-ended types of higher μ_m . This resulted in considerable improvement on the lower bands, but in substantially no improvement on the bands above 7 Mc. Believing at the time that the trouble lay in poor image rejection (with an i.f. of 455 kc. and only one r.f. amplifier this is a possibility) and in oscillator pulling, I was in the process of changing over to dual conversion on the three high bands of the receiver (above 5.7 Mc.) with a first i.f. of 5.0 Mc. However, before I had gone very far with this I noticed the above article, and it has done the trick. The cathode follower on the oscillator has eliminated the pulling (if there was actually an appreciable amount present), and the increase in r.f. tank circuit Q occasioned by the use of the cathode followers has improved the image ratio. This increase in Q , incidentally, has made the tracking more critical, but not enough so to be a serious problem. But, of course, the major improvement has been in the terrific reduction in receiver self-noise. I now feel that I have a receiver which is equal or superior to anything in the \$300 class.

There were, however, several items in the article which I feel were mistakes, and others which were open to considerable question. One of the items you pointed out, which was that two r.f. amplifiers are not necessarily better than one, since the primary function of the r.f. stage (noise-wise) is to override the noise of the mixer. (Of course, for image-rejection purposes, the more r.f. stages the better, but the law of diminishing returns sets in very rapidly.) In the present instance one r.f. stage is more than ample from the noise consideration, since the equivalent noise resistance of a 6AC7 triode mixer is

$$R_{eq} = 4 + \mu_0 = 4 + (\mu_m \div 4) = 16 + \mu_m = 16 + .011$$

which is about 1450 ohms! (The equations used may be found on page 937 of *Radiotron Designer's Handbook*, 4th ed.) Therefore, the limiting resistance for noise production is the r.f. stage, which has an $R_{eq} = 2.5 \div \mu_m = 230$ ohms.

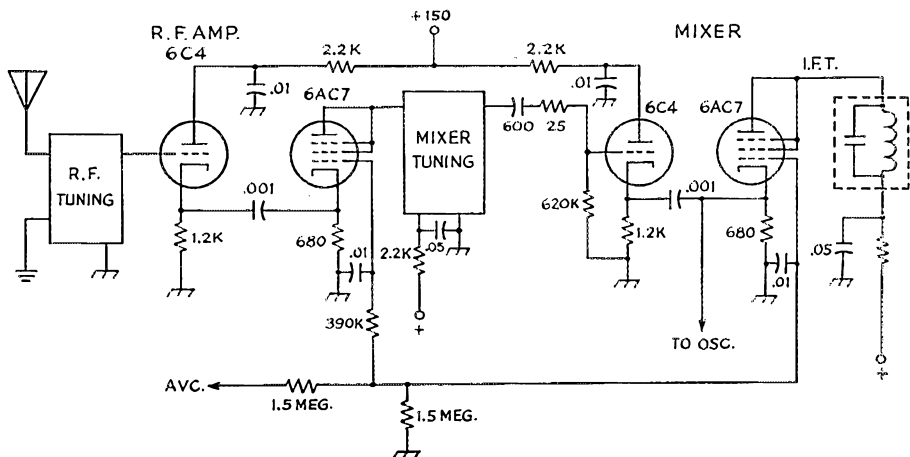
Let me back up a bit and substantiate that "therefore" in the last sentence. Assuming a minimum gain of ten times from the grid of the r.f. stage to the grid of the mixer, the effective resistance of the mixer at the grid of the r.f. stage would be 1450/10 or 145 ohms. The gain of the r.f. stage in the original receiver was 10, and if anything, it is greater in the present configuration. This is based on the consideration that the μ of a triode-connected 6AC7 is 40, and the Q of the tank circuit has been increased. Hence, the mixer resistance translated to the r.f. grid would be less than 145 ohms, and the 230 ohms of r.f. tube equivalent resistance at the grid of the r.f. amplifier would be the controlling factor in noise production.

Another error, which is in some ways more obvious, is the application of a.v.c. voltage to the grid of the 2nd r.f. amplifier cathode follower in Fig. 1 of the article. If A is the gain of the tube in a normal grounded-cathode amplifier application, then the gain of a cathode follower is

$$A' = A \div (1 + A)$$

and since the gain of a 6C4 is about 10 or 12, this fraction would be in the neighborhood of 12/13 or about 0.92. If the gain of the tube were reduced to $\frac{1}{2}$ by a.v.c. action, or to a gain of 4, then the cathode-follower gain would be reduced to 4/5 or 0.8. This is not my idea of very good a.v.c. action, since it would result in a reduction of gain of small percentage for a large value of a.v.c. voltage. A more practical method would be to apply the a.v.c. (or even better, partial a.v.c.) to both r.f. and mixer grounded grids, grounding the grids for r.f. through a 0.01- μ f. capacitor. In my receiver, applying no a.v.c. to the r.f. stage or mixer resulted in severe cross-modulation in the presence of strong adjacent signals, particularly on the broadcast bands. This was eliminated completely upon application of $\frac{1}{2}$ a.v.c. voltage to the r.f. and mixer grids as indicated above.

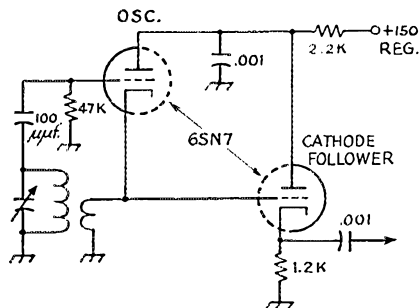
In addition, the authors quoted a transconductance of 11,000 for the triode-connected 6AC7. However, the tube manual gives this value of μ_m only for a plate voltage of 150 volts and a cathode bias resistor of 160 ohms. Under these conditions the plate current is 12.5 ma., and this results in a bias of -2.0 volts. The 1500-ohm cathode resistor used by the authors in Fig. 1 is certain to result in a smaller effective value of μ_m for the operating conditions, producing a smaller gain, and more important, more noise. I used a cathode resistor of 700 ohms in both 6AC7 stages, and would have used a smaller value if the gain had appeared to be insufficient. There should be no difficulty in obtaining sufficient driving voltage even with a cathode resistor of only



Revised front-end wiring of an HQ-120. The oscillator schematic is shown later.

100 to 200 ohms, because of the low-impedance output of the cathode follower. I have not been able to obtain a set of characteristics for the triode-connected 6AC7, so I have no idea how the variation of plate voltage will affect the picture, but as a general thing, the greater the bias voltage applied, the less the transconductance.

Another small point: In Fig. 1 of the article, it is not necessary to provide the 47- μ mf. coupling capacitor and the 47K resistor to the grid of the cathode follower on the oscillator stage. The d.c. level at the cathode of the oscillator is not sufficient to affect the operation of the cathode follower, being only a few millivolts; compared to that at the cathode of the cathode follower it is negligible. Furthermore, either the Hartley or the tickler-feed-back oscillators shown in Fig. 2 can be used as a grounded-plate oscillator. The Hartley circuit is so shown in Fig. 2; the tickler circuit need only be changed to look as follows:



This results in a somewhat simpler arrangement than that shown in Fig. 2, and uses about three components less. This is the oscillator circuit as I used it in my receiver. It is to be noted that the polarity of the feed-back coil must be observed — the end previously tied to the plate must go to ground to maintain oscillations. In my opinion this configuration results in a more nearly constant output as frequency is varied, due to the slight degeneration inherent in having a r.f. potential at the cathode. In addition, the signal is not taken from the tank circuit of the oscillator, which improves the isolation somewhat.

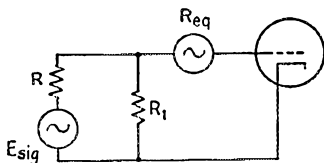
In closing, let me say that in my case the article was very timely and much appreciated. I am enclosing a sketch of the complete front end on my HQ-120 as it now is wired.

— Robert Irving, Lieut., USN

4420 Narragansett Ave.
San Diego 7, Calif.

Technical Editor, QST:

... Before proceeding with individual points it might be well to examine the equation for the noise figure of the input stage of a system as given by Goldberg ("Some Notes on Noise Figures," *I.R.E. Proceedings*, October, 1948).



Where R = Generator impedance
 R_1 = Signal generator load
 Noise from the tube is represented
 by generator R_{eq}

$$\text{Noise figure } F = \frac{R + R_1}{R_1} + \frac{R_{eq}}{R} \left(\frac{R + R_1}{R_1} \right)^2 \quad (1)$$

The first term on the right side of this equation gives the effect upon the noise figure of a load upon the source of voltage when tube noise is disregarded. Such a load produces noise but no signal; thus, if $R = R_1$ this term in the equation is 2. The second term shows the effect of the load

upon the source in reducing the voltage in comparison with the noise voltage contributed by R_{eq} . If $R = R_1$, the second term of the equation becomes $4R_{eq}/R$.

When R_{eq} is about the same in value as R or larger, the second term is, of course, larger than the first term and has a greater influence on F . Under these conditions, changing from the actual antenna to a dummy may cause a change in R which could swamp out the effect of any external noise present in the antenna.

Now let us consider the simple test prescribed to determine whether or not the receiver is noisy. If we take the assumption made by the authors that we are operating at a frequency where external noise is very low, there is no reason that substituting a dummy antenna for a real antenna should reduce the noise, since the radiation resistance of the antenna certainly would not have a temperature greater than that of the dummy resistance. If there were actually no external noise, this test could condemn the best receiver that could be built. The fact that very few amateurs have the equipment to measure the impedance of an antenna also makes it very difficult to assess the reason for the change in noise level when the dummy antenna is substituted for the real antenna. As shown above, with a change in impedances between the two it is quite conceivable that the noise level could increase when the resistor is substituted for the antenna.

As mentioned in the article, a low-noise-figure receiver has no advantages in a noisy location, so another simple test can be prescribed to see if the receiver is working down to the local noise level. The receiver should be set to a frequency where there are no signals and the antenna trimmer should be tuned through resonance. If there is an increase in noise as the antenna circuit goes through resonance, the receiver is satisfactory for the location. If no noise peak is noticed then some improvement is called for.

If we are to make some improvement in the receiver it is nice to know where to begin. Now we remove the antenna and swing the antenna trimmer through resonance. If we hear the noise peak there is hope that the necessary changes will not be too drastic. Perhaps in this case a new r.f. amplifier may be the answer. If we hear no change in noise, the next step is to vary the trimmer on the next grid. If a change of noise is heard, there is still hope that the receiver can be improved. If no change of noise is heard in this case, I can only recommend a new receiver or a converter.

Assuming that we have decided that we need a new r.f. amplifier, let us look into the question of what is the best type of amplifier to use. To make our calculations easier, assume that we match the antenna into the receiver, a condition which is necessary if we are to have a flat transmission line feeding the receiver. Because of tracking difficulties most receivers covering wide tuning ranges will not be more closely coupled than a matched condition. This matched condition will give us a noise factor at least 3 db. worse than we would have if we had no loss in the antenna transformer and maintained the same source impedance feeding the tube.

We should now look again at equation (1).

As stated by Goldberg, we should take the sum of the $R_{eq1} + R_{eq2}$ for the two tubes in a cathode-coupled circuit. For simplicity, let us neglect the two cathode resistors in the circuit, which will further degrade the noise performance of the amplifier, and just assume that if there is a close contest between the cathode-coupled amplifier and one of the others, it would be advisable to select the other one. Although the authors have selected the 6AC7 as a high μ_m tube they have proceeded to bias it until the μ_m is down to about 4000 μ mhos.

In our calculations let us consider two receivers, one with a very good input circuit which, when loaded by the antenna, offers a source impedance R of 5000 ohms to the r.f. amplifier and the other a relatively poor one which offers a source impedance of 500 ohms to the first tube. We can now look into the noise figures of four different amplifiers: a 6SK7, a 6AG5, the cathode-coupled stage recommended in the article, and a 6BQ7 cascode circuit. The noise resistances for these follow:

6SK7	11,000 ohms
6AG5	1650 ohms
6C4	300 ohms
6AC7 triode with 1500-ohm cathode resistor	600 ohms
6BQ7	500 ohms

Goldberg gives the following formulas for the noise figures:

Grounded cathode:

$$F = \frac{R + R_1}{R_1} + \frac{R_{eq}}{R} \left(\frac{R + R_1}{R_1} \right)^2$$

Cathode coupled:

$$F = \frac{R + R_1}{R_1} + \left(\frac{R_{eq1} + R_{eq2}}{R} \right) \left(\frac{R + R_1}{R_1} \right)^2$$

Inserting numerical values we have:

$$R = R_1 = 10,000 \text{ ohms} \quad R = R_1 = 1000 \text{ ohms}$$

	F	N.F.	F	N.F.
	(power)	(db.)	(power)	(db.)
6SK7	6.4	8.1	46	16.6
6AG5	2.66	4.25	8.6	9.35
6C4-6AC7 cathode- coupled	2.56	4.10	7.6	8.8
6BQ7 cascode	2.2	3.4	4.0	6.0

From these figures it can be seen that very little is gained by going to a system more sophisticated than the 6AG5 pentode unless R is very low and in this case it seems worth going to the cascode which is really a simpler modification than the one recommended in the article in question.

On the basis of the considerations above, I recommend that anyone contemplating the modification of a receiver give the situation a lot of study before he digs in with the cutting pliers; and it is my opinion that the modifications recommended in the article are not the easy way to improve a receiver.

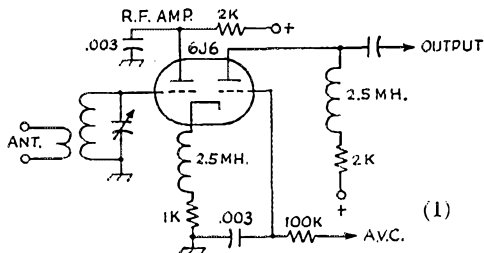
— W. B. Bernard, K6EUS, Cmdr., USN

P. O. Box 790
Dunedin, New Zealand

Technical Editor, QST:

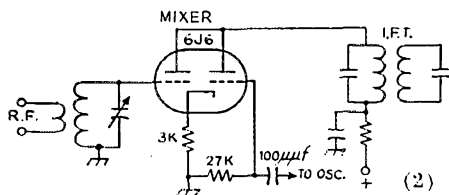
Whilst the writer can fully agree in principle with the findings of Longerich and Smith in their article on low-noise receiver design, it seems that they have taken the long way round the problem.

The 6J6 has an equivalent noise resistance of 470 ohms,¹ and lends itself to use in the circuit shown in Fig. 1, which



is electrically identical to that used by your contributors in their r.f. stages.²

One of the advantages of this circuit is its ability to handle signals of several volts; yet it is reasonably free from cross-modulation effects. This is because the total plate current is almost constant when the control voltage is varied. For example, a drop in the grounded-grid section plate current caused by a.v.c. lowers the bias to the cathode-follower section, which in turn increases the plate current in that section. It follows then that the cathode-follower section is unimpaired by a.v.c. bias and may handle a signal input



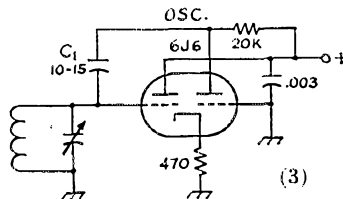
¹ Radiotron Designer's Handbook, 4th ed.

² Philips Valve Data Book, Philips Electrical Industries of New Zealand Ltd., Vol. 3, ECC91-2-3.

of several volts. The degree of curvature of the grounded-grid section then determines the degree of cross-modulation. The stage gain compares more than favorably with ordinary r.f. pentodes, and it may have a.v.c. applied.

Mixer tracking, instability and oscillator pulling difficulties experienced by the authors were to be expected under the conditions of nonisolation used. A mixer capable of good gain (approximately 14 times at 30 Mc.) with quiet operation is shown in Fig. 2.² This circuit has good isolation from the oscillator. Circuit gain is independent of oscillator injection-voltage change.

An alternative oscillator to that used by the authors is shown in Fig. 3. This circuit overcomes switching difficulties



since there is no cathode tap nor are there two coils to switch as in pentagrid circuits. The cathode output gives splendid isolation from the mixer and pulling troubles are virtually eliminated.

Feed-back control is by means of C_1 , which should be a silver mica for best stability. The value shown for C_1 is satisfactory for operation over the range 3.5 to 50 Mc., but for operation at i.f. requires a feed-back condenser value of 100 μf . or larger, depending on the i.f. This circuit makes an excellent b.f.o., since any old i.f. transformer will suffice for the grid inductance, no tap being required. All these circuits have been tried and are in use in the writer's receiver. They are simple to adapt into existing commercial receivers, requiring only a socket change and realignment. Manufacturers seem to have overlooked these triode circuits, and it would be worth their while to experiment with them.

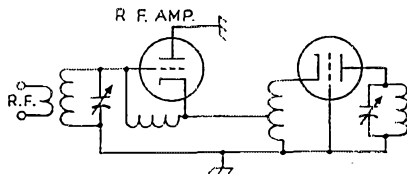
— R. S. Pottinger, ZL4GP

St. John's College
Cambridge, England

Technical Editor, QST:

In the March issue of QST Longerich and Smith discuss low-noise receiver design. The r.f. input circuit shown is a cathode-follower amplifier followed by a grounded-grid stage. I believe their interpretation of the performance of this combination is somewhat misleading, in that it seems that they assume that the low-noise performance of the grounded-grid amplifier is not spoiled by the preceding cathode follower, or grounded-plate amplifier, and in fact, no thought seems given to the choice of a triode of low-noise resistance for the cathode-follower stage, since a Type 6C4 tube is used. The noise resistance of a 6C4 is 1140 ohms compared with 220 ohms for a triode-connected 6AC7. The combination used by the authors would be somewhat inferior to a low-noise design using a single pentode-connected grounded-cathode amplifier employing a Type 6AC7 tube.

Basically, the circuit used by the authors is a grounded-plate grounded-grid triode amplifier. The conventional circuit is (simplified):



Here neutralization of the first stage is required except perhaps for the case where triode-connected pentodes are used.

The cathode interstage coupling coil is designed to present optimum admittance to the grounded-grid tube for

(Continued on page 126)



Correspondence From Members -

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

NEW SYMBOLS

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Bellport, N. Y.

Editor, *QST*:

. . . I am particularly offended by the new designations for inductors and chassis grounds. . . .

— William R. French, W2NYC

2521 W. Cold Spring Lane
Baltimore 15, Md.

Editor, *QST*:

I protest! Back to the old symbols. Perhaps I'm used to the old ones after all these years, but I certainly can understand the old ones without redrawing the circuits. Let's not be too much of a leader in this field.

— Samuel Geller, W3MQF

320 Winslow St.
Watertown, N. Y.

Editor, *QST*:

. . . I can no longer "see" the circuit but must laboriously "feel through" the similar symbols. Incidentally, the last time I used a "chassis" which was not common to "ground" I got 1100 v. d. c. and came to consciousness 10 feet away. Shouldn't we switch back to safety?

— George Bonadio, W2WLR

West Main St.
Chester, Conn.

Editor, *QST*:

. . . I suggest that for the next few issues of *QST*, you set it up in German script, which would go well with the new diagrams, and help us over the transition period. We all would then concentrate more on the diagrams and less on the text, and thus more easily learn the new and forget the old.

Of course I am not really serious as I can see the advantages of standardization, although it is rather bitter to take in one gulp.

— G. Roger Gladding, W1AOS

P. O. Box 69
Billings, Mont.

Editor, *QST*:

. . . Maybe the alphabet should be revised too. It too has a lot of little loop holes to fill up with ink like the old coil symbol. Wonder how many of those responsible actually use the "New Look" in their daily sketches? My soldering iron didn't get much work out from the past two issues of *QST*. But, I suppose in due time we will all get accustomed to it. It is about time the different branches of the electronics industries standardized in their symbols.

— S. P. Guth, W7KGF

THIRD-PARTY TRAFFIC

51 Pettits Lane
Romford, Essex, England

Editor, *QST*:

After reading the letter from W1DLO on the above subject in May *QST*, I feel that I ought to correct a widespread misunderstanding regarding G stations. We are not allowed to accept or originate third-party messages in any shape or form as laid down by our license conditions, and any station so doing is liable to receive the G equivalent of a pink ticket by return of post.

In the past I have heard W stations calling specific cities in this country and saying that they have traffic. They have probably been disappointed in not receiving a reply, and I hope the true reason will be appreciated.

While on the subject of traffic, may I enter a plea for the

removal outside the ham bands of the MARS stations in Europe and Africa who clutter up our frequencies with high-power stations passing military traffic only. These messages generally relate to movement of personnel and supplies, etc. The stations use amateur call signs and are prevalent on the 20-meter band. In Europe we suffer enough commercial QRM on this band without this addition, and I would have thought that the operators, who appear to be hams, would have appreciated this fact. Presumably, however, this operation has official backing.

— R. F. Stevens, G2BVN

602nd AC&W Sq., Box 325
APO 34, New York, N. Y.

Editor, *QST*:

. . . Although I could write a great deal pertaining to flag waving and sentiment, I feel it would have little effect on the FCC. I can fully understand the need for the law; however, I cannot see why it should pertain to military personnel.

All DL4 stations are U. S. military personnel. Although the licenses are issued by the German government, all exams are given by U. S. military officers, all stations are located on property controlled by the U. S. government, and the majority of the equipment is owned by the U. S. government. This certainly makes us controlled more by the U. S. government than most parties listed as free to handle third-party traffic.

The majority of the DL4s are MARS operators and just about all the operating is done from MARS-controlled stations. However, there is only one MARS frequency on which conditions and power permit us to reach the States. This is hardly enough to handle priority traffic (pertaining to deaths or serious illnesses) much less normal traffic.

I would certainly appreciate you giving our side of the situation the same consideration you gave the opposite side.

— A/EC William B. Sanders, DL4TU

LEVELING PROCESS

19 Paton Street
Piccadilly, Manchester 1
England

Editor, *QST*:

I read with disappointment the letter from one of our fellow Gs on the subject of QRP (April *QST*).

What he says may be true of a certain type of ham; one, say, who believes in bringing everyone in every way down to his level. But it must not be imagined that we all feel like that. Some of us are very tired of this leveling-down process we are subjected to over here, and would hate to see it applied where it does not exist in other countries.

Our friend's suggestion of a general limitation to 150 watts does not seem to me to offer any solution to his complaint, and even if this was the case, some would get out better than others, and there would still be the same number of stations. I suppose he would then start a campaign for half-wave dipoles only to be used.

Finally, if some brother ham wants to spend some of his money on a bigger and better rig, I say good luck to him. . . .

— N. S. Potter, G5GNC

75-METER COMMERCIALS

121 East 6th
Junction City, Kans.

Editor, *QST*:

I wish to comment on c.w. in the 'phone bands, especially 75 meters.

The skip has been long this past winter and if the 'phone men had taken a little time to read what the c.w. stations

(Continued on page 142)

QST—Volume IV

Part I†—Foreword to Sumner B. Young's (WØCO) Index

VOLUME IV of *QST* was the second complete Volume to be published under the management of a full-time editor (the late K. B. Warner). It was issued during the period August, 1920, to July, 1921, inclusive.

Volume III of *QST* had been a big one, as readers of my index will have seen; but Volume IV was to surpass it, both in size and importance.

As a "background" for Volume IV, let us review some of the events covered by Volume III.

A great "boom" in amateur activities had followed restoration of transmitting privileges in October, 1919. Amateurs had begun flocking to local and regional meetings. On a small scale, "tube" transmission had begun; and the new editor had encouraged it enthusiastically. A few progressive amateurs had "taken up c.w." despite the coolness toward it which many friends of the spark transmitter had instantly displayed. With the advent of Volume IV, the groundwork for further progress in this (and other) fields had been accomplished.

One of the most interesting items in Volume IV is an editorial published in the September, 1920, issue ("In Introspect"), which contains a review and an evaluation of the happenings of the previous twelve months. As of that date, it was Mr. Warner's opinion that during the first year of amateur work following the restoration of transmitting privileges in October, 1919, the development of "tube" transmitters had constituted our most significant achievement. Despite the difficulties of obtaining power tubes (not yet placed on the amateur market), and regardless of the expense of producing suitable high voltage power supplies for the plate circuits, the "pioneers" had done the job. Some of them had held Special or Experimental-Station licenses, and could lawfully operate on wavelengths around 300 to 350 meters—which was a distinct advantage, because most of the early c.w. transmitting circuits (a term loosely applied to c.w., i.c.w., and 'phone arrangements) would not operate below 300 meters. Others, who had held only General amateur station licenses officially limiting them to waves not exceeding 200 meters, had also participated in this early work (with or without a special permit); but the Department of Commerce had been indulgent; and, in any event, it had lacked sufficient personnel and financial appropriations to enable it to "crack down", even if it had wanted to do so. Nobody had paid much attention to the 200-meter restriction, even in the case of spark

stations; and (in 1920–1921) the over-all average amateur wavelength in actual use was at least 240 meters. (See Warner's editorials, at 31–32, January 1921, and at 25, April 1921.)

Volume IV of *QST* records some significant events occurring in the c.w. field: (1) In the Spring of 1921, the R.C.A. power tubes arrived. The famous "5-watter" (the UV 202) was first released. Then came the very-popular "50-watter" (the UV 203), and the announcement that larger tubes (not so important to the widespread development of the art, as it turned out) would be released in fall of 1921. (2) P. J. Furlong's article on the electrolytic rectifier was published. (3) E. W. Whittier's article gave data on the famous "IDH" c.w. circuit (also called the "sure-fire c.w. circuit", the "reversed-feedback circuit", the "Stanley circuit" and the "British-aircraft circuit"). And (4) John Reinartz published his memorable article on his "C. W. Tuner".

Events (3) and (4), in the above list, showed amateurs how to operate "tube" transmitters on 200 meters, or on wavelengths even below 200; and they also taught them how to receive, and to hold, a c.w. signal over a wide range of wavelengths. As a result, more tube sets went into operation, down below 300–350 meters.

Another characteristic of the busy and eventful months covered by Volume IV of *QST*, was this: Hams had become so numerous, that some means of controlling their own "use of the air" had become imperative. Almost everybody was operating at about the same wavelength (240 meters; not at the legal maximum of 200 meters, or below it). Spark transmitters—notorious "QRM-producers"—were still the most widely used type of rig. Practically none of the c.w. stations were using "pure c.w." (see 57, July 1921); and the radiophones created so much interference that one expert (Kruse) reached the conclusion that as far as he was concerned they were "an obnoxious perversion of the c.w. set". (57, July 1921).

The resulting din in the ether was terrific.

Note that this QRM situation was still very largely an amateur affair. *It is true that some broadcast-listeners (BCLs) had also arrived on the scene; but the great public "rush" to equip one's home for the reception of broadcast programs did not get under way until fall of 1921.*

The principal method of resolving this particular problem was quickly developed. It was the so-called "Chicago Plan", originated by F. H. Schnell and R. H. G. Mathews, and sponsored and administered, originally, in the Chicago area, by the Chicago Executive Radio Council. A time schedule was agreed upon, and enforced. Different classes of

† For previous installments see following *QST* references: Part III of "*QST*—Volume III," June, 1955; "*QST*—Volume I," October, 1954; "*QST*—Volume II," February, 1955; Part I of "*QST*—Volume III," March, 1955; Part II of "*QST*—Volume III," April, 1955.

amateur radio communication were allotted a place on the schedule; and (for a while at least), great improvement in operating conditions was achieved. This plan depended upon the organization of strong clubs—particularly near large centers of population. It had the outstanding merit of providing an essential function for those clubs to perform; and, for that reason, it tended to develop a fine group of local and regional organizations affiliated with the League.

The "Chicago Plan" spread rapidly over the U. S. A. But when (at a later period of time) the problems connected with BCI became so numerous and so serious that amateur radio's very existence was endangered, this scheme proved to be inadequate. (We shall see, later, when we examine Volume V of *QST*, that attempts to bring the BCLs into the amateur clubs, and to make these listeners parties to any agreements about "use of the air," were hopeless; and that only *technological* solutions were of any avail.) It is true that even back in the period extending from August, 1920, to July, 1921, some of the more far-sighted amateurs suggested that the development and use of waves below 200 meters was imperative, from the standpoint of *QRM avoidance*.¹ Unfortunately, their views were little noticed. But, "for the record," I wish to draw your attention to three items: (1) The work of Professor R. V. Achatz, City Manager in Lafayette, Indiana;² (2) A remarkable letter from F. B. Llewellyn;³ and (3) An instructive and well-reasoned letter from W. F. Scott (2PP).⁴

The period with which Volume IV of *QST* deals was also characterized by other problems. One concerned allotment of wavelengths below 200 meters at a time before the full usefulness of such waves had been even faintly proved:

¹ In fact, suggestions to this effect had been made as far back as October, 1919. See 26 to 27, October 1919. Other references: 20, January 1920; 17 to 18, February 1920; 13 to 14, February 1920; 40, December 1920; and 35, November 1920.

² 44, June 1921. This is an item under "Strays," and reads: "We are proud of the city of Lafayette, Indiana. Professor R. V. Achatz of Purdue University, City Manager, reports he has his city tuned down to 200 meters, and has personally checked up every station under his jurisdiction, with several of the smaller stations operating on 160 and 180 meters. Let's have more cities like Lafayette." (Italics by S.B.Y.)

³ 59, 64, January 1921. This letter points out the great difficulties to be faced in attempting to eliminate interference by time-schedules, and then says: "... The new plan is taken from Naval procedure.

"The idea is based on a change of wavelength. A designated wave is fixed on which all calling shall be done. Other wavelengths are arranged so that once having established communication, it is a simple matter to shift to a wavelength on which there is no interference. . . .

"The amateur is limited to 200 meters. During the war the Navy used a wavelength of 52 meters for short distance work. Amateurs whose powers do not exceed $\frac{1}{4}$ k.w. could use 100 meters or less without a very appreciable decrease in range. They would then be free from jamming by higher powered amateur stations.

"Each higher powered station should be tuned to a slightly different wave under 200. It would not be difficult to have these waves published in the call books.

"Under these circumstances a common calling wave would not be necessary. . . ." (Italics by S.B.Y.)

a series of attempted "grabs" by the U. S. Navy commenced.⁵ Another involved the assignment of wavelengths around 300 meters: the A.T.&T. wanted these for use in ship-to-shore telephony.⁶ *Editor Warner thoughtfully sounded the warning that it was necessary for the radio art to develop every single wavelength which could be put to practical use.*⁷ How many of us paid attention, I do not know.

Closely allied with wavelength allocation problems were activities in the legislative field. With the rise of broadcasting, and the development of interest in short waves as a potential source of many communication channels, the old Radio Act of 1912 had begun to "break down." It did not confer upon the Secretary of Commerce adequate means and discretion, in the matters of: the classification of radio stations, the prescription of the services which they should perform, and the specification of the frequencies upon which they should operate. He even lacked power to deny a request for a broadcasting station license which actually (from the standpoint of public interest, convenience, or necessity) would clearly be improvident to issue. Although the first of the so-called "National Conferences" between representatives of the radio industry and various governmental agencies was not held until February 27, 1922,⁸ Secretary Herbert Hoover (at an earlier date—in 1920) named a committee to recommend a new radio law "to meet modern conditions"; and he appointed Mr. Charles H. Stewart (of St. David's, Pennsylvania) to serve on it as the League's representative.⁹ In 1920, this committee, "consisting of representatives from every radio interest in the country" gave consideration to the question: What should be the amateur's wavelength assignment in the new law to be recommended

⁴ 55 to 56, December 1920. Scott described and diagrammed a tuned spark-coil set, using a Century buzzer as an independent interrupter, giving a good 500-cycle note. *Means of bringing the primary circuit of the spark coil itself into resonance with the frequency of the buzzer, by means of a large choke having a sliding metal core, were disclosed.* This transmitter covered 10 to 20 miles, with an input of 8 to 10 Watts, on "200 meters." The letter then states: "... With the same set using a smaller condenser and a loading coil in the open circuit, signals have been transmitted about a mile on a portion of the lead-in 25 ft. long and 20 ft. high. The wave used was about 180 meters. Good radiation was obtained but very few sets in the vicinity were able to get down to some of the low waves used.

"Through these experiments I believe it is entirely possible for amateurs to have a small indoor aerial for work on waves as low as 100 meters and with which local communication could be carried on successfully, thus eliminating some of the *QRM on 200.*" (Italics by S.B.Y.)

⁵ 33, July 1921. This editorial indicates that the Navy wanted a wavelength, down below the suggested amateur wavelength assignments, for "chaser boats."

⁶ 33, July 1921. The editorial "What We Want in Radio Law," here cited, states: "... with the Navy below us and the A.T.&T. above us, both clamoring for more room, believe us, we would like to see our wavelength written into the law so that there would be no question about it. . . ."

⁷ 33, July 1921. "... the intensive development of radio demands that use be made of all waves. . . ."

⁸ See "The Memoirs of Herbert Hoover," (Volume called "The Cabinet and the Presidency"), pages 139 to 148.

⁹ See Warner's editorial: "In Introspect," at 23, September 1920.

by the conferees? The answer was this: 180 to 220 meters, for spark stations, and 180 to 250 meters for c.w. stations.¹⁰

As of June, 1921, no less than seven radio bills were pending in Congress.¹¹ The most "unpalatable" of these was "Senator Poindexter's infamous S. 31."¹² Offsetting this, was Congressman White's Bill, H.R. 4132.¹³ An ARRL "legislative committee" was watching developments; and Secretary Warner visited Washington to gather information and to report his findings.¹⁴

The June, 1921, issue of *QST* also mentions the fact that the Department of Commerce had sent a representative to Paris in the year 1920 to attend a *preliminary international conference*; and that the report prepared at that gathering was "already influencing practice in the choice of wavelengths, in the classification of modern types of radio systems, etc."¹⁵

The period of time reflected in Volume IV of *QST* was also marked by the rise of the big conventions. These eventually were to lead to a National Convention, at Chicago, in September, 1921. The large-scale affairs held at Philadelphia, St. Louis, New York, San Francisco, and Chicago, were the most noteworthy.¹⁶

In this same period, amateurs, in coöperation with the U. S. Bureau of Standards, participated in several series of so-called "fading tests", in an attempt to discover the causes of fading.

First transmissions were on 250 meters. Some later transmissions were made on 200 meters. Both spark and tube transmitters were used.

The scientific results were not of great importance; but the several series of tests represented an outstanding example of amateur coöperation with government agencies.

In the April, 1921, "fading tests," one station (9ZN, at Chicago) operated two transmitters, simultaneously, on 200 meters; 3XF and NSF were "on the air," at the same time (on 200), with i.c.w. sets; and 9LQ and 9JZ transmitted (on 200), at the same time using synchronous-spark transmitters.¹⁷

¹⁰ See Warner's editorial: "What We Want in Radio Law," at 33, July 1921.

¹¹ See Warner's editorial: "The Legislative Situation," at 28 to 29, June 1921.

¹² 28, June 1921. See, also, 5 to 6, 12, December 1920. ("Dangerous Legislation Confronts Us.")

¹³ 28, June 1921.

¹⁴ 28, June 1921.

¹⁵ 21, June 1921. See, also, 5, December 1920, which speaks of an International Communications Conference to be held in Washington, in October, 1920.

¹⁶ On Philadelphia, see: 40, February 1921; 26, April 1921; 41 to 43, April 1921; 23, September 1920.

On St. Louis, see: 31, December 1920; 37, December 1920; 9 to 16, 19, 23, February 1921 ("Rotten S.O.L.", by "The Old Man"); 30, February 1921. ("Hams" from all 9 Districts were present. See 14, February 1921.)

On New York, see: 47 to 49, May 1921. The total attendance of this one reached 5,165; of which 2,765 were "paid admissions", and the balance were "repeater attendants", admitted on "season tickets".

On San Francisco, see: 32, 48, February 1921. Formation of a separate league was voted down. Attendance was nearly 600.

On Chicago, see: 38 to 39, August 1920; 21, October 1920; 31 to 34, October 1920; 34, 37, October 1920;

Other coöperative activities involved the use of amateur stations to disseminate police, Market-Bureau, and Weather-Bureau reports and information. A report received (from KUVS) by Messrs. Richard Frank and William Mitchell, who operated station 2TK, at Union Hill, N. J., resulted in the recovery of the first "hot" car to be located with amateur help. This was about March 21, 1921.¹⁸

With the increased use of radiotelephone transmitters, in particular, amateur stations began to be used for broadcasting, and for other purposes which have long-since been declared illegal.¹⁹ (When we study Volume V, of *QST*, we shall see some of the consequences of the indiscriminate use of poorly operated amateur radiophone stations.)

The spark transmitter was still a favorite, with most amateurs; and, in fact, some of the DX records held by such stations as 2BK, 2RK, 6JD, and 9ZN, were "mighty impressive."

2BK was heard in Los Angeles, by 6KA, on April 19, 1921, at about 4:38 A.M. (EST).²⁰ The world records of 2RK (J. K. Hewitt, of Brooklyn, N. Y.),²¹ listed on page 43 of the February, 1921 issue, included the following items: (a) December, 1920 — copied by an American ship, from New York to London and return; (b) Copied on a Grebe CR-6 receiver, by an English vessel, at Gibraltar (3,200 miles); and (c) Reported heard off Pernambuco, South America, on a Navy SE-1420 (non-regenerative) receiver, a distance of 3,600 miles.

Stations 6JD, 9ZN, and 1AW, "hung up" a new record for a round-trip "transcon" message, on the night of January 17th-18th, 1921, when they handled one "over and back," in 6½ minutes.²²

DX work, and large scale message handling, with various types of tube transmitters also began to be reported. These reports were impressive, largely for the reason that the power of most c.w. stations (as of, say, July, 1921) was under 50 watts.²³ Station 2ZM was heard (on

On plans for a National Convention, see: 26 to 27, July 1921; 55, July 1921.

¹⁷ See 23, April 1921.

¹⁸ 16, May 1921.

¹⁹ 52, June 1921 (broadcasting of election returns, in conjunction with the *Dallas Dispatch*); 45, June 1921 (newspaper installs an Amateur station as part of its regular news-gathering machinery); 41, February 1921 (sermons broadcast over an amateur radio station installed on church property); 46, February 1921 ("*The Desert News*", from its Special Amateur Station, 6ZM, broadcasts news-items to amateurs); 36, December 1920 (SAO sends time signals); 44, September 1920 (Young & McCombs, at Rock Island, Illinois, sends out Radiophone concerts on amateur waves); and 33, June 1921 (Doubleday-Hill Electric Co., of Pittsburgh, installs a high-powered c.w. and 'phone set "to be used largely for the purpose of handling business with their Washington, D. C., store").

²⁰ 45, June 1921. "Old" 2PM, according to an unverified report, was copied in Los Angeles before World War One. See: 24, November 1920; and 23, April 1921.

²¹ See, also: 23, April 1921; 30, May 1921; and 53, May 1921.

²² 12, March 1921. 27, April 1921 (Trans-continental c.w. relay-route being formed).

325 meters) by a ship in the Pacific Ocean, located off Guatemala, Central America.²⁴ Frank Conrad's station, 8XK (in Pittsburgh), which used an "r.a.c." plate supply, was heard 3,000 miles away.²⁵ And on the night of July 10th, 1920, a non-amateur station, NSF, using two 250-watt tubes, and an Alexanderson multiple-tuned antenna, was heard in Bristol, England.²⁶

With records like these before them, it was only natural that amateurs should speculate on the possibility of bridging the Atlantic, by means of amateur transmitters; and (in February, 1921), the first "transatlantic tests" were run. These were hastily organized and were not properly planned. In any event, the tests failed; and perhaps their principal value was to disclose certain defects of planning and of preparation which the "second transatlantics" avoided. (The story of those second tests is covered in Volume V of *QST*.)

In the May (1921) issue of *QST*, Mr. Warner (at page 16) made the interesting announcement that he would bet his new spring hat that if a good U. S. amateur were sent to England with a standard American regenerative receiver (using variometer tuning in the secondary and tertiary circuits), and with an Armstrong superheterodyne, "*reception of U. S. amateurs would straightway become commonplace.*" (Italics by S.B.Y.)

Volume IV also records the results of the "Ideal Relay Spark Transmitter Contest." This represented the first orderly and systematic attempt to collect, and to summarize, the learning which amateurs had acquired on any one subject. By the time when the findings were published, however, the "shift-over" from spark to c.w. had acquired considerable momentum; and amateur spark transmitters had only a short time to live.

Emergency and relief work, by amateur stations, during the period covered by Volume IV of *QST*, was almost nil. Cushing, of Duxbury, Mass. (1FBF) performed the most noteworthy work within this category: On November 28, 1920, the U. S. Minesweeper *Swan* went ashore, near that place, in a terrific northeast gale. She was unable to "raise" the Boston Navy Yard, on her radio; so Cushing relayed her traffic to KQZ (S.S. *City of Rome*). She, in turn, passed it on to NAD. (The crew of the *Swan* was rescued.)

The best "reminiscences" published in Volume IV were those written by Irving Vermilya, concerning the "passing" of old WCC (Cape Cod). These will be found at 16 to 17, August 1920.

In the short-wave field, the advent of John Reinartz's "C.W. Tuner" provided a means of receiving waves down as low as 150 meters.²⁷

But commercially-built receivers were still inadequate for reception of signals below 200 meters. The September, 1920, issue of *QST* reported²⁸ that "old" 6KL (William Wood), now Canadian 5BR (of Vancouver, B. C.) was transmitting on 100 meters, with $\frac{1}{2}$ -k.w. of power, and that he was hoping to contact some U. S. amateurs in the 7th District. (I have since wondered what results he had down there.)

The November (1920) issue, at page 35, announced that E. A. Bessey (6BR, of Sunnyvale, California) had installed "a new panel-type transmitter designed for 150, 200 and 375 meters"; and it stated that this would "greatly relieve the QRM situation."

At page 40 of the December (1920) issue, I find that John D. Hertz (7ZB, of Portland, Oregon) announced that he would do local work, on c.w., on 150, 175, and 200 meters. (Again, I wish I knew what the results of his work turned out to be.)

Sunspots, magnetic storms, and Aurora-Borealis effects were noted by various amateurs.²⁹

A "dead-spot", near Savannah, Georgia, was explored by 4YA. He arranged tests between a radiophone station, mounted in a truck, and other amateur stations.³⁰ Two other "deadspots" — between Springfield and Boston, Massachusetts, and between Springfield and Worcester, Massachusetts — were also noted, but were not explored.³¹ The Bureau of Standards sought data concerning "dead-spots" at sea.³²

In the "miscellaneous" category, readers of the Index to Volume IV of *QST* will be interested in the following items:

(a) *League affairs:*

League Officers began to visit hams in various parts of the U. S. A.; and Mr. Maxim became the first League officer to visit amateurs on the West Coast.³³ While in San Francisco, he made an address over the De Forest radiotelephone station.³⁴

F. H. Schnell became the League's first full-time Traffic Manager.³⁵

During the Midwest Convention at St. Louis, the League's Board of Directors met in that city; and "for the first time our directors from the west and south actually sat in with those from the east and north."³⁶

At the Pacific Division Convention, in San Francisco, "the question arose of forming a separate relay league on the Pacific Coast, to be entirely independent of our American Radio Relay League." This was overwhelmingly defeated.³⁷

(Continued on page 138)

²⁴ 35, July 1921. In April, 1921, it was stated that 2ZL (J. O. Smith, of Long Island, N. Y.) was probably the most-powerful amateur c.w. station. See 27, April 1921.

²⁵ 42, May 1921.

²⁶ 12, May 1921. See, also, 32 to 34, September 1920, for a description of 8XK.

²⁷ 52, November 1920; 25 November 1920. For a description of NSF's equipment, see: 5 to 6, September 1920; 8, November 1920.

²⁸ 5 to 7, June 1921.

²⁹ 31, September 1920 (in the Northwestern Division report).

³⁰ See 27 to 28, June 1921; 40, July 1921 (Phelps' report); 62, July 1921; 53 to 54, July 1921; 13 to 14, January 1921.

³¹ See 32, May 1921 (Merritt's report).

³² See 36, July 1921 (Entwistle's report); 33, January 1921.

³³ See 22 to 23, April 1921.

³⁴ See: "East Meets West", at 24, September 1920.

³⁵ See: 44, September 1920. This was the 1-k.w. set, located at the California Theatre, San Francisco, California.

³⁶ 26, November 1920.

³⁷ 30, February 1921.

³⁸ 32, February 1921.

YL NEWS and VIEWS



BY ELEANOR WILSON,* W1QON

Results — YL-OM Contest

The Sixth Annual YL-OM Contest sponsored by the Young Ladies Radio League attracted more YLs and OMs than ever before. Two-hundred seventy-four logs were received, an increase of about 100 over 1954. One hundred sixty-eight of the logs came from OMs, along with such comments as:

"Didn't realize there were so many fine c.w. operators — and so patient they would operate at any convenient speed."

"The thrill of a century — will be aboard next year."

"Lots of fun — more girls on c.w. this year."

"Having c.w. and 'phone on separate week ends excellent."

The following message was received from YLRL Vice-President Gilda Shoblo, W6KER:

"I wish to thank everyone for sending in reports, and of course, my heartiest congratulations to the winners, as well as my condolences to the very fine losers. In the long run we all win. Some of the reports have been altered, mostly due to contestants sending in combined scores. I hope the tabulations and awards are as near correct as possible; if not, I shall be very happy to make corrections. Also, I shall be pleased to receive suggestions and comments on the contest, so that the next officer can know of any changes desired by the contestants."

Since the rules of this contest were published, I have discovered there is a Silver Cup awarded specifically for top or aggregate score. Since this cup is awarded and so inscribed for this "specific" category, and due to the many, many aggregate scores sent in for this award (ostensibly), having no alternative but to give this to the winners for which it is intended, I have done so."

YL SCORES

Aggregate YL Winner: W4HLF, Arlie Hager, 27,682. Highest c.w. scores: W4BLR, 10,765; W4HLF, 10,132; W9JUJ, 7880. Highest 'phone scores: W4KYI, 25,818.75; W1SCS, 24,096; W4HLF, 17,550.

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

Station	Aggregate	'Phone	C.W.
W1OAK	528	—	528
W1QON	316	316	—
W1RLG	5460	—	5460
W1RLQ	4792.5	4792.5	—
W1SCS	24096	24096	—
W1UKR	5126.25	4531.25	595
W1VOS	1068.25	1068.25	—
W1VYH	192	192	—
W1WYX	3260	—	3250
W1YNI	193	—	193
W1YPH	3177.5	987.5	2190
W1YYR	5605	—	5605
W1ZUR	2291.25	2291.25	—
W2BNC	3698	2006	1692
K2CJQ	1237.5	—	1237.5
K2DKQ	120	—	120
K2DBL	750	—	750
K2DXD	2316.25	—	2316.25
W2EEO	1080	1080	—
W2EMU	658.75	—	658.75
K2INQ	1500	—	1500
W3CDQ	125	125	—
W3LSU	1162.5	—	1162.5
W3MAX	9140	7950	1190
W3MDJ	7992	7992	—
W3QPF	5328.75	—	5328.75
W3TYC	87	—	87
W3UTR	1040	—	1040
W3YTM	4752	—	4752
W4AHN	1181.25	—	1181.25
W4BLR	10775	—	10775
W4DWP	837.5	837.5	—
W4HLP	27682	17550	10132
W4HLN	3790.75	1954	1836.75
W4KYI	25818.75	25818.75	—
W4RIG	585	—	585
W4UTO	880	880	—
W5EGD	8068.25	2441.25	5625
W5BQ	25	25	—
W5WUX	4522	4522	—
W5WXY	3206.25	2625	581.25
W6CQT	4162.5	4162.5	—
W6EHA	4608.75	3673.75	855
KN6EIG	125	—	125
W6AJA	1399.25	1399.25	—
W6NAZ	420	—	420
W6QGX	119	119	—
W6QGZ	90	90	—
W6QMO	3330	1991.25	1338.75
W6QYL	375	—	375
W7QY	4120	4120	—
W7QYA	130	—	130
W7SNP	2887.5	1870	1017.5
W8BIQ	742.5	742.5	—
W8HUX	1175	1175	—
W8HWX	4622.5	997.5	3625
W8KLZ	330	—	330
W9AQB	3685	3685	—
W9FRW	200	200	—
W9JUJ	7880	—	7880
W9LOY	7038	7038	—
W9MLE	878.75	—	878.75
W9MYC	1286.25	—	1286.25
W9SYX	743.75	—	743.75
W9WZL	4305	—	4305
W9FVE	2312.5	375	1937.5
W9KJZ	1840	—	1840
W9LGG	2210	—	2210
W9OMM	3918	3750	168
W9PQB	2968	2968	—
KP4ZV	4356	4356	—
KZ5DG	14520	14520	—
VE1ABT	1657.5	1657.5	—
VE2AOB	1225	—	1225

* Operated by W3OQF

The following stations submitted 'phone logs for checking purposes only: W1YNI, W2OWL, K2UTZ, W5YRT, K6s, ANG, CYZ, ELI; W6s DXI, NAZ; W7TGG.

The following stations submitted c.w. logs for checking purposes only: W4RLG, W7s RHM, RRM; VE3s AJR, DDA.

OM SCORES

Aggregate OM winner: W1BFT, Carl Evans, 3705. Highest c.w. scores: W1BFT, 1820; W8AJW, 1820 (tie for first place); W4IA, 1102.5; W4JUJ, 892.5. OM 'phone winners: W4ARR, 2287.5; W1BFT, 1885; W9CMC, 1295.

The ten YLs who attended the East Texas Hamfest at Longview in April had a "fine old rag chew," according to Maxine, W5YRT, who forwarded the above photo. Left to right the smiling femmes are: W5s UYI, UUS, RYX, WNSFDR, W5s TKM, VYI, LGY, YRT, YAJ, and VSN.

Station	Aggregate	'Phone	C.W.
W1BFT	3705	1885	1820
W1FF	108	108	108
W1YH	638	188	488
W1OPZ	318.25	150	168.25
W1RFC	275	—	275
W1BSZ	292.5	—	292.5
K2AFQ	828.75	—	828.75
K2BWF	637.5	637.5	—
K2COB	262.5	262.5	—
K2DSW	701.25	—	701.25
K2EIU	227.5	—	227.5
W2EMV	658.75	—	658.75
K2EVP	261.25	—	261.25
W2EZZ	200	—	200
K2KDW	257.75	—	257.75
W2MCO	308.75	308.75	—
W2NIY	543	—	543
W2UAP	165	—	165
W2WDP	643.75	302.5	341.25
W3AXT	426	228	198
W3CDG	540	—	540
W3MDO	384	—	384
W3OP	300	—	300
W3PWN	540	—	540
W3QLW	385	385	—
W3RRI	640	640	—
W3SLJ	487	—	487
W3STY	270	—	270
W3WKX	542.5	—	542.5
W3YUW	110	—	110
W3YVT	120	120	—
W4AAR	2292.5	2287.5	5
K4ATD	112.5	—	112.5
W41A	1428.25	308.75	1102.5
W4JUL	1342.5	450	892.5
W4KDS	255	255	—
W4KL	245	—	245
W4OM	168	—	168
W4TFD	900	220	680
W5DXW	61.25	61.25	—
K6AUC	90	—	90
K6CUK	97	—	97
W6MES	176	176	—
W6UTZ	387.5	387.5	—
W7SEK	527	—	527
W7VIL	318	131	187
W8AJW	2413	593	1820
W8FRD	308.75	—	308.75
W8JHE	672.5	375	297.5
W8JPE	336	336	—
W8LAQ	195	195	—
W8MQQ	123.75	—	123.75
W8OMR	1245	—	—
W8RGF/2	200	—	200
W9CCO	150	—	150
W9CED	308.75	—	308.75
W9CMC	220	1295	935
W9DIE	341.25	—	341.25
W9EDV	208	208	—
W9FYM	616	616	—
W9GMT	4	4	—
W9KLD	675	—	675
W9NMJ	1550	997.5	552.5
W9PQA	630	630	—
W9SVZ	439	—	439
W9VBZ	468.75	—	468.75
W9GAX	591.25	276.25	315
W9HFP	665	665	—
W9IU	261.5	—	261.5
W9IUB	546	—	546
VE3AVS	275	—	275
VE3BNQ	120	—	120
V06N	120	—	120

The following OMs submitted 'phone logs for checking purpose: W1s BUD, LQ, PO, YGR; K2s AEQ, AFQ, DSW, EUI, HID, KID; W2s BVN, CVW, CYK, IFI, UAP; W3s YG, YUT; W4s FPX, MG, WRH/4; W5ZWR; K6DYW; W6s FAD, FRD, VQD; W7s KLD, SIE; W8s IJU, LOW, VRN, YQR.

The following OMs submitted c.w. logs for checking purposes: W1s BOW, JZA, NLM, VBR, YGR, YUN; K2s BUE, BUP, CMV, MTA; W2s BUN, CVW, NEP, OLT, REP; W3s JUN, NRE, QLW, RRI, WG, ZID; W4s FPX, GMY, RXI, WRH; K6DYM, KN6INU, W6PQK; W8s DAE, GQD; W9s EDH, FYM, PQA, RKP, SIE, UDK; W0s JBM, VRN; VE6SX.

Aggregate winners W1BFT and W4HLF each received a silver cup and were awarded certificates for various other high scores.

In 1954, W4KYI received the highest aggregate score and a silver cup. In 1955, W4HLF had the highest aggregate score and received a silver cup. The highest 'phone score (gold cup) was made by W4HLF in 1954 — in 1955 the cup goes to W4KYI.

We wish to thank participants who called our attention to the fact that rules published for the 1955 contest omitted mention of a silver cup to be awarded for the highest OM combined score and a silver cup to be awarded for the highest YL combined score. We regret any misunderstanding which may have resulted from this omission.

For W4AHN, Merle McBlain, of Alexandria, Virginia, the YL-OM C.W. Contest was a first

venture into a contest. Merle says that the experiences of those two days "forced" her to preserve her thoughts on paper, as follows:

The Monday Morning Blues

My ears ring with a dit-dah tune 'tho the contest's over and I'm back to earth pushing a vacuum cleaner through a house that's a shambles. Dirty dishes in the sink — quick! close the door to the shack — hide it from human eyes. Only a ham would understand.

I brushed-up my c.w. three weeks before the YL-OM contest when a license renewal reared its dit-dah head. I gingerly touched the dit side of the bug and jumped clear across the room; the result of five years of neglect, I'm sure.

But thanks you patient OMs; all 65 of you. As for those who QRSD, I'm certain you'll go to ham heaven where there's no QRM or TVI and DX is unlimited! Forgive me, W9DO, for making a DOG of you — conditions you know, not my 13 w.p.m.

Glad to give reports on your two antennas, W3KTR, even 'tho it was in the midst of the con-



"My ears ring with a dit-dah tune" — W4AHN

test! Hope you know better than to count too much on this YL's untrained ear.

One thing boomeranged, though. Once after a number of repeats on a QTH, I was embarrassed and answered with an R. Thought I'd be smart and look him up in the call book. But the joke's on me — he's not in "Summer 1954." Moral, gals: always lead the good clean life.

Speaking of OMs, mine is a very patient one. Well, fairly patient. He'd wander into the shack and remark something like "It's three o'clock. How about something to eat?" I'd stare glassy-eyed while busily calling CQ OM. Quietly, he'd leave, but I know he didn't starve — not with all those dirty dishes I found in the sink. On Sunday I knew for sure that I had married him for better, not worse. At 0830, into the shack he strolled with a breakfast tray — HAM and eggs!

That's why I feel so bad about deliberately letting our Sunday dinner burn. A roast's the thing, I had thought. I'd just throw into the oven; it would cook itself. I cannot tell a lie (other than a signal report). I smelled it burning and pushed the thought from my frenzied brain. A Wisconsin was calling me

(Continued on page 134)



Hints and Kinks

For the Experimenters



RESISTOR HINTS

IN reworking a Q5-er, it was discovered that all resistors were conductive between the outside surface and the leads. This condition was especially prevalent in the *gold-band* section of each resistor. Upon breaking a few of the units open, it appeared that they had no insulating coating such as applied to present-day jobs. Apparently, the grey carbon impregnating material extends all the way to the outside of each resistor. Naturally, faulty operation of the receiver will occur if one such resistor makes contact with the chassis, another part of the circuit, etc.

— E. M. Fry, K2CW

POWER-REDUCTION HINTS FOR S.W.R. BRIDGE MEASUREMENTS

ONE of the problems frequently encountered in making s.w.r. measurements is that of reducing transmitter power output to a level low enough to prevent damage to the bridge. In installations where there is no existing means of controlling output from the amplifier, it is possible to control the power to the bridge by means of the simple system shown in Fig. 1. In this arrangement, most of the output from the transmitter is dissipated in the 52-ohm dummy load

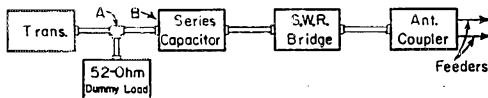


Fig. 1 — A simple arrangement for reducing power during s.w.r. measurements. A is a "T" coaxial-cable coupler and B is a variable capacitor with a range of approximately 0-100 μf .

and a portion of the remaining power is fed to the bridge through a variable capacitor.

The dummy load must be capable of dissipating nearly the full output from the transmitter. It should be shielded and equipped for coaxial-cable input. The variable capacitor should also be enclosed in a metal compartment and should be terminated with coax connectors. A standard "T" connector and short lengths of coax may be used for making connection between the transmitter, dummy load and variable capacitor.

When using this method of power reduction, the bridge is inserted in the transmitter output line in the usual manner. Then adjust the variable capacitor for normal reflection of the s.w.r. indicator and proceed as you would with any other set of adjustments or measurements.

— John W. Stack, W5QQY

INPUT CIRCUIT FOR EITHER CRYSTAL OR CARBON MICROPHONES

THE circuit shown in Fig. 2 permits feeding the output of either a crystal or a carbon microphone to the speech-amplifier tube. The closed-circuit jacks automatically convert the circuit

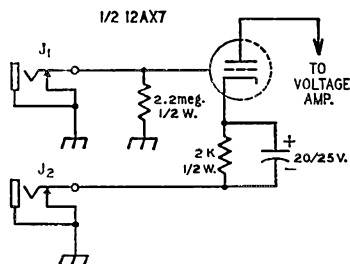


Fig. 2 — Schematic diagram of the speech amplifier designed for either crystal- or carbon-microphone input.

for whichever type of microphone is used. When using a crystal or other high-impedance microphone, it is plugged into J_1 . In this application, the cathode circuit for the 12AX7 is completed through J_2 . With J_1 closed (microphone plug removed) and with a carbon microphone plugged into J_2 , the stage operates as a grounded-grid amplifier. The second half of the dual triode is used as a conventional voltage amplifier with a gain control in the grid circuit.

— Vernon Phillips, W7NPV

CUSTOM-MADE NAME PLATES

ALL you need to make attractive custom-designed name plates for the new rig are a package of transmitter decals (Tekni-Labels, Burbank, Calif.), narrow strips of aluminum, clear finger polish and a piece of crocus cloth or polishing paper.

The strips are cut to the desired width and length, a mounting hole drilled at each end, polished with the crocus cloth or paper, cleaned of abrasive dust and given a quick even coating of nail polish. After the polish dries, the decal may be affixed and allowed to dry thoroughly. Then one or two more coats of polish should be applied, each coat being given sufficient time to dry completely.

The result is an inexpensive indicator or name plate that is commercial looking in appearance. As the drying of the nail polish is tricky, since it dries so rapidly, it is best to experiment first before going into production. The instructions supplied with the Tekni-Labels should be followed closely.

— Rev. Joseph F. O'Reilly, W9UFL

CHASSIS-LAYOUT AID

THE construction practices chapter of recent editions of *The Radio Amateur's Handbook* makes the excellent suggestion that one commence construction by covering the chassis with a sheet of paper. The location of components, mounting holes, etc., is then marked on the paper so that the latter may be used as a drilling template for components to be mounted above deck. After drilling, the parts which require mounting underneath may be located and the mounting holes drilled, making sure by trial that no interference exists with parts mounted on top.

An easy way to ensure a good alignment of components below with those above the chassis is to place a sheet of translucent paper (onion-skin) on top of the chassis, and mark on its top surface the position of topside parts. Then place the same sheet against the underside of the chassis, unmarked side exposed, and locate the parts to be mounted inside the chassis. Since the paper is translucent, these may be easily placed so as not to interfere with components on top of the chassis.

— David Weinfeld

PARALLEL 6Y6s FOR THE SIMPLEST MODULATOR

THE simple grid modulator described by TW6LNN in *QST* for September, 1953, has usually lived up to its name if constructed with a single tube in the output stage. However, the installation of parallel 6Y6s in the modulator has occasionally resulted in instability within the unit. With the assistance of W8RXX, and with the addition of a few inexpensive components, it has been possible to stabilize the parallel-tube arrangement. Fig. 3 shows the revised circuit which, incidentally, is used to modulate

resistors R_{12} through R_{15} are the recent additions to the modulator and are the components which stabilize the new arrangement. R_9 of the one-tube layout has been replaced with a 100-ohm variable to provide a convenient means of adjusting the plate current of the r.f. amplifier. This adjustment is particularly helpful when resetting the plate current to *half value* after band changing.

— Philip J. Hart, W8MMK

[EDITOR'S NOTE: The simple grid modulator referred to above is also described in Chapter 9 of recent editions of the ARRL *Handbook*.]

ADDING A SPINNING REEL TO THE BOW-AND-ARROW TRICK

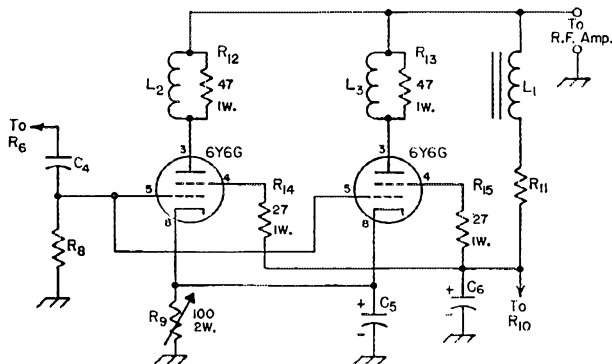
THE trick of using a bow and arrow to shoot an antenna halyard into place can be improved on by using a spinning reel and rod as a means of paying out the guide line. Four-pound nylon test line and a short rod is the best combination to use. Tie the line to the arrow just to the rear of the feathers. As the arrow passes over the top of the tree or other type of support, have the person holding the rod apply enough pressure to the reel to control the flight of the arrow. When the arrow has landed, untie the nylon line and fasten the halyard in place. Now haul the halyard back to the firing position so that the halyard and antenna can be connected together.

— E. M. Fry, K2CW

IMPROVED R.F. CABLING FOR REMOTE-TUNED VFOs

AFTER constructing and using several remote-tuned variable-frequency oscillators, it became apparent that one of the weakest points in this system is the cabling between the frequency-control box and the rest of the oscillator. Instabil-

Fig. 3 — The simple grid modulator circuit used by W8MMK. L_2 and L_3 are each 10 turns of No. 26 enamel wire wound over R_{12} and R_{13} , respectively.



the popular 4-250A amplifier described in recent editions of the *Handbook*.

Many of the components shown in Fig. 3 bear designations — R_6 , C_6 , L_1 , etc. — which refer to the original diagram inasmuch as these parts remain unchanged in both value and placement. With respect to the original circuit, it should be mentioned that the 6SL7 section of the unit requires no modification. L_2 and L_3 and

ity or intermittent operation of a VFO can frequently be traced to poor contacts in the plugs and receptacles used to terminate the interconnecting coax line. I have found that Amphenol type 83-22SP and 83-22R plugs and receptacles, respectively, used in conjunction with RG-22/U coaxial cable, provide the most reliable tank-to-tube connections yet employed.

— Donald Miller, W4VZQ

NEW BOOKS

License Manual for Radio Operators, by J. Richard Johnson. Published by Rinehart & Company, Inc., New York. 480 pages, including index, 6½ × 9½, cloth cover. Price, \$5.00.

A question-and-answer manual covering the eight elements of the FCC commercial operator examinations. Several appendices are included, one correlating examination questions with the normal progression of theory courses in the various subjects, a second giving specific references to laws applicable to legal questions, a third listing the Q signals, and a fourth tabulating general texts with a notation of their usefulness in connection with specific elements of the examinations.

Introduction to UHF Circuits and Components, by Milton S. Kiver. Published by D. Van Nostrand Company, Inc. 408 pages, including index. Schematics. 6½ × 9½, cloth cover. Price, \$7.50.

Although the layman naturally thinks "television" when "u.h.f." is mentioned, the subject of u.h.f. television is discussed only in one brief chapter in this volume. The book is actually a survey of components, methods and circuits in the v.h.f.-u.h.f. field generally, covering tubes, transmission lines, waveguides and antennas used in this part of the frequency spectrum. Chapters on measurements and receivers also are included. Gives a good over-all picture of the field.

Elements of Radio Servicing, by William Marcus and Alex Levy, second edition. Published by McGraw Hill Book Co., Inc., New York City. 566 pages, including index. Schematics. 6½ × 9½, cloth cover. Price, \$6.00.

In addition to the inclusion of new material on features of a.m. broadcast receivers that have been introduced since the appearance of the first edition, new chapters have been added to cover f.m. receivers as well. The text is general, dealing with types of circuits and methods rather than specific receivers. Test instruments and their proper use are discussed.

Elements of Radio, Third Edition, by A. Marcus and Wm. Marcus. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. 6 × 8½ inches, cloth cover, 771 pages, including index. Price, \$6.00.

Very suitable for the raw beginner, as well as useful to those who have some practical acquaintance with radio circuits and want to get an elementary technical background. The book is divided into two parts, the first of which teaches by using the development of the broadcast receiver as a theme, carrying through from the simplest crystal set to modern types. This section is entirely nonmathematical. The second part is an elementary theory course developed along more conventional lines. There are questions and problems with each of the forty-two chapters.

How To Install TV Antennas, by Samuel L. Marshall. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. 124 pages, 5½ × 8½, paper cover. Price, \$2.50.

About half of the book is devoted to a discussion of TV antenna characteristics, transmission lines, and pointers in selecting the proper antenna for a given situation; the remainder deals with the actual mechanics of installation. Available materials and fittings are described, and considerable attention is paid to such factors as the stresses on masts and guy wires. Much of the antenna installation data appears to be useful for amateur antennas as well.

Preview — DX Contest High C.W. Scores

Excitement reigned supreme during the 21st ARRL International DX Competition c.w. portions. February band conditions allegedly were the best in years. Then came March and Kellenly-Heaviside lowered the boom in a sudden about-face that diehard DXers have recently learned to expect. With claimed scores, multipliers and contacts shown in that order, here are the leaders in U. S. and Canada:

W3CTJ*	524,080-255- 672	W9LNM...	153,180-148- 345
W2BAI	443,538-246- 602	W9FBF	149,212-146- 342
W4KFC	425,924-244- 584	W6RW	148,920-146- 340
K2EDL	400,200-232- 575	W1BTH	144,525-141- 342
W3DGM	386,460-238- 565	W1AKA	143,934-149- 322
W4DHz	370,982-222- 557	W1TYQ	140,904-159- 309
W6YMD*	363,480-233- 520	W1JEL	139,722-146- 319
W4KVV*	360,528-232- 518	VEARO	137,160-127- 360
W4CEN	330,338-222- 496	W8DUS	136,782-153- 298
W6ITA	314,720-212- 495	W5CKY	129,204-148- 291
W3LOE	313,848-216- 501	W3KCT	128,900-141- 300
W3WVN	313,110-213- 490	W3KDP	125,936-136- 319
W2WZ	309,080-202- 507	W6MBA	125,891-131- 321
W8TT*	284,271-197- 481	W6KEV	124,605-135- 309
W3EIV	277,440-204- 454	W4UXI	122,264-136- 301
W3ALB*	256,896-192- 446	W1AZF	120,834-137- 294
W6KAL/7	254,582-192- 442	W4LZF	120,096-144- 278
W2FGX	249,504-197- 405	W6WBF	119,310-130- 306
W6LDJ*	244,820-180- 453	W6FSJ	118,491-127- 311
W3GHS	234,765-185- 423	W3GHD	118,170-130- 303
W3JTC	227,367-189- 401	W2DOD	117,786-134- 295
W3JTK	225,431-181- 417	W4MZP	115,506-138- 290
W3PQ*	220,473-157- 383	W3EKN	115,411-131- 297
W9AVJ*	207,765-171- 405	W6MFW	115,172-143- 288
W4OM	197,488-168- 372	W1BOD	113,577-131- 289
W4YHD	188,710-167- 377	W6LDD*	112,266-126- 297
W3ECC*	187,605-166- 379	W3ADZ	110,565-135- 273
W6AM	185,370-167- 370	W5DWT	110,336-128- 288
W9DF	179,798-166- 351	W9AVL	109,820-140- 281
W1BFT	171,687-151- 379	W2AVU	109,263-121- 302
W8BKP	169,092-158- 354	W5BKS	105,605-135- 261
W4DQH	168,795-155- 365	W9DPA	104,931-131- 267
W6VW	165,120-160- 345	W1ODW	104,775-127- 275
W3GHM*	164,898-159- 344	K6CIT	104,544-121- 288
W3HEC	160,038-153- 350	W1TX	101,748-122- 278
W9HUZ	159,360-160- 332	W1DLC	100,564-124- 271
W8BTI	158,814-153- 346		

Some tremendous totals were recorded, too, by these crack brasspounders on the other side of the fence:

KH6MG	489,066- 74-2203	KL7BCH	63,312- 34- 621
K8BJL	474,000- 70-2032	EA6R	62,287- 39- 641
VP7NM	453,726- 78-1939	KH6ANK	61,047- 61- 399
XE2OK	307,572- 76-1365	EA1AB	60,822- 31- 654
ZL1BY	306,408- 68-1502	KP4YL	59,056- 16-1233
KG4AJ	303,012- 57-1772	E1BJ	57,744- 36- 538
KV4AA	298,742- 68-1469	OE6JK	57,484- 28- 688
KP4CC	246,976- 64-1287	D79BV	56,684- 32- 584
KH6PM	237,006- 63-1254	FARDA	53,638- 44- 408
HK4DP	228,152- 76-1040	LUTAS	50,181- 43- 389
KP4DH	225,056- 52-1450	CT3AB	46,020- 65- 236
KP4ZW	222,912- 54-1354	DL1JW	45,141- 41- 371
KH6AYC	211,062- 58-1216	F8VJC	44,506- 34- 438
LU3EX	185,304- 56-1103	CE8AB	44,170- 35- 404
EL2X	182,373- 63-1147	CO2BM	43,848- 29- 520
LU8AE	156,774- 63- 986	TF8MB	43,152- 17- 464
DJ1BZ	137,193- 47- 991	CE8AB	42,874- 35- 435
VP7NG	130,520- 52- 840	OZ1W	42,600- 30- 488
EA9DF	127,872- 37-1152	YV5EJ	42,441- 43- 845
OQ5GU	113,085- 45- 845	F7EB	42,091- 49- 287
PY7AN	109,820- 45- 812	HK4BD	41,220- 30- 465
ZL2GS	106,899- 49- 727	KR6LJ	40,560- 26- 520
CR6AI	104,200- 40- 871	FP8AP	39,960- 30- 445
DL1KB	101,292- 46- 746	KP4YT	39,344- 42- 312
KV1JA	100,750- 41-1153	JR3AB	39,184- 37- 476
CE3AG	98,340- 44- 745	CE6AD	37,842- 34- 371
OE1JUSA*	97,965- 35- 940	EA9AP	37,760- 32- 396
FA9RW	97,008- 47- 694	EA6AF	34,200- 36- 322
PJ2AR	93,149- 49- 841	HK9AI	32,098- 22- 499
EA8BE	92,720- 40- 778	GZ3T	31,472- 28- 360
DL1ZC	91,876- 49- 635	LURFBH	31,119- 27- 381
G5RI	89,712- 48- 623	DL1BE	31,080- 37- 280
KH6SP	88,800- 40- 740	GW5SL	30,384- 24- 424
ZL1MQ	81,243- 51- 531	I1NT	29,970- 27- 370
KL7AWB	80,811- 41- 657	IBNU	29,818- 34- 293
PA99N	77,520- 38- 680	FP8JC	29,626- 26- 266
DL1DX	76,956- 40- 683	YV5AE	28,990- 23- 420
OK1MB	76,440- 40- 654	IBDVJ	27,360- 24- 380
PJ2AN	72,116- 44- 558	JE5JA	26,730- 30- 297
KL7AOL	71,058- 39- 609	JA3AB	25,740- 26- 339
KT1UX	69,966- 39- 698	PA9VB	25,560- 30- 284
VK2EO	68,112- 33- 683	ET9Y	25,146- 22- 393

* Multioperator station.

A complete report will appear in these pages as soon as possible.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whom?

It's time we dipped into our DXtensive backlog of potential "How's" badinage and drew forth a sequel to our Pearl Harbor comments in last December's *QST*. You'll recall we inquired as to the identity of the DXer—DXer X, if you please—who was communicating with K6SRZ on 20-meter 'phone at 0700 Hawaiian time on the morning of December 7, 1941. This intriguing research project was initiated by W2TNC, K6SRZ operator at the time.

Well, the plot thickens, if anything. Though we didn't scare up the western W who held down the Stateside end of that historic QSO we did raise a casual eavesdropper who also heard the stick of bombs that overloaded K6SRZ's modulator one fateful Sunday morn over thirteen years ago. It was W7GAT, then news chief of the weekly *Oregon Statesmen* (Salem, Ore.) and now publisher of the Mount Vernon, Washington, *Argus*. Steve swells to a grand total of two the number of persons who heard one of the most momentous transmissions in ham history. We excerpt from a yellowing page of the special *Statesman* extra dated that December 7th:

Hawaiian Ham Tells Salem Radioman of Things Amiss

"This looks bad! I can't stay in this place!"

An excited, doubtless frightened, voice spoke those words over the 20-meter radio band Sunday forenoon, tipping off [W7GAT] that something was amiss in the Hawaiian Islands.

"Can't talk anymore," the voice said. "Signing off—you take over."

Then the Hawaiian operator shut off his station and a Salt Lake City amateur responded: "Okay, but you didn't say what was the matter. 73 . . ."

No time to polish the doorknob on that QRT! This clipping considerably narrows the search for Station X—beyond much doubt he was a W6 in the Salt Lake City area. But where is he now? What part, if any, did he later play in the hostilities he so dramatically heard begin? These questions and others may never be answered, for Station X seems to have vanished into the past along with the lost logs of old K6SRZ.

— — — —

Bouncing back after May mayhem at the hands of DXHPDS antagonists, W6MUR disturbs us with excerpts from his latest treatise on avocational communicational diseases. The following ailments are identifiable with DX hunting in particular:

Operational Turpitude—A contagion resulting from excessive exposure to DX contests.

* Please mail all reports of DX activity to DX Editor Newkirk at 4128 North Tripp Ave., Chicago 41, Illinois.

Figmentary Impotence—Frustrating inability to raise the "easy" ones in DX contests.

Immedicable Perpetuophobia—Screaming mimies as a result of agitation through immersion in pile-ups.

Mental Plausibilianism—Reflexive log entries made when rare ones come back to people with calls like yours.

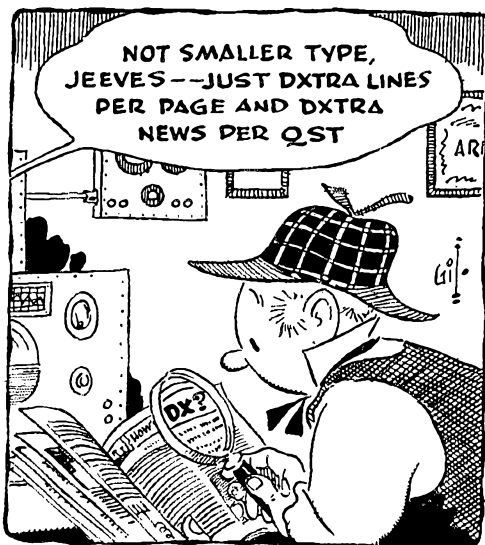
Radiational Astigmatism—A strange malady that causes its victims to answer directional CQs of any and all types.

Flatulent Amphigoria—Cultivation of a permanent sneer brought on by DX column flashes about DXpeditions to HV, ZA and Northeast Dontundustan.

These afflictions have several symptoms in common—glazed eyes, twitching elbows, desultory mumbling—and accurate diagnoses are difficult. Beyond all dubiety the DX Bug is secondary host to the infectious parasites involved. Beware!

What:

20 c.w., now frequently open around the clock in northern latitudes, gives evidence that better days are at hand. DL4ZC's noncontest 19-minute WAC with VK4YP, LU1AR, JA7AD, DJ1ER, W4PVD and FA30A in late May is a tantalizing sample of what we can all anticipate from the rising o.u.f. Lloyd also worked FB8BE, KG6AFY 12, LU1ZV 21, a UF6, ZDs 6EF 18-19 and 9AB 18. . . . HZ1AB QSOd AP2Q 11, CT2AF 17, DU1NL 15, EA6AU (35) 13-21, ET3LF 12, KT1EX 11, MP4BBL 16, a UA4, VK9AU 12 and VO3CF (74) 13-15, plus dozens of W/K pursuers. . . . GM3AIM (43) 21 of the Hebrides, representing a rare entity on DARc's WAE List, came back to W2FJH. Len will linger there until September and then return to G3AIM in Liverpool. . . . CR4AF (20) 0, HA7KLD (37) 21, H18WF (17) 23, JZ0AG (08) 15, KJ6BG (46) 3, OYs 2D (63) 22, 7ML (68) 22, TG9CR (79) 23, a UB5, VK9RM (65) 13, VP1FL (25) 23, VSs 2DW (57) 16, 6CG (20) 13, 6DD (44) 12, ZDs 2DCP (87) 21 and 8AA (3-100) 22-0 worked W9TGY, son of equally enthusiast DXer W9RMH. . . . K6ENX found conditions to Europe much improved and nailed CE7ZJ (40) 15, CX2BP (5) 1, CP3CA (50) 2, FA8ZZ (30) 21, FO8AL (40) of Tubuai isle, LU7ZT (40) 2, a doubtful OD5AB, PJ2s AI (60) 15,





Sunspot numbers again soar upward, north Atlantic propagation paths become more solid day by day, and it won't be very long before 59-plus Europe-U.S.A. QSOs are the 14-Mc. rule rather than the exception. OZ2KR, 11ER and CT1CO, pictured here from left to right, are among the Continental DX crew who look forward to "the good old DX days" revisited. All three are OTs; 11ER, especially, for Mario recently completed his 30th year as an ARRL member. (Photos via WØVFM)

AR (50) 0, TF3AB (50) 0, VSs 2EI (90) 16, 2EM (40) 16, 6DB (40) 15 and YU2JJ, VU2CY, ZC2PJ (45) 14 and ZM6AS escaped. . . . W4TFB, now at the 100-confirmed mark, associated with CP5EP (1) 20-21, EAs 8BH 9AP 19, 9AC 23, GC3EBK, HA5KBZ, HZ1AB (40) 19-21, LZ1KAB (40-66) 19-21, OX3UD, Swede SL3AG 17, TF3MB, SP5AA 22, VQ4FM, ZB1AY 20, ZC4IP, ZP9AU 1, 4X4s BX DC 23, FQ 22, 9S4BN, G3IRL who is *not* a YI, and G13JM whose name is Jim. . . . GD3UB (32), MB9BJ (59), Y12AM (75), ZC4GF (35), 3V8SC (72) and 4X4BR swapped sigs with WIBFK. . . . FA8RJ, HA5BL (20) 19-21, HK4BD, HR1MC (88) 3, 11BLF of Trieste, ZBITNE, 4X4s FS (45) 23, 1E, 9S4s AX (51) 22 and BE (11-64) 12-20 brought K2DSW to No. 51 and WAC. . . . W6NIF/4 caught GE7TZ, EAs 8BP (45) 18, 9DF of Rio de Oro, FM7WP, FY7YE (40) 23, HA5KNB, HZ1HZ, OQ5G, SV1AB and YQ2HR with modest input. . . . Fortunate who looked ZD6BK recently ate ET2PA 19, KC6UZ, KG6APT 13, KR6s MC 13, OY, KT1EXO 17, MP4OAL (62) 16-20, SV0WR 19, TF3AR 18, a UB5, VQ8CB (100) 12-17 of Chagos, VSs 1BJ 2EL 6CL 9GV 14-15, W4DGW/OQ5 9, W6TMX/KG6 13-14, XZ20M, ZB1s JRK BF 18 and ZD4BM 18-19. . . . K2BZT took the measure of G3CAV (52) 0, HA5BL (17) 16, JA6AO (45) 13, KA8AB (33) 15, MP4JO (40) 20, SP8FA (27) 19, VP5DC (10) 16 of Turks, VQ3FN (77) 23, YO3GY (45) 22, 3V8AB (35) 21, 4X4s CK (80) 23 and FK (70) 23. . . . KR600, LX1RB, TG9AQ, ZD3A (61) 22 and ZP5GM got away from W1OJR, but HK6AI (190) 1, KA2KS (55) 12, VQ4FK (70) 6, GC LZ and OY customers didn't. . . . W8KAK pinned down a Qatar MP4, LU8ZS (76) 23 of So. Shetlands, ST2AR (55) 20 and ZB21 (60) 22 while friend W8APM, lately returned to the DX fold, practiced on an OY, FB8BR and VS2AL. . . . W3TYW managed CN8AF (16), HA5BB (13), SPIKAA (16), T12FG (73) and a GC, LX1DU (42) and ZD3D (18) still are stalled. . . . F9YP/FC (60) 21-22, HA5s BU (72), BW (40), KG1AA of Thule, VP5BM (10) of Turks, VQ4FM, ZP6CR and gadabout EL2X keyed with W4ZAE. One VZ1AZ "QSL via FB8CZ" — puzzles Mike. . . . FA8SB, JAs 3AB 15-16, 6AD 15, 9AA 15, PJ2CK 18, NE1UU 14 and YN1KK 1 encountered WØVFM of Davenport. . . . 14-Mc. c.w. doings at scattered shacks, first W1WAI: EA6, KT1UC (55) 23, YS10 (8) 0, V86, ZP, W4GCB: CR6CW, PJ2s AE CC (80), SP, VPI, W5AQ/2: SL7AG of the Swedish military, W6CAY: DU7SV (89) 13, KA5 2FEC 2USA 9MF, KR6LX, YN1PM, W6WZQ: DU, HK6, KA2MB, VP6RG, W6NTR: KC6AI (16) 3 of Utah, W6UED: KA3s MD 3, WL 3, KG6, V86, K6AAJ (W6LDJ): VS1EW (62), K6DVB: JA3AF, KR6USA, XEIOX, W7JLU: YN, ZP5AY, W8PCS: FC7XB (90) 22, SV, ZB2, W9EU: BV1US, KA9IJ of Iwo, KC6CG, VQ6LQ, VU2AS, W9KXK: EA9, FF8AJ, FG7, HK6, VP8AQ. . . . West Gulf DX Club *DX Bulletin* 20-meter code notes: AC4OK (6) 21-22, Cs 3AV (40) 21, 8GA (3) 0, GE7ZJ (22) 14, GRs 5AA (3) 21-22, 6CZ (46) 21, 8AB, DU1s GT (90) 13, SCS (82) 13, ETs 2AB (60) 1, 3GB (10) 18, 3S (12) 20, F9QV/FC (33-75) 18-1, FD8AB, FF8AP 8, FK8AH (62) 4, FY7YE (50-70) 23-0, G2FZC (17) 13, HA2KTB (22) 19, Swiss military-ham station HB4FE (40) 16-17, HE9LAA (50) 21, HH3L (1) 21, ISIAHK (4) 17, IT1TAI (29) 22, JA0CA (42) 16, KG6AFX (119) 15, KJ6BH (38) 5, LZ1s KDP (57) 23, KP6 (47) 17, MP4s KW NL, OYs 2A (30) 14, 2H (47) 12, 4A (35) 18, TFs 2WAB (38) 19, 5TP (41) 16-17, VKs 1VH 9BW (52) 13, VP8BD (82) 2, VQs 4AQ (18) 20, 8AG, VR3A (78) 6, VSs 2BJ (25) 14, 2EL 5CT (87) 14, 6CT (70) 13-14, 6CW (12) 20, YN1AA (18) 3, YOs 3RF (64) 20, 3ZR (61) 21, 4KC4 (71) 18, ZCs 4GF (48) 21, one 6AA (59) 23, ZEGJU (87) 13, ZS3LD (62) 19-20, 3V8AN (64) 19, 4X4s G1W (110) 19, GZ (86) 14 and II (77) 20. . . . WJ1DL (10) 6, HZ ICC (75) 18 and M1H are in high demand.

20 phone circumstances are equally DXhilarating. W1YOU needed only a TBS-50D (40 watts) to raise CS3AC of the Azores, FA3KC, FF8AP, GC6FQ, GD8IA (153) 21, HH3DL, KSA4W, OD5AF, SV6WO, TF2WAF

(215) 21, ZBIJRK, 3V8AS (177) 18 and 4X4FK (130). A Telrex 2-el. spinner is no hindrance. . . . EA9AR (132) 12-23, FA3ZH 8, FR7ZA 6, 11BNU 9 of Trieste, VQ8CB 12 and a bunch of W/Ks came back to HZ1AB with little reluctance. . . . W8PCS knocked off VPISD and YN4CB while awaiting his WASM award. . . . HZ1AB (328), KG1AA (202) 3 and KM6AX (250-275) 4 entered W9WHM's Indians archives. . . . GC3EBK and the aforementioned HZ1 were welcomed by K2BZT. . . . TF2s WAG (130-160) 18-20, WAH and ZM6AT (140-160) 3-8 QSOd W1YWU. . . . KGAK landed Formosa's BV1US (ex-AB1US) whose 100-watter frequently haunts 14,250 kc. . . . KL7FAF speaks of poor Alaskan 14-Mc. conditions in one breath and of QSOs with FA3GZ (121) 19, JA3HD, OD5AB (125) 21, TF2WAB, VQs 2DC 4FK (120) 23 and 5A2TZ (170) 14 in another. . . . VK4IC 7 of Willis Islet and VSCT (130-190) 14-15 interested W6SYG. . . . AC4NC, GR5NC (161) 21, CT3AN (175) 21, DU7SV (193) 12, EA9AR (132) 23, ET2s XX (184), ZZ (145) 19, FF8AK (105) 15, HI6EC (175) 1, HK6AI (169) 1, KA9IJ (251) 7, KC6s CG (215) 13, UZ (237), KG1FR (245) 1 of Greenland, KJ6s AF (280) 13, AZ (227) 6, BG (225) 7, KM6AX (250) 4, KR6KS (279) 7, KX6s AF (285) 13, BU (230) 8-14, M1B (126) 18, MP4s QAI (200-250), OAM (150) 17, OK1MB (170) 19, OYs 3PF (110-160) 18, 7ML (160) 22, PX1YR, SP6WF (108) 21, SV0WM (100) 17, VK1VH (137) 7 of Macquarie, VK9s DB (124) 14, EB (122) 8, GV (142) 14, NF (183) 14, OK RH (122) 5, VP1OJF (177) 1, VQ4AQ (135) 19, VR2AP (170) 7, VS1s CZ (137) 15, FK (121-195) 15, FS (47-109) 14, VS2s BN 12, DB (170-190) 14-16, DN 11, DY (185) 17, DW (145) 15, GM 11, UW 11, VS6CL (156-174) 12-13, Y12AM (129-198) 19-20, YO3GM (210) 21, YU1AD (165) 22, ZDs 2A (110) 21-22, 8AA, ZS2MI (165) 13-14, 4S7s FG 17-19, LB 17-19, MP (160) 13-14, 4X4s DK (159) 1, GB (120) 17, 9S4s AD (125) 22, AH (175) 20 and other A3 specimens are recorded by WGDXC conferees. . . . Newark's Neus Radio Club tuners tuned in CN2AD (105) 20, CRs 4AF 16, 6AG 6BX, CT2AG (115), EAs 6AF (85) 20 of the Balearics, 8AI 8AP 15, 8CB (230) 21, EL2X, ET2US 19, FAs 8BG 9WD 21, FM7s WD 22, WF WQ, FQ8AK 22, FY7YE 22, GD3s IBO (120-255), UB (140), HB1MX (155), HH2RM, HI6CP, JA4BB, KA5 2AK (150) 18, 2OJ, 2SM (100) 23, 2YA (200) 22, 5MA 8SD, KC6AB, KG4AP, KR6AF, KTIWV, KV4s BB BD, MP4QAD 21, OAB8 (135) 0 in the Peruvian Amazon, OQ5s DX FA (125), RL TE, OX3AY (130), OY2Z, PJ2s AF (183) 18, AK AP CA, SP9KAL, SUIAS (130) 18, SV0WS, TA3US, TF3EA 14, TG9s MB RB (190), VK9FK 12, VP1s BS (192) PX, VP2s DC DL DN GW (155) 20, KM VA (190), VP3LF (195), VP7s NE NJ 21, NK (190) 2, NS NX, VP8s AQ BD, VQ2s DQ (120) DT 23, FU, VQ4s ERR EZ JB (135), MZ 20, RF SK, VU2AL 21, XZ2ST 14, YN1s RA WR, YS1s CB (200), MS, YV9AP (150) 21 in Venezuelan Amazon, ZBs 1CM (170) 1GBF, 2A (110), ZDs 3BFC 18, 4BF 22, ZM6AT 4, ZP5s CG IB, ZS3AH, 3V8s AP CS, 4X4IO (240) 5As 2CL (150) 19, 4TU (120) 18 and several 9S4s. . . . Here's a good spot to remind you single-sideband specialists that "How's DX?" is for you birds, too. QTC? QRV!

40 c.w. keeps a flock of DXers happy. W7JLU had a ball with DU1SCS (20), KG1AA (15), KR6LJ (20), OX3AY (25), VK9PFF (35), V86CQ (1) and one ZL1A. . . . GE7ZT, HR1JZ, KC6CG, KR6KS, KV4AA, VP7NM, VS1AE, a pile of VKs and JAs tried out K6EBB's 811. Don reports JAs 15R and 7BO as having standout signals among thirty Japanese nationals logged. . . . From the other end of the country W3WPG suggests EAs 6AF 9AP, FA8DA, OE13USA, VQ5EL and 9S4CF, reaching 77/66 with an 813 final coming up. . . . It's 106/88 for W1WAI in part because of IT1TAI (5) 1, TI2CAE (1) 1, VP5 2SH (22) 0 and 6RG (40) 0. . . . DU7SV JAIJN, VKs and ZLs in number conversed with W5CAV. . . . The ground-plane and 150 watts of W5WZQ fagged down EA9DF JZ6DN, KC6 KR6, VP6 6C 7NX,

ZS3HX, as well as JAs 1GS 1NI 2LC 3AF 5AB 6FC and 8AI. Those Japanese DX men really get around in quantity on 40! W9VBS found a plains QTH good for HK4DP, KG4AV, TI2s BX PZ, VP7s NG NM, ZL1BY and a helping of KH6s. Now a perambulating perusal of 7-Mc. c.w. doings hither and yon, at K2DSW: KH6, OE, ZL, KN2WZ (now K2JWZ): KV4BK, K2HZR: IT1, YS10, YU3s ABC AJK DJK, K2JK: KV4, OE, K2JLN: CT3AB, Europeans, W3ZUH: KH6AUJ, W4TFB: KG1, VKs, YU2ADE 2, LU8ZC 7, K6ENX: F9QP on ship off F18, JZ8, KR6, Z6GJ (30) 4-5, Z8s, W7VWS: JA1VP (40) 16 who switches to 'phone during c.w. QSOs, KH6 KL7s AQU AZI BAK BKI, W9UOL: KG1, LU, PJ2AE (50) 7-8, PY, VK7, DL4ZC: Ws 1ADM 2TQC 3VAN 4UXI 6VUP 8GMD, ZD6BX: long-path W6s, W7s, ZS7D 16, WGDXCers: FG7XB (32) 15-16, VK9RH of Norfolk, and ZD2WAF (ex-ZD9AA) 0.

40 'phone, as a DX band, leaves much to be desired. So, having made the understatement of the year, let's see what NNRC's redoubtable eavesdropper uncovered in the way of 7-Mc. A3 DX: FQ8AQ, HP3FL, HR1BG, JAs 1AEV 1DG 3BU 3KE 3MB 4XF 6BE, KH6s in quantity, KV4AQ, VKs 6MO 9RM, VPs 1LJF 3HAG 6WR 7NY, XZ2OM, YS1MS, ZS6AR and enough Australian and New Zealand stations to run you out of QSL cards. Attention is called to the fact that 40-meter 'phone suballocations are quite various around the globe (e.g., check K6AA's "Whence" comments to follow). You don't just tune off the low edge of the FCC-specified Yank 'phone band and expect to log the world. For the general pattern of world-wide amateur band suballocations, including 7-Mc. 'phone, we refer you to the full-page chart in the current edition of ARRL's invaluable *License Manual*.

80 c.w. and its kin 160 have, for most practical DX purposes, been given back to the Indians, traffic men and rag-chewers for the summer. Eighty always dies hard, though, and W7JLU latched onto JA7BO, KG6GX on voice, KM6AX, KZ5DE, ship SM8CWC, VK9RH (12), VP7NX, VS6CQ (3), W6TMX/KG6, YV5BJ (9) and ZK1BG (18). K2HZR found the European path still open for EIs and PA9s, while friend K2JK bumped into KV4BK. DL4ZC reports QSOing big signals from Ws 1WLW 2GGL 3AXT and 4KVX through the rash of static crashes.

15 'phone comes next on this month's Bandwagon and W4NQM gives our vehicle a good push with CE3II, CN8CS, CP5EQ, CRs 4AI 6BH, CX5AF, EA9AZ, FAs 30A 8RJ 9ML, HH2W, HK4DF, HR1KS, KT1s EXO WX, OK1KAI, OQs 5CJ 0DZ, SV0VO, TA3US, VQs 4EU 4EZ 4RF 5EK, YN4CB, YS1RA, YU1GM, ZB1JRK, ZP5AM, 4X4s DK and FQ to reach 85 countries on 21-Mc. A3. Sparky also worked squads of Europeans, ZSs and Oceanians — few dull moments these days on fifteen! W4WVM clicked with 57 ARRL DXCC Countries List items in just four months with 30 watts: a CR4, EL2X, VP7NG, YV5EW, ZL3FP and a 4X4 assisted. Fifteen's faithful W6ZZ reports an entertaining mixture of short and long skip, the latter helpful toward KH6s AFS A1W BIM ZA, KV4BD, KZ5s a-plenty, OA4M, TI2RX, VP6FR, XE10E, ZLs iBY 2AJB 2AX 2SO, maritime-mobles operated by Ws 1KS 2WAT 3OZA and 5EWS. Miles, ex-W1WV, now is 68 years young, a credit to ham radio for many, many years. EL12A, OA3L, OQ5RU, PJ2AR, VP6GN, VQ4EZ and other catches swell the records at W4UWC. W6NJU collected a CP5,

HR1, TI2, VP1, VKs galore, VP7 and YS1RA (250) 21. 21-Mc. voicers FAs 3JY 9VN, HC1s GE WG, HP1FS, KG4AG, KV4BB, KW6BB, MP4NL, OA5G, OQ5AI, PJ2s AP CD, SV1SP, VPs 2AD 4LL, VQ4ERR, YV5EC, ZBs 1AUV 2A, ZD2FHW, ZP5IB, ZS3G and 4X4BG are accounted for by NNRC informants.

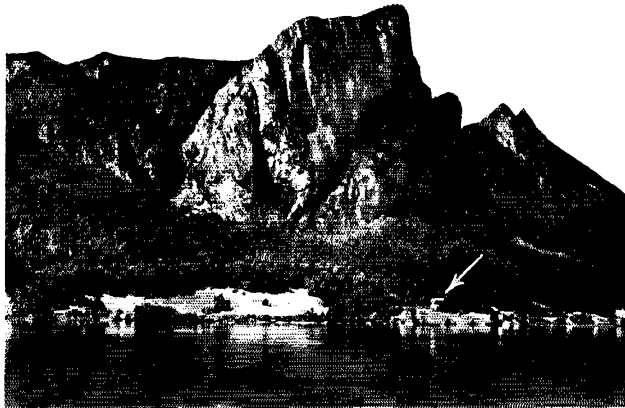
15 c.w. gets short shrift now while DX comes so easy via radiotelephone. W1CTW soaked up EA0AC and SV1AB around supertime to make it 68 21-Mc. code countries. Cal also corralled Ws 8HZ (W. Va.) and 9TJG (Wic.) to close out his 15-meter c.w. WAS. Novice DXer W4GSM traded RSTs with CN8AF, Fs 3AT 9VK, FA8RJ, G3AET, KZ5LB, LU9DAZ, PY7DN, VP9BL and ZB1AY. Terry's Virginia 30-watter holds its own with the Generals any old day.

10 'phone now delights the short-skip gang mainly but there are DXers whereabouts poking through the *h's*, successfully. Scattered 10-'phone reports, thanks to W4NQM — K2AIN: CX6BBM, LU3AY, K2AJD: CX4AB, HC6KI, HR4WH, LU8s DDI EJ, TI3LA, K2PFB: CX2s BP GF, PJ2AF, W2ZAS: TI3LA, W3ESE: HP4FL, LU8s 3AAT 5DC, W3POG: LU8s, PJ2, W3VSV: PJ2AG, YV1AU, W3GNY: CE2BO, CXs 3BT 4CS, LU8s 1CM 2DA 2DED 5DBN 6EX 8AM 9DBA, OA5G and PJ2AO. CR6BX, and ZS6ZK spoke with W1YWU, and we note that W9RVB's 65-watter and 3-el. c.s. rotary are close to the 1955 10-meter 20-country mark. HP2TP partakes of 28-Mc. c.w. sport — rare sport, indeed — encountering K2AJD and W3HTF thereby. On which weird note we leap off the Bandwagon for this month and peck into the postbox to see what's cookin' in the QTH department.

Where:

From ubiquitous Bob Roberts, G2RO: "I have just completed my last and longest tour of this series and cards have been ordered from the printer. Everybody contacted will get one in due course. Calls covered are VR1RO, VR2RO, VL6RO (Nauru), VR4RO, VQ8AY and ZC4RO. It may be worth mentioning that VQ8AY is my own issued call and not a borrowed one as some have thought. Authorities could not give me VQ8RO. VU2JF gives assurance that QSLs bound for VU AC3 and AC4 areas will be relayed via Box 1, Munnar, Travancore, India, as usual even when he's traveling or on U.K. furlough in Scottish highlands. Regarding the VP1GG address run last month, QSLs will be held by VR2AS pending ex-VP1GG's arrival in Fiji after completing leave in the British Isles. We learn from W6LTY that VK9DB assumes maneragement of Papua Territory QSL matters now that VK9GW has returned to New South Wales. "The MARTS QSL bureau has been extended to include the areas of VS1 VS2 VS4 VS5 ZC2 ZC3 and ZC5. Anyone wishing to QSL amateurs in these areas should send cards to MARTS QSL Manager, P. O. Box 600, Penang, Malaya." This info from K6GAK after a recent QSO with VS2DQ. W1YOU correctly believes we should reaffirm here that a QSL card *not* enclosed in an envelope now can be sent anywhere in the world via air mail for ten (10) cents — provided it is no smaller than 2 3/4 by 4 inches and no larger than 3 1/2 by 5 1/2 inches. ZD4BT, via W1WPO, asserts that quite a few incoming QSLs have gone astray and suggests that amateurs whose return ZD4BT pasteboards are long overdue reapply to the corrected address that follows. Don't fret and fume if you lack the QTHs of any KC6s you

For our QTH of the Month we present the back yard of OE5AH at Drachenwand u. Plomburg, Mondsee, Austria. This Gibraltar-like "Wall of the Dragon" blocks off OE5AH to the west — "No South American stations heard here since 1953." OE5AH is operated by Austrian Archduke Anton Habsburg, better known to prewar DX hounds as OE3AH. Anton is quite active again with p.p. 807s driven by an HT-18, and HRO.



work. KC6AA reiterates: "Any and all KC6 QSLs can be sent through me." Although VR3A is to remain active on Fanning until the fall he requests that, as of now, QSLs for him be mailed to the Australian QTH to follow Reminder: In our monthly address rosters, such as the one to follow, we strive not to duplicate QTHs available in the latest *Call Book*. Also, addresses that are at variance with W9TRD's listings for identical stations do not necessarily indicate either "How's" or the *Call Book* to be in error. This is because DX stations often adopt box numbers, etc., to facilitate collection of mail while their station-location addresses continue usable. W1s JLN 88Z UED WPR ZDP, K2GMO, W4NQM, W5WZQ, W6s LDJ NFF/NTR, K6s AAJ ENX GAK, W7JLU, W8LMO, W9s CFT UEV FGX RMI, W6s GPM QCI VBS, VS2DE, ZD6BX, NCDXC, NNRC, SCDCX, WGDXC and member societies of the International Amateur Radio Union unearthed these individual items for you:

BV1US, MAAQ, Formosa, APO 63, San Francisco, Calif. C8GA, Box 55, Peiping, China CE2AN, Casilla 3016, Valparaiso, Chile CM6FA, F. J. Fernandez Amador, Box 38, Fomento, L. V., Cuba ex-CP5AB (QSL to HCIES) CR7FM, F. F. Morgado, Malema, Niassa, Mozambique CR7HF, Hugo Felizardo, Caixa Postal 13, Chinde, Zambézie, Mozambique CR7MG, M. A. Morgado, Alto-Molucue, Quelimane, Mozambique CR9AJ, Jose Maria, Box 28, Macao DL2XZ, QSL to J. Martin, G3JVC, 23 Aldensley Road, Hammersmith, London W. 8, England EA5DT, Box 999, Valencia, Spain EA8BS, J. M. de R. Perez, Calle Ripocha 22, bjo. dcha., Las Palmas de Gran Canaria, Canary Islands E13AB, Lt. R. P. Gower, Naval Vol. Res. Radio Club, Cathal Brugha Barracks, Rathmines, Dublin, Eire FB8BN, Box 806, Tananarive, Madagascar FO8AL, Tubuai Island via Tahiti HI8EW (QSL via W4VQ) KA2RP (QSL via FEARL) KA5MH, APO 950, San Francisco, Calif. KA7GB, APO 45, San Francisco, Calif. KC6AI, Richard Kohler (W6MFF), USCG Depot, Box 3, Navy 926, San Francisco, Calif. KG1AA, APO 23, New York, N. Y. KG6AFT, William Jones, P. O. Box 97, c/o CAA, Agana, Guam KG6SB, P. O. Box 14, Navy 935, FPO, San Francisco, Calif. KJ6BG, Kirk, APO 105, San Francisco, Calif. KJ6BH, APO 105, San Francisco, Calif. KL7BFT, Lt. Cmdr. G. R. Maxwell, USN, Navy 127, Box 14, FPO, Seattle, Wash. ex-KL7JE (QSL to KW6AT) LU7MAR, Casilla Correro 345, Mendoza, Mendoza, Argentina ex-MI3TM (QSL to VQ4EG) MP4JO (QSL via W2PCD) MP4QAM, N. J. Clarke, c/o Helljord, Dubai, Trucial Oman, Persian Gulf OA3L, Roy Letourneau, Tournavista, Peru OY2S, Svend Poulsen, Box 27, Thorshavn, Faeroes Islands OY7ML, M. Haesen, P. O. Box 141, Thorshavn, Faeroes Islands ex-PA8YX (QSL to VK3AIW) PY8NN, Box 96, San Luis, Maranhao, Brazil ex-ST2NW, C. N. Webber, International Aeradio, Ltd., c/o P. M. G., Kuching, Sarawak, via Singapore, Malaya TF2WAB, Reykjavik Airport, Reykjavik, Iceland TF2WAF, 1971st AACs Sqn., APO 81, New York, N. Y. TF2WAG, 932nd AC&W Sqn., APO 81, New York, N. Y. UD6KAD, P. O. Box 73, Baku, Azerbaijan, U. S. S. R. VPIFL, Frank Locke, Telecommunications Department, Belize, British Honduras VP5BM, QSL to W5HJL/4, Route 1, Box 53E, Bay Minette, Ala. VP5DC (QSL to W4NMO) ex-VQ2JO-VQ4MNS-ZE2JO, M. Salmon, G2CKM, Hastings House, Ledsham, So. Milford near Leeds, England VQ3CF, Box 35, Songea, Tanganyika VQ4AO (QSL via W4PDZ) VR3A, Ray Baty, 79 Bealiba Rd., So.

Caulfield S. E. 8, Victoria, Australia VR4SWL, P. O. Box 47, Guadalcanal, Solomon Islands VS1EW, P. O. Box 1158, Singapore, Malaya VS2EM (QSL via MARTS) VS5GT (QSL via MARTS) VS6DB (QSL via HKARTS) VU2AS, Capt. P. A. McGrath, ESD Panagar, P. O. Arjunpur, Dist. Burdwan, West Bengal, India XE1PAZ (QSL to W9UUE) YJ1DL, D. E. Laing, ex-VK2DE-ZC3AB, Port Vila, New Hebrides YS1ZG, U. S. Embassy, San Salvador, El Salvador ZB1AJX, G. Stanton, 5 Mifsud Flats, Paceville, Malta ex-ZG1AL (QSL to VS2DQ) ZD4BT, S. Browne, Eastern Radio District, Dept. of P&T, Accra, Gold Coast, Br. W. Afr. ZK2AD (QSL via ZLIDA) ZS7D, Creon Cloete, P. O. Emlembe, Swaziland, So. Afr. 3A2AM (QSL via G6LX)

Whence:

Asia — Because Afghanistan remains on the rarer side these words from W9ERG in Kabul should be of interest: "In the present [new] QTH there'll be room for a 7-wave-length beam on 20; but, if anything at all, I'll have only about 10 watts to a 6V6." That will be all he'll need! "We're expecting a couple of Globe Scouts at Afghan Institute of Technology and, since I'm teaching a radio course this year, we will have them on the air quite a bit. The fellows know no code so we'll be on 'phone." The time appears to be approaching when YAs will be available in number. W9EU was the first W contacted by VU2AS who likes 20 c.w. with an 807, BC-348 and dipole W1YUO notes that OD5AF-MP4QAJ signs G3HEH when in England MP4QAL tried low-level modulation on his 120-watt 807a rig "with horrible results." He has a ground-plane, a 300-foot long-wire, an Eddystone receiver and likes most of all to work his pals back home around Dublin town W1YEH, just back from Japan, left WITTA in charge of the KA8AB BC-610E, 75A-3 and 3-element rotary on 20. W4LPI is quite active as KA2DC W6CRV, who leaves HZ1AB next month, bears down on the 100-country mark in his Saudi Arabian efforts. Surprisingly solid openings to W6 and W7 spiced up Ron's recent activity. "QSL situation still rough — the 300 from OE13USA are gone now; 900 [from the States] still have not arrived. I Mimeographed 100 but they are pretty sloppy. Sending them out, anyway." We also hear from W7YBI/8, one of HZ1AB's former operators, who was delighted to note that "Hot-Ziggity-One-Affectionate-Bachelor" still cracks away at 14 Mc. Other HZ1AB ex-ops, W9ERG and W3ZCG/5, are attending Purdue U. and serving with the USAF at Keesler AFB, respectively. W7YBI/8 regularly operates K0FDV and has applied for his own W0 ticket in anticipation of a future North Dakota-style DXCC The Massachusetts OD5 who specializes in baiting W5s is closer to the end of his rope than he realizes, says W1SSZ From VS2DQ via K6GAK: VS5CT has ordered QSLs but is deep in the Brunei jungle with an oil exploration party. He will QSL 100 per cent but doesn't expect to be shipping out cards in quantity until late this month FEARL (U. S. nationals in Japan) contemplates a KA DX contest to be scheduled for August or September. It will be a single week-end affair and we'll pass along the dates as soon as they are selected 4S7LB, off the air awhile rebuilding, tells W6RW that CR8 activity is becoming noticeably less frequent.

Africa — ZD6BX now is up to 131 worked "in spite of poor conditions. ZD6EF runs 100 watts to a long-wire, mainly on 20 c.w. at present." "Please cancel all rumors of VQ4NZK as W9C, Seychelles. Geo. still is in Kenya

The city of Damascus, believed to be the oldest continuously-existing community in the world, turns out to be a pretty fair radio QTH as verified by the 'phone signal of YK1AA.



EA9DF is kept very busy representing the Spanish Africa territory of Rio de Oro on DX bands. Cesar does a fine job with the 50-100-watt 'phone-c.w. rig at left. A scrupulous QSL policy is maintained at EA9DF. (Photo via FIWPR)



and is very busy making movies." This from VQ4ERR who promises there'll be ample warning when and if VQ9NZK fires up ZS5JY doesn't expect to raise his much-publicized tower for a year or so, according to W4NQM. Don't forget to add "Natal" to the ZS5JY QTH appearing in the *Call Book* Mozambique amateurs now number some 70 strong. CR7s AC AE AI AK AZ BL BN BV CY DA DC DG DM DI DK DL DN DO DR FM HG and MG are among new licensees reported by LREM The South Africa city of Pretoria celebrates its 100th anniversary this year. SARL secretary ZS6AMO writes: "To mark the occasion, members of the Pretoria branch of the South African Radio League have prepared special QSL cards to be issued in addition to their regular cards." So, for a collectors' item, go raise yourself a Pretoria ZS6 at once "VQ3EO is off the air. I will probably be VQ4EO during May and June. Many thanks to the 1300 U. S. stations — particularly W1JNV — who helped me spend the long evenings in the bush." Ex-VQ3EO, who still has a stock of Tanganyika pasteboards on hand, can be reached care of Mascalder Nyanza Mines, Private Bag, Kisumu, Kenya.

Oceania — From KC6AA of Yap, Western Carolines: "Would like to remind the DX gang that KC6 stations do not work the same frequencies on 40 that Stateside DXers work. Our 40-meter band is 7000-7150 kc., 7100-7150 kc. for 'phone. I work 40 almost exclusively and always tune the Stateside 'phone band when working 'phone. KC6AA can be found almost nightly on 7116 kc." The areas compassed by the Eastern vs. Western Carolines are somewhat tricky to determine. The Eastern Carolines appear as just "Caroline" on most maps and this may account for the difficulty. Knowing that Truk, Ponape and Kusaie are in the Eastern Carolines, and that the Palaua, Ulithi and Yap are in the Western group should help keep the bearings straight W6NTR finds that KC6CG on Ulithi is W6MFF in rare-DX clothing. KC6CG has a Viking II at the input end of a 14-Mc. ground-plane DXers of several continents are busily pursuing YJ1DL to forsake 40 for 20 meters KC6s ZB and ZC take a dim view of KC6HX or KC5DX on "Mays Island" W5LCI, who recently wangled a VR6AA QSL for a 1947 'phone QSO, advises that VR6AC has a new receiver and hopes to be working 20, 15 and 10 meters in the near future. W5LCI's Pitcairn confirmation finally came about through correspondence resulting from Jim's recent contact with a bogus VR6AC on 14 Mc. This time it paid to work a phony!

Europe — The experience of HBIMX points up why DX stations rarely QSL first these days. Kurt's Liechtenstein operation resulted in nearly 2000 QSOs with 91 countries, 852 contacts with the U. S. A. Only one out of every ten U. S. stations bothered to answer his cards and just three out of every ten non-U. S. stations replied, according to F7ER. "Present 3A2 activity is entirely confined to local 'phone work. The only DX activity from Monaco occurs when some DXpedition-type station gets on the air there. Such activity is usually announced in advance through proper channels. Ergo, any 3A2 activity (particularly on c.w.) that pops up unannounced should be viewed with dark suspicion, to say the least." These words from OT DXpediter W6SAI-FPBAC-3A2AF-7B4QF who noted that his 3A2AF call recently was borrowed for 14-Mc. use by some unscrupulous individual. Bill adds, "Come the peak of the sunspot cycle, I hope to polish off some spots like 3A2 PX and HV to everyone's satisfaction. As you know, the main requirement for a DXpeditionary man is a strong back and a weak mind." Two-letter Irish calls become reality with the licensing of EIc 2AB and 3AB EI6U and TF5TP scored the first EI-TF 80-meter

QSO in history. Icelandic amateurs are authorized to employ 3.5 Mc. this year and from now on, so there's another multiplier available for the annual ARRL DX Tests W6RW received a reception verification from Albania's *Radio Tirana* in response to his QSL to ZA1BB A flyer bearing a list of British Commonwealth and Colonial Empire call areas, plus descriptions of RSGB operating awards based thereon, now is available from RSGB Hq. and should quickly answer general inquiries concerning WBE, BERTA, et al. WIBB's 160-Meter Test Bulletin tells how YU1GM's 80-meter folded-dipole collapsed and threw a good chunk of Belgrade into darkness by shorting power lines DXers of the old school will be glad to hear that DARC (Germany) is reviving an old top-favorite DX contest — the annual DJDC. It will be known instead as the WAE DX Test and is tentatively scheduled for September 17th-18th (c.w.) and September 24th-25th ('phone).

South America — From HC1ES, ex-CP5AB: "I have started operating on 21 and 14 Mc. and will shortly be active on all bands, 28 through 3.5 Mc. My previous call, CP5AB, has been cancelled but I still retain my Argentine call, LU9DBF." The new HC1ES uses a BW-5100, a 75A-2 and folded dipole antennae FM7WN won't be back from France until September and FY7YZ is n.g., according to FY7YE W6NIF/4 points out that the LUSABL 400-watter needs only Nevada to complete a 14-Mc. c.w. WAS In the *Circular Letter*, the G2DPY-edited organ of the First Class Operators Club, we see that well-known DXer G5RV soon will commence a three-year South American hitch as YV6RV Argentine Antarctica QTHs courtesy SCDCX's *Bulletin*: LU "Z" calls ending in A G and M are on South Orkneys (Laurie Island base); C I O S T on South Shetlands (Deception Island and Bahia Luna bases); and B D E F H J N P Q U V on Grahamland, Antarctica proper (Bahia Esperanza, General San Martin, Almirante Brown and Melchior bases).

Hereabouts — VP4BN's DX career goes 'way back through these calls: Ws 3JMG 4RHC 6BRZ 6TPK KZ5NA, KA1BN, XU5 1BN and 8BN W6NIF/4 terms Florida a DX paradise in spades — AI picked up 85 countries in less than three months with 35 watts. He hopes to land a short tour of Grand Turk or Caicos duty before heading back west Potomac Valley Radio Club efforts lead by W3JTK, W3RXXD and W3VQS set off 723 HK6AI QSLs via bureau channels. — W1ZDP "Believe it or not, I prefer to be 'just another W!' All joking aside, it's nice to be back home and I still enjoy the thrill of competition." This from indefatigable DX hound W4VE, ex-KR6AA-KA9AA HR4WH, licensed in October of last year, already has built up an excellent reputation in the QSL department and is rolling up quite a DX tally of his own DX stations needing South Carolina are invited to set up 20-c.w. skeds with W4GC6 Iowa W0QGI reports confirming 100 ARRL DXCC Countries List items worked with a 2E26 at 30 watts From W8LMO: "VP5AE has gone QRT and I am returning to the States for reassignment. The Turks and Caicos continue well represented on the ham bands by VP5s BM and DC. Anyone who did not receive his VP5AE card should QSL to W8LMO's home QTH." W8s card should be succumbing to conscience: K6ENX finally received a W8BHW QSL confirming their 7-Mc. QSO in 1940 when they were XU8MI and W2BHW, respectively. W8BTI, another Ohio DX-delver, just got around to answering the 1941 QSL of W9BRD. [One less state to go for WAS, Boss! — *Jeepers!*] W2QHH obtained his 160-meter WAS endorsement from Hq. to batten down his claim to the first and only six-band Worked All States certificate on record.

New Apparatus

The Model 587 Audio Bandpass Filter

NUMEROUS ARTICLES in *QST* and other publications have pointed out during past years the advantages of restricting the speech range of a 'phone transmitter. On a m., reducing some of the low-frequency response can save modulator power and actually add to intelligibility. In s.s.b. rigs, restricting the audio range "protects" the audio phase-shift network and results in better side-band suppression, and it eases the burden on an exciter using a filter. A number of designs in the past have shown a filter or other device for restricting the audio range of a speech amplifier for the reasons outlined above.

The operator who has always wanted to try an audio filter but is reluctant to dig into the rig to install it will be interested in the Model 587 Audio Bandpass Filter. This small unit is designed to go in the microphone cable between microphone and transmitter, so no work is involved outside of making the connections. The input side of the filter has an Amphenol microphone jack that takes the usual connector, and the output side is a 5½-inch length of microphone cable terminated in a microphone plug. The only time you might have to modify anything is when your transmitter is fitted with something other than the Amphenol microphone jack, but even then it is easy to rig up an adaptor.

The filter itself is housed in a 1½-inch diameter metal tube 4 inches long, so it doesn't take up much room on the operating desk. It is designed to work only with crystal microphones, and because such microphones represent practically a pure reactance, the filter has practically no insertion loss. This means that if the gain of your speech amplifier is marginal you can still use the filter without cutting down your modulation. Although different microphones vary slightly in their output capacitance, the manufacturer's tests show that the extremes of this range result in only about 100 cycles difference in the low-frequency cut-off point. The manufacturer's response curve of the filter indicates the response to be down 3 db. at 450 and 3300 cycles, and 20 db. down at 210 and 7300 cycles.

But a coldly scientific response curve doesn't give the whole story, and we thought that many readers would be interested in what the filter does to speech. The best test we could think of along these lines was to use the filter in the microphone lead feeding a "medium hi-fi" unit, switching the filter in and out as a number of office guinea pigs took turns speaking into the microphone. This was considered to be a better test than modulating a transmitter and listening on a receiver, since it eliminated the bandpass effects of the receiver and the possible distortion in both transmitter and receiver. The results were rather interesting, we thought. In most cases, observers reported no significant change in the voice characteristics. However, on two voices

(one male, one female) it did change the voice characteristic noticeably — observers agreed that these were "high-pitched" voices. The consensus was that the filter has good "balance" for most voices, but there will be a few where the use of the filter will change the voice characteristic. Since this is bound to occur with any fixed filter design, it would appear that the manufacturer has made a very good choice.

The Model 587 Audio Bandpass Filter is manufactured by the R. L. Drake Company.

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 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
- W2, K2 — H. W. Yalinel, W2SN, Lake Ave., Helmetta, N. J.
- W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Oren B. Gambill, W5WI, 2514 N. Garrison, Tulsa 6, Okla.
- 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, Wis.
- 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 — W. Bert Knowles, VE3QB, Lanark, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 329 15th St., 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, Box 1061, San Juan, P. R.
- KH6 — Andy H. Fuchikami, KH6BA, 2543 Namau Dr., Honolulu, T. H.
- KL7 — Box 73, Douglas, Alaska.
- KZ5 — Gilbert C. Foster, KZ5GF, Box 407, Balboa, C. Z.



W9HCN's address has been changed three times in the last three months, but he hasn't moved. Seems he was caught in the middle of a post office redistricting.

The World Above 50 Mc.

1215-1500

2300-2450

3300-3700

5650-5925

10,000-10,500

21,000-22,000

30,000-2

CONDUCTED BY EDWARD P. TILTON, W1HDQ

WE'VE tried v.h.f. here, but it just doesn't work!"

Over the past twenty years or so we've heard this lament from just about every section of the country, including areas that eventually proved to be prize v.h.f. locations. How is it that so many hams, some of them in spots that could hardly have been more favorable, have come to the conclusion that they could not do interesting work on the frequencies above 50 Mc.?

Some have made their initial efforts with ineffective gear, certainly. You wouldn't expect to set any of our lower frequencies on fire with 10 watts, a broadband receiver and a small antenna. Why "try v.h.f." with such a set-up? Sure, low power and simple gear work well enough if you have plenty of near-by activity, but if you're going for extended ranges you'll need the best gear obtainable. A good big antenna, a low-noise receiver and good stability and selectivity are musts. High power pays off handsomely, too.

But alert operating is even more important. Most of the trouble, we think, has been lack of knowledge of what to expect, and when to expect it, and too few stations within the possible working range. Coordination of operating schedules can be mighty important. The best location in the world will produce a complete blank, if there is nobody on the air in the territory you're scanning with your beam. Countless opportunities for v.h.f. DX are missed in this way.

Take the Gulf States, for example. There is plenty of evidence that from Florida around to Texas, and up the Atlantic Seaboard to the north, too, tropospheric propagation on the frequencies above 50 Mc. is good more often than almost anywhere else in the United States, yet tropospheric DX on the amateur v.h.f. bands is still a rarity over these routes.

Early in May your conductor visited radio clubs in several Florida cities, and met with similar groups in Georgia and North and South Carolina. All along the line we found evidence of increasing v.h.f. interest. Getting going on 144 Mc., particularly, was a major objective. Before we arrived back in West Hartford 2-meter DX had already been heard or worked over several



Don Goshay, president of the 2 Meter and Down Club of Los Angeles, shows some of the 1215-Mc. gear exhibited at a recent meeting of the club during which this band was featured. Numbered items are described in the text.

southern paths that had never been spanned before, and new southern states should be showing in the "worked" totals of W1s, 2s, and 3s, as they already have appeared in the records of Texas, Louisiana and Mississippi W5s.

Here are some reports that indicate the possibilities. W4UUF, Pensacola, Fla., who got on 144 Mc. through the efforts of W5RCI last summer, has been working Texas stations frequently since the middle of March. W5FEK, Houston, says that W4UUF has hit S9-plus levels on several occasions, and has been heard working stations at 500 to 600 miles as fast as he could turn from one to another. We'll bet that Tampa to Houston, 800 miles, could have been worked almost as readily.

From Orlando, W4CSS writes that he and W4MSX and W4QN have heard W4UUF. This is an all-Florida circuit of some 400 miles that almost certainly could have included Jacksonville, Miami and other Florida cities, too. Just after midnight, May 8th, W4QN heard W4SMA, Whiteville, N. C., for more than an hour, but could not raise him. This is a 450-mile over-water path that is probably close to ideal for v.h.f. work. We suspect that Norfolk, Baltimore, or even Philadelphia might be worked from Florida points now and then, too. To aid in establishing contact with distant points, Orlando stations aim their antennas on the following



schedule, transmitting and listening for DX: 2045 EST — Miami area; 2100 — local check, beamed on Gainesville or Tampa; 2115 — Pensacola; 2130 — Tampa; 2145 — various directions, depending on conditions observed during above checks.

Activity on 144 Mc. in North Carolina has been coming along well in recent months. Our meeting in Raleigh was attended by an enthusiastic band of 2-meter men who are working the band for all it's worth, several of them in locations that should be hot spots for 2-meter DX. W4MDA, Wilmington, N. C., has since written that on the night of May 10th, while W4MDA was at work, K4CTW picked up a weak signal

with his beam north. Peaking the beam position indicated that the signal was from the south, and further listening showed it to be W4GGO in Miami! He was in contact with several locals, and the following were identified: W4UIW, Hialeah; W4UTJ, location unknown; and W4JZB, Hollywood. The path from Wilmington to Florida East Coast cities is entirely over water. Though it's some 600 miles to Miami, we think the hop might be made quite often on 144 Mc.

W4CVQ, Raleigh, and W4MDA and W4SMA demonstrated their ability to work north on the night of May 3rd, and into the following morning, contacting innumerable W1s, 2s and 3s on 144 Mc. The best DX we've heard of as the result of this night's work is W4MDA to W1JSM, Waltham, Mass., close to 700 miles. As signals were good over this path it is obvious that longer distances await only the appearance of stations on 144 Mc. in South Carolina and Georgia.

From now on through the summer and fall months there will be many opportunities for work over distances of 1000 miles or more on 144 Mc. and possibly higher bands. The 50-Mc. band will be open for hops up to at least 2500 miles during the early summer. The Atlantic Seaboard and the Gulf Coast are only two of the many paths where such work will be possible. The Pacific Coast, from San Diego to Seattle, should be included in the potential DX paths for 144 Mc. We know that the vast Middle West can be crossed in any direction by 2-meter signals, and even the highest mountains and roughest terrain can be covered under certain conditions. Whether or not we work DX on the v.h.f. bands this summer depends far less on the character of our locations than on whether there is activity in the right places, at the right times, with the right kind of equipment. If we take maximum advantage of the breaks that Nature will provide, there should be many new states worked on 50 and 144 Mc. and new DX records on 220 and 420 Mc. to report before the end of 1955.

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

The best 432-Mc. DX so far reported in 1955 was worked April 30th by W3BSV, Salisbury, Md., and W1OOP, Needham, Mass. This 365-mile contact, at 2305 EST, was made with good signals both ways, indicating that if the 432-Mc. enthusiasts around Norfolk, Va., had been on hand a new record might have been set.

The night of May 3rd was a big one for VE1QZ, Dartmouth, N. S. Beginning about 2120 EST, Oscar heard 144-Mc. DX signals, and between then and 0032 EST he worked W1DEO, Cape Elizabeth, Maine, W1KHL, S. Norwalk, Conn., W1KYF, Ridgefield, Conn., W2TBD, Medford, N. J., K2IEF, Oceanside, L. I., and W1REZ, Stratford, Conn. W2TBD is about 650 miles. VE1QY, Yarmouth, N. S., also had a busy time that night, but we have no record of his contacts.

The 2-meter DX schedules of W7VMP (May QST, page 59) have yielded no positive results up to press time, but a separate sked with W6WSQ is producing regularly. It is 350 miles and many mountains from Phoenix to Pasadena, but signals are being heard regularly, though weakly, each way.

We get some of our v.h.f. news the long way. This tidbit came from T12BX. He says that C02XZ will be trying for U. S. contacts on 146 Mc. after about the middle of June. Transmissions of 3 minutes' duration will be made at 1230 and 1300, 1800 and 1900, and 2030 and 2100 EST, with listening periods following each transmission.

2-METER STANDINGS

Call			Call		
States	Areas	Miles	States	Areas	Miles
W1RFU	19	7 1150	W6BAZ	3	2 320
W1HDQ	19	6 1020	W8NLZ	3	2 380
W1CCH	17	5 870	W8MMU	3	2 340
W1IZY	16	6 750	W7DJG	3	2 340
W1UTJ	16	6 680	W6GCG	3	2 310
W1EEO	16	5 475	W6QAC	2	2 200
W1KCS	16	5 600	W6EXH	2	2 193
W1AZK	14	5 650			
W1MNF	14	5 600	W7VMP	4	3 417
W1BCN	14	5 650	W7JJO	4	3 247
W1DKJ	13	5 520	W7LBE	3	2 240
W1MMN	10	5 520	W7YZU	3	2 240
			W7JJO	3	2 140
W2ORI	23	8 1000	W7RAP	3	1 165
W2UK	23	7 1075			
W2NLY	23	7 1050	W8BFQ	29	8 850
W2AZL	21	7 1050	W8WV	28	8 1200
W2QED	21	7 1020	W8WJC	8	775
W2BLY	19	7 910	W8RMH	22	8 690
W2OPQ	19	6 632	W8DX	22	7 675
W2DWJ	18	6 632	W8SRW	20	8 850
W2AOC	18	6 680	W8SVI	20	8 870
W2UTH	16	7 880	W8WRN	20	8 685
W2PAU	16	6 740	W8BAK	20	8 685
W2PCQ	16	5 650	W8JWV	18	8 650
W2LHL	16	5 550	W8EP	18	7 800
W2CFT	15	5 525	W8ZCV	17	7 970
W2DFV	15	5 550	W8RWW	17	7 630
W2AMJ	15	5 550	W8WSE	16	7 800
W2QNZ	14	5 400			
W2BRV	14	5 590	W9EHX	24	7 725
			W9BPV	23	7 1000
W3RUE	23	8 950	W9FVJ	22	8 850
W3WKM	19	7 680	W9EQC	22	8 820
W3IBH	19	7 650	W9KLR	21	7 690
W3BNC	18	7 750	W9CCE	21	7 750
W3FPH	18	7 720	W9ZHL	21	7 720
W3TDF	17	6 720	W9KPS	19	7 660
W3KWL	16	7 720	W9MUD	19	7 640
W3LNA	16	5 570	W9REM	19	6 640
W3TDF	16	5 570	W9ALU	19	7 800
W3GKP	15	6 800	W9GAB	18	7 750
			W9JGA	18	6 720
W4HHK	26	8 1020	W9WOK	17	6 600
W4AO	23	7 950	W9MBI	16	7 660
W4PCT	20	8 950	W9BOV	15	6 660
W4JFV	18	7 830	W9LEE	15	6 780
W4MKJ	18	7 665	W9DSP	15	6 760
W4UMF	15	6 600	W9JNZ	15	6 560
W4OXC	14	7 500	W9DDG	14	6 700
W4JHC	14	5 720	W9FAN	14	7 680
W4WCB	14	5 740	W9QRM	14	6 620
W4TCR	14	5 720	W9UTA	12	7 540
W4UBY	14	5 435	W9ZAD	11	5 700
W4IKZ	13	5 720	W9GTA	11	5 540
W4JFU	13	5 720	W9JBF	10	5 760
W4UDQ	11	8 850			
W4ZBU	10	5 800	W0EMS	26	8 1175
W4MDA	9	4 680	W0HFD	24	7 870
W4DWU	8	6 625	W0GUD	23	7 1065
W4TLA	7	4 850	W0NQC	17	6 1090
			W0INI	14	6 830
W5RCI	21	7 925	W0OAC	14	5 725
W5TJI	19	7 1000	W0TJF	13	4 830
W5AJG	11	4 1260	W0ZPB	12	6 715
W5QNL	10	5 1400	W0WGZ	11	5 760
W5CVW	10	5 1180			
W5MWW	9	4 570	VE3AIB	20	8 890
W5ML	9	3 700	VE3DIR	18	7 790
W5ABN	9	3 780	VE3BDN	14	7 790
W5ERD	8	3 570	VE3DER	13	7 800
W5FEK	8	2 580	VE3PB	12	6 550
W5VX	7	4 1200	VE3OK	12	5 550
W5VY	7	2 950	VE3AQQ	11	7 800
W5ONS	7	2 950	VE1QY	11	4 900
W5PSC	7	2 500	VE7FJ	2	1 365
W6WSQ	4	3 1380			
W6ZL	3	3 1400			

The advent of Technicians on 50 Mc. has helped the activity picture markedly. Not only has the new order produced additional stations, but it has encouraged the old hands to spend more time on the band. Here are a few regularly scheduled operations we've heard of recently. In the Puget Sound area W7s TMU YJE DYD TMM PQS UFE PRW KGQ VIC PZP KO and GOU are on 50.4 regularly, checking the band at 1900 PST nightly. W5ZVF is on 51.16 Mc., evenings and early mornings. W0FKY and W0CNM are active regularly in Grand Junction, Colo., also making trips into Utah in the hope of providing that very rare state for some of the gang. W0FKY is on 50.064. Hal reports that there is an active 2-meter net in Western Colorado, comprising W0CNM, 144.1 Mc., W0PXZ, 147.2. W0QEL, 144.4. W0PCB, 144.5, and W0FKY, 144.018.

From the R.F. Carrier, Dayton Amateur Radio Association sheet, we learn that 2100 is 8-meter time in the Dayton area. W8WRN, Columbus, checks 6 (makes transmissions; no cold-filament listening) several times daily. W8CMS, Newton Falls, Ohio, says that about 20 new stations have appeared locally, with prospects good for at least 10 more soon. Claire now has a 4-125A in the final on 6. W8PCK, Silverton, Ohio, is on each morning, Monday through Friday, between 0900 and 1115, and at all hours over week ends. He says that W8s HQK SVU QIS PLB JSW LPD PCK and SDJ are keeping the band active in the Cincinnati area. An unsigned note reports that the Joliet, Ill., Amateur Radio Society has a net on 53.28 Mc. W9OKM and W9VQO monitor this frequency regularly with fixtured receivers.

That Nevada-Utah expedition we reported in May QST is being whipped into final form by W2QCY. The 6146 transmitter delivers 45 watts output, and the converter is all set, as is the audio section. Some test hops to near-by high locations will be made in June, to be sure that all is in order for the big one the latter part of the month. Provision will be made for VFO operation, both 'phone and c.w. Operation will be undertaken from Utah and Nevada locations during the latter part of June and early July.

That hard-to-work state of Nebraska will be on tap again this summer, courtesy of W9ET/Ø, at Lincoln. Gordon will be set up about July 5th, and will operate through at least the 16th. His rig will run 90 watts input on 50.1 to 50.4 Mc. He will QSL all contacts, but eager ones may write him at his *Callbook* address in Chicago.

The 50-Mc. DX season got under way in good style over most of the country during May, and DX reports were coming in to your conductor's desk in numbers we've not seen in some years. Sporadic-E skip of the single-hop variety is a common occurrence in May, June and July, despite the fact that it always comes as a big surprise to the newcomer to learn that contacts can be made on 50 Mc. over distances of 1200 miles or more. Individual reporting of two-way work is out of the question at this season, because of the great number of contacts made. We're always glad to have the reports, however, as they help to keep the national picture in focus, so keep 'em coming.

If you have trouble reading the modulation on weak signals, try turning on the b.f.o. and tuning it to zero beat, says W9GAB, Beloit, Wis. On some receivers this will make an appreciable improvement in the readability of voice modulation.

The 2-meter net of the Atlanta area, inactive for some time, is being reactivated. W4LRR reports that a meeting is held each Sunday at 1300, on 144.138 Mc. The gang usually get together Saturdays around 1000.

W5FEK, Houston, reports some nice work on 144 Mc. W5UUM at Edna, W5IHS, Eagle Lake, and W5IRP, Livingston, work regularly at noon. Livingston is about 120 miles, and Edna is 160 miles. W5IRP has also worked W5EIV, Alice, Texas, about 290 miles on noontime skeds. These are not long distances for band-open conditions, but the skeds are maintained at a time of day when propagation is not likely to be too favorable.

V.h.f. DX tip from a guy who never works any, W9BRD. Rod sits for hours at the console of KSB242 listening to the signals rolling in on the 155-Mc. police band. He says that there are hundreds of stations on 155.37 Mc., and 155.01, 155.13, 155.25, 155.61 and 155.73 are other widely-used channels. Other frequencies in the same part of the spectrum are used locally. As the point-to-point stations give their locations in each transmission, the signals are reliable indicators of good v.h.f. conditions. Now you may not be set up for listening in this frequency range, but plenty of ham



W0ZJB.....48	W5VY.....48	W9ZIB.....48
W0JFV.....48	W5GNQ.....46	W9JUV.....48
W0CJS.....48	W5ONS.....45	W9GTB.....47
W5AJG.....48	W5JTI.....44	W9PK.....47
W9ZHL.....48	W5ML.....44	W9VZP.....47
W9OCA.....48	W5EFW.....44	W9RQM.....47
W6OB.....48	W5ESC.....44	W9ALU.....47
W0INI.....48	W5JLY.....43	W9QKM.....46
W1HDZ.....48	W5JME.....43	W9ULA.....45
W5MJD.....48	W5VV.....42	W9UNH.....45
	W5FAL.....41	W9MFH.....36
W1CLS.....46	W5HLD.....40	
W1CGY.....46	W5HEZ.....38	W0QIN.....47
W1LLL.....46	W5FXN.....38	W0DZM.....47
W1GJO.....45	W5LTU.....37	W0NFM.....47
W1LSN.....44		W0TKX.....47
W1FMS.....43	W0WNN.....43	W0KYF.....47
W1DZ.....41	W0ANN.....45	W0JOL.....46
	W0TMI.....45	W0HVV.....46
W2AMJ.....46	W0TWS.....41	W0MVG.....46
W2MEU.....46	W0CVK.....41	W0WKB.....45
W2RLY.....45	W0CGC.....35	W0TFF.....44
W2IDZ.....45	W0BVG.....30	W0JHS.....43
W2FHJ.....44		W0PKD.....43
W2QVY.....40	W7HEA.....47	W0IPI.....41
W2GVH.....38	W7ERA.....47	W0FKY.....32
W2ZUW.....36	W7BCX.....47	
	W7FDJ.....46	VESAET.....43
W3OJU.....46	W7DYD.....45	VESANY.....42
W3NKM.....41	W7JRG.....44	VEIQZ.....34
W3MQU.....39	W7ACD.....43	VESAIB.....32
W3OTC.....38	W7BQC.....42	VEIQY.....31
W3CMY.....38	W7JFA.....42	VESPER.....27
W3RUE.....37	W7FIV.....41	XEIGE.....25
W3FPH.....35	W7CAM.....40	COBWW.....21
W4FBH.....46	W8N8S.....46	
W4FQM.....46	W8NQD.....45	
W4QIN.....46	W8TZD.....45	
W4FWH.....42	W8R1W.....45	
W4CPZ.....42	W8CMS.....43	
W4FLW.....42	W88QU.....43	
W40XC.....41	W8BFQ.....42	
W4MS.....40	W8T1S.....41	
W4FNR.....39	W8QIN.....40	
W4IUJ.....38	W8LED.....37	
W4BEN.....35		

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

operators of police equipment are. They're good fellows to know, if you want to keep tabs on favorable propagation.

Confusion in the Picnic Department. Unknown to each other, the Terre Haute and Western Michigan v.h.f. groups scheduled picnics on the same date, July 31st. When the Michigan gang heard that they decided to move their date to August 14th, Turkey Run having become something of a National Convention of v.h.f. operators in recent years. This info from W8NOH.

Here's a 220-Mc. item we missed last month. On April 22nd W5AJG hit the jackpot. After catching a new state on 144 Mc. by working W4UUM, Pensacola, Fla., he hooked up with W5JTI, Jackson, Miss. Signals were strong on 144, so they changed to 220 and worked on the higher band with equal signal strength. This is just under 400 miles, and W5AJG's first out-of-Texas contact on 220.

1215 Night in Los Angeles

The Two Meter and Down Club of Los Angeles has been an eminently successful v.h.f. club for some years now, but the "and Down" part of the organization's name has not received too much attention. There has been scattered activity on 220 and 420 Mc., but little on the higher bands. To encourage members to move to higher frequencies, the club recently staged a 1215-Mc. night, under the direction of its president, Don Goshay, W6MMU.

Members were urged to bring equipment for 1215 Mc. and higher bands to the meeting for others to see. Some of the gear is shown by W6MMU in the accompanying photograph by K6GLG. Item 1 is Don's parabolic reflector. The illuminator has a standing-wave ratio of 1.09:1 at 1225 Mc. Just below it is a collinear array with plane reflector made by W6NLZ. Phasing lines are electrically one wavelength long, so no transposition is needed. Pairs are spaced 3/4 wavelength apart physically. Item 3 is a mixer assembly by W6DQJ. It has a quarter-wave coaxial line tuned at the

(Continued on page 158)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
R. L. WHITE, WIWFO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, WIZDP, Communications Asst.

GEORGE HART, WINJM, Natl. Emerg. Coördinator
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, WIZJE, Administrative Aide

More FCC Suspensions. Several different and significant FCC actions have already been reported to you; see page 70 of March '55 *QST*. To those now add the following:

FCC Ordered (29 April, 1955) that the Novice Class operator license of A. R. Bookoff, Miami, Florida, be suspended 120 days, that the license be turned in to the FCC and KN4BQU not be permitted to be operated by any person in the 120-day period, *it appearing that the licensee*, on Jan. 14, 1955, violated Sec. 12.23(e) and 12.158 of FCC rules by using call sign K4BQU which is not assigned to him and by transmitting on a frequency of 3855 kc. using Type A-3 emission which is not authorized for use by Novice Class licensees.

FCC Ordered (11 May, 1955) that the Technician Class amateur operator license of Charles K. Heath, Hinsdale, Illinois, be suspended for six months, that the license be turned in to the FCC and W9ZIZ not be permitted to be operated by any person in the period of the suspension, *it appearing that the licensee* while operating or supervising work at his amateur station violated Sections 12.23 and 12.28 of FCC rules by transmitting and/or authorizing others to use his equipment on frequencies below 50 Mc. He violated sections 12.82(a) and 12.158 of the rules with regularity by using and/or offering others while using his equipment to use call signs not assigned to him, especially W9WFN/9; and also violated section 12.136(b) by not keeping his station log with proper signatures.

About Learning the Code. Having memorized the code by its sound values many (starting in) look to some radio club or operator who is a friend for round-the-table instruction. This is fine, when it can be got; besides a League booklet *Learning the Radiotelegraph Code* that can help, ARRL also periodically prints a list of clubs that have arranged to give local instruction to assist budding amateurs. But it is no occasion to despair if completely without such a local group. Many of the *best* operators learned their Continental *by listening*. It is important in getting started to listen to tape-sent code or an experienced operator to get the proper sense of rhythm, or the spacing of characters and words in code work. The most vital thing of all is *practice*; stick with it for yet more practice. Only practice makes progress and perfection possible. In using WIAW's daily hour of practice do *not* stop "writing down" at the speeds you can comfortably set down on paper! Copy just as diligently *all the letters you can get* at higher speeds. Use the bulletin transmissions in the earlier or later period deliberately to get what you can at speeds definitely beyond your ability to make solid copy! Look over the bands and spectrum between the amateur bands for stations that are repeating their identification or calls.

You may not at first be able to make much of this. With careful listening to repeated calls, however, you will start getting a letter here and

there, till finally you have a whole transmission and the station's identity. It is bound to be a big thrill to ferret out this pioneer bit of intelligence, entirely by your own efforts! Don't overlook the opportunity to hook up an inexpensive oscillator and key and *send* in rhythm with the WIAW tape, too. (Consult the monthly *QST* announcement of the Code Proficiency Program to note those special nights when we give the subject of the practice text. With that in hand you can send in step with the transmitter and perfect your rhythmic responses.) A *lot* of receiving practice is essential. Highest authorities in this field of learning, however, recommend that at least 25 per cent or more of one's time be spent in *sending* practice. This advances the general ability to coordinate in fast recognition of all the letters and aids your *reception* as well as sending ability. The whole idea in amateur radio is "learn by doing." Once you can memorize and buzz the letters locally, most anyone can learn Continental just by regular periods of tuning in and getting the essential practice on the stations that can be tuned in.

Why? (Echo from ARRL DX Test!) P. W. Watson, ZL3GQ, writes, "May I say how much more satisfactory the number system as used by the Ws in your DX Test was. This must be of inestimable value to anyone chasing WAS. However, I have one minor criticism of W/VE operating. If a W/VE receives a report of 579 to 599 I'd estimate 95% of the time he could send the exchange *once*. Why did those getting such reports send their number three times? . . . And when a lower S report was given even send it four times!" We confess we can't explain this, since in our poor efforts with a pultry 200 watts, we never had to use more than a single repeat as an investment against a time-consuming additional transmission. It is our guess that some operators have never reflected that the "R5" means "perfectly readable" with the S7 to 9 indicating "moderately to extremely strong signals!"

RACES Insignia. Until recently we had not heard where RACES authorized groups could obtain the RACES insignia as mentioned in this column in April *QST* and as illustrated herewith. A number have written for more details so we quote from the FCDA memo which constitutes the legal background and the detailed description. "The RACES insigne has superimposed on the official Civil Defense insigne a white jagged arrow edged in blue resembling a flash of lightning, symbolic of space radiation, containing the inscription 'RADIO' in *blue* letters, and extending

from the upper right circumference of the blue circle through the lower lefthand angle of the triangle. Below the triangle and within the blue circle is the inscription RACES in white letters."

W9UMS writes us that their c.d. office at Evansville, Indiana is financing their group to obtain 50 RACES c.d. emblems. W2BGO advises that the Forbes Products Corporation, 625 So. Goodman Street, Rochester 20, New York can supply the design at 25 cents each in lots of 500.

— F.E.H.



Versatile W9NZZ is perhaps most famous for the traffic work which won him the 1953 Edison Award. Some of the other certificates and awards which Stan has earned pounding brass since 1922 include: Edison Award Special Citation, 1952; Edison Award Hurricane Citation, 1954; plaque from British Arctic Expedition, 1952-54; Indiana's Outstanding Radio Amateur, 1954; two ARRL Public Service Awards; A-1 Operator Club; CP-35; BPL Medallion; section winner, 1947 VE/W Contest; DXCC (150); KZ5-25; WBE; BERTA; DUF-4; Radio Onda; RCC; WFJS; WASM; WAC; WAS (3 bands, c.w.); WAVE; OTC; ORS; 50 BPL cards; and several crests and trophies from the Arctic.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C.W.		'PHONE	
3550	14,050	3875	14,225
7100	21,050	7250	21,040
	28,100		29,610

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

The following are the National Calling and Emergency Frequencies for Canada: c.w.—3535, 7050, 14,060; 'phone—3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

APRIL CD QSO PARTIES

"One of the best spring parties on record," were sentiments voiced by numerous participating ARRL appointees and officials. ORS W6RIP found activity brisk enough on 80 through 15 meters for him to grind out 146,497 points and leave other c.w. competitors in his wake, while New Mexico ORS W5DWT supplied a tougher section as he went about accumulating 144,270 score-points. W4YHD's shrewd handling of the M.L.T. set-up likewise resulted in a husky tally for WIMX. Sidlight: W4KFC took part for just a short spell but reports his busiest flurry in any contest to date: 73 QSOs in one hour of 3.5-Mc. brasspounding. . . . Despite fierce QRN from storms and rain static, PAM/OPS W4TVO plied 40 and 75 for a dandy 20,825-pointer to edge the 'phone brethren, W9KDV, with W9Vfy doing the talking and switch-throwing, and RM W1CRW reached the other top positions with scores of 15,840 and 14,645 points, respectively. Full results in July CD Bulletin.

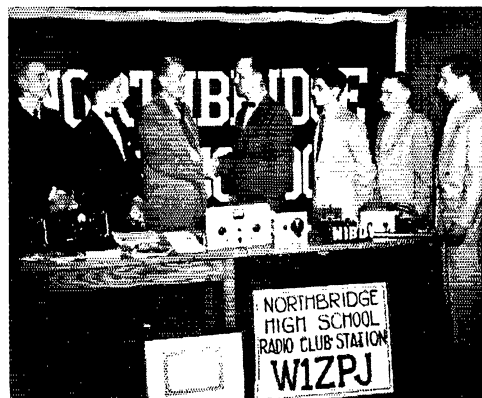
C.W.

W6RIP.....	146,497-272-59	W1ZIO.....	72,240-297-48
W5DWT.....	144,270-451-83	W1FZ.....	71,500-255-55
WIMX.....	143,655-464-61	W4WXX.....	71,280-262-54
W1EOB.....	138,775-448-61	W6JWD.....	71,001-161-49
W4RVX.....	134,200-440-61	W2IVS.....	70,125-248-55
W1TYQ.....	133,500-445-60	W4VQT.....	69,750-274-50
W4PNK.....	122,700-409-60	W4YZC.....	68,105-250-53
W3JTK.....	119,180-404-59	W1NXX.....	66,000-257-50
W4IA.....	113,850-407-55	W0DW.....	63,990-237-54
W2ZVW.....	102,175-328-61	W6GZR.....	60,122-143-46
W3VOS.....	96,600-353-54	W0PH.....	59,000-236-50
W6CMN.....	91,900-440-51	K2DSW.....	58,800-252-46
W8GBF.....	87,580-295-58	W9NH.....	56,610-216-51
W3DVO.....	87,210-316-54	W7JLU.....	56,072-141-43
W1JTD.....	85,840-289-54	W8YDR.....	55,900-215-82
W8LHV.....	85,595-316-53	K6BWD.....	54,684-128-47
W9SDK.....	85,250-300-55	W4AMZ.....	54,600-280-42
W1MZ.....	84,150-330-51	K2ARQ.....	54,510-233-46
W2FEB.....	79,750-290-55	W4VQV.....	54,250-211-50
W9KLD.....	79,110-290-54	W2DMJ.....	52,525-184-55
W0IUB.....	78,650-288-55	W3QZC.....	52,320-212-48
W6CRT.....	75,762-152-54	W9RKP.....	51,695-205-49
W8NOH.....	74,100-280-52	W2ABE.....	51,480-198-52
W0RDN.....	73,700-268-55	W1REP.....	51,385-239-43
W1AW.....	73,530-251-57	W2GXC.....	50,880-212-48
W1CRW.....	73,320-282-52		

'PHONE

W4TVO.....	20,825-119-35	W1AW.....	8510- 67-23
W9KDV.....	15,840- 96-35	W1YBH.....	8330- 70-22
W1CRW.....	15,645-101-59	W4IA.....	590- 62-22
W8NOH.....	13,720- 93-28	W8NBS.....	7475- 60-23
W1FZ.....	11,880- 94-24	W2ZVW.....	7000- 63-20
WIMX.....	11,000- 81-25	W1GVK.....	6900- 60-23
W7RSP.....	10,350- 46-25	K2DSW.....	6900- 65-20
W1AGD.....	9600- 61-30	W1AGE.....	6500- 65-20
W9ZRP.....	9570- 63-29	W1REP.....	51480- 47-24
W1JYH.....	9130- 76-22	K6BWD.....	6080- 40-16
W1ZIO.....	8580- 74-22		

¹ W4YHD, opr. ² W1QIS, opr. ³ W9Vfy, opr. ⁴ W1WPR, opr.



William F. Ham, W1RRX, ARRL Section Emergency Coordinator (fourth from left), congratulates James Saunders, W1BDV, Faculty Advisor of the Northbridge High School Radio Club, Whitinsville, Mass., as club members look on. W1RRX lauded the group for developing teen-age radio operation and expressed the wish that more schools would follow their outstanding example. The occasion was the appearance of the students on *Teen Time*, a weekly program honoring youngsters and telecast over WWOR-TV, Worcester.



There seems to continue to be some question about the relation between the AREC and RACES. Why, we wonder? On a good many occasions, we have attempted to clear this up, but in some places there is still conflict. Who causes the conflict is a detail, but it takes two to make a fight. Obstreperous AREC groups on the one hand, and a cold, fishy attitude on the part of c.d. people on the other hand can cause all kinds of trouble. They are matters for local resolution.

ARRL's official view of the relationship is that the two organizations are (i.e., *should be*) overlapping and interlacing — in some places identical. We are not ready to drop the AREC overboard, for several reasons. The most important one is that we've worked hard, we amateurs, for the last 20 years, to make the AREC our own emergency service organization, and we're proud of it. As long as there is a need and use for it, we want to maintain it — and where no particular c.d. program exists, there is plenty of need for it.

But this does not mean that the AREC wants nothing to do with RACES. On the contrary, long before there was an PCDA heading up the nation's civil defense preparedness effort, ARRL officials were urging that radio amateurs be given a key rôle in civil defense communications. As much, if not more, than any other group or individual, ARRL was



Amateurs of the Sioux Amateur Radio Assn. have converted this bus into a mobile communications center. Civil Defense and Red Cross have cooperated in installing transmitting and receiving equipment, a 6500-watt generator, field telephones and a p.a. system.

an active midwife at the birth of RACES. We think, and have thought right along, that the AREC is the natural and logical instrument at local level for the implementation of RACES. In the places where RACES has been most successful, it has been just this. It's one of the things that the AREC was set up for: to serve any need for emergency communications that might arise.

Such a philosophy will not embrace the premise that precipitant abandonment of all previous organization for a new concept is a desirable course of action to follow. You might as well ask the telephone and telegraph companies to abandon their previous organization and set up anew, under new leadership, new policies, using new equipment. It won't work. *Full use of existing facilities* is requisite, both to our efficiency and our economy. The AREC is an existing facility. It is flexible enough to embrace the new civil defense function, and where sufficiently supported can (and has) become RACES. The EC and radio officer, if they are different people, *must* work together toward the common civil defense end, whether they care for each other personally or not. AREC members *must* sign up in civil defense. We have a job to do in implementing RACES. Civil defense has a job to do in utilization of the amateur

service for communications purposes. Let's stop asking ourselves and each other foolish questions, and *get the job done!*

The AREC and RACES, at top level, are welded for the duration. This state of wedlock must be made to extend to all levels. That's the job of you fellows on the ground floor, so get a firm grip on your prejudices, personal and otherwise, and let's get the ceremony under way.

A snowplow and its crew got stranded in a blizzard in the wilds of Western Nebraska on February 19th, and W0AIN was called on to help find them. He contacted W0LOD in Ogallala on 3525 kc., since telephone lines were down between Ogallala and Lewellen, and relayed the information that they had left Lewellen at 1700 on the 19th. Late the next afternoon it developed that the men were safe. W0AIN sent this word to W0LOD, who notified their families. Other stations participating: W0s ZAA GEQ UOB BEN.

When a telephone cable broke down between the La Crosse (Wis.) Municipal Airport and Madison on February 25th, amateurs filled the communications gap until it was repaired, obtaining weather and flight information from Madison on behalf of airport officials, CAA and the Weather Bureau. W9GPU and W9OGT held down the La Crosse end, while W9OOL kept contact from Madison. Excellent publicity was received on television, radio and the newspaper on this bit of public service. — W9AKY, EC La Crosse, Wisc.

From the Ontario SCM we have gleaned the following: "We would like to commend VE3UJ who tried for two hours to get Sarnia and Chatham Civilian Defense hooked up during the windstorm of March 22nd. The Oil City Civil Defense readied two trucks to dispatch to Chatham, but the efforts of VE3UJ made the long and dangerous trip in grim weather unnecessary. Appreciation from c.d. officials is extended also to VE3s AWQ LB DIJ DZ and MW. Traffic for the London *Free Press*, civil defense and police officials was handled due to wire facilities being out. VE3EI and VE3BVM also exchanged important traffic.

A severe train accident near Albany, N. Y., was the occasion for some creditable work turned in by amateurs of the Capital Area Radio Emergency Net on April 2nd. W2EOM and K2ACB flashed word of the emergency and within a few minutes six mobiles were proceeding to the scene. K2CWX assumed net control. Of the six mobiles, W2EOM, W2SZ, K2AYH and KN2IUE arrived at the scene. KN2JHY was turned back by police, and W2FEN set up in Castleton to act as a relay station. K2AYH, W2SE and KN2IUE placed their cars at strategic locations while W2EOM took his portable down to the wreck. Stations on the "home front" were W2s AWF DIF TMM and K2s BUU (operated by W2GTZ) ACR and GAZ. The net was conducted in an efficient and businesslike manner throughout. Much informal traffic was handled and one formal message was relayed out of the area via K2BUY. Much credit for the operation goes to the NCS. K2CWX, at the Veterans Hospital.

The Smoky Mountain Amateur Radio Club in April organized a network to furnish radio assistance to the Maryville (Tenn.) Police Department when this community was left without adequate emergency telephone service. W4BXG (EC for Blount County) reports the following stations active: W4s AMA BXQ FEP JSP OKD NLJ T2B VSS VTT ZEN ZSI QCZ FHT. K4s AAO AAV COF CRV, and W5LLR/4. These stations manned net facilities consisting of fixed and mobile units on two and 160 meters. For 23 days, police traffic, medical and other matters were handled as emergency radio communications.

VE5LU, SEC Saskatchewan, reports that landlines were out in the blizzard that hit southwestern Saskatchewan April 3rd. Amateurs assisted in restoring communications for the power companies, VE5TV and VE5LU maintaining schedules three times daily through April 6th. Others participating: VE4AI, VE5s BO TV CM BH RU CX MS LU and RE.

The Texoma Amateur Radio Club was called into action for emergency operation when a tornado struck Sherman, Texas, on April 6th at 0245, disabling telephone and power

circuits. The first mobile was on the air at 0415, a net control station with auxiliary power having previously been set up. The civil defense radio unit operated three field stations and four mobile stations several hours following the storm with one out of town trip to Perrin AFB for additional fire-fighting apparatus for Gunter. The work of the amateurs participating was highly commended by the civil defense director and assisting auxiliary police chief. Those participating were W5s UTB IDZ POG LDG SGR DGG and UIQ. — W6UTB, EC Sherman, Tex.

The snowstorm that hit western Nebraska on April 12th took the town of Potter out like a light — literally. Potter had no electric power for two nights, and communication lines were down, too. W8KQX started his putt-putt in his snow-covered back yard and made contact with W8UOB, in Sidney, to provide the only communications. He was able to tell Sidney that no special emergency measures were required, although many Potter residents were suffering from cold. The communications situation was returned to normal on April 13th.

On April 17th, a distress call from W6GRU/m was heard on the American Legion Amateur Radio Net frequency (3975 kc.). He gave his location as the Donner Pass road east of Sacramento, where the snow had reached 18 inches, resulting in blocked highways. Traffic was heavy due to the North American Ski Championships being held in the area. W6GRO took over the net, with W6EPB assisting, and contacted the California Highway Patrol to start relief equipment on the way. The experience gained in the Tehachapi earthquake proved invaluable. An amateur employed by the California Highway Patrol (call unknown) set up a station in the office and maintained contact with W6GRU/m until relief arrived about 2240. K6EJT and K6ECP maintained control with W6GRU/m until he reached Sacramento. Also active were W6s QMO CNA OFJ and IDY. This incident rated blare headlines in the Los Angeles Times for April 18th.

— W6WJF, PAM San Joaquin Valley

The Alabama Emergency Net P was alerted at 2200 on April 23rd during a tornado warning for Northern Alabama. The alert lasted until 0230 April 24th. W4s HKK TKL AZX and ZSQ took turns as NCS. Traffic was handled for the Tennessee Valley Authority to participate in the search for a lost boat on the Tennessee River. Other stations participating: W4s ZWE ATF FEC CDE SX OAO HKE NIQ WXW YDU ZSH ZSB UHA HYI BOE MEP HTP GCV WEM OGV SMD WGT GVI HFU, W6s KNB GGZ SEH, — W4TKL, SEC Alabama

On May 3rd, a heavy snowstorm hit Saskatoon, Sask. The wet snow clung to everything it hit, and soon telephone and electric wires and poles were bending and snapping under the weight. At 1730, VE5LM called VE5BG to relay a message to the phone company that his telephone was out. W5RE also was without telephone communications. VE5DR was asked by the civil defense director to arrange communications for the power company. This he did, and VE5DR and VE5EH went to the local club station set-up at c.d. headquarters. There they found the antenna down. After repairing this, the power went off; so they took a portable power plant to the VE5DR location and were soon on the air.

This was the beginning of a busy time for the amateurs. VE5s DN, DG and RE were kept busy handling messages for the power company, which was in dire straits, and later the railroads called on the amateurs to help them with some of their communications. Schedules were maintained from VE5DR (with VE5EH assisting) all through Tuesday night. VE5JG at Regina also came on the air, staying until 0200. VE5s DN and RE remained operative throughout the night. On Wednesday morning (May 4th), VE5CM was on from Regina and remained all day. VE5WW also was on from VE5DG, and VE5JP did some very valuable relay work. VE5BU operated on emergency power for a while, but ran out of gas. VE5BG took over from VE5DR at 0830 Wednesday, later assisted by VE5s BD RL and DU. VE5VL was on stand-by. VE5s FY and YF sent and received news dispatches to the outside by tape recorder, since normal news-dispatching agencies were without communications. Helping out in this news coverage were VE5s JP YJ RB VD DD and WW. Considerable traffic

was handled during the day by VE5DR, who later made a radio broadcast via amateur radio, VE5DR to VE60D. VE5HR was in the hospital and unable to be active, but supplied us with all the above data.

Sixteen SEC reports were received for March activities, representing 5356 AREC members: Minn., S. Dak., Ky., Tenn., Maritime, Ga., Wash., W. N.Y., E. Fla., N.Y.C.-L.I., Ore., Wisc., San Joaquin Valley, E. Bay, Los A., Ont. The Los Angeles SEC reports 1424 AREC members in his section, and claims this to be the highest in the United States, by plenty. The number increases a little each month. So far, no one even comes close to this number, N.Y.C.-L.I. being second with 742.

RACES News

From FCDA, we have the latest info (May 17th) on states having fully-approved RACES plans. We thought this would be of interest to you. The following are fully approved for RACES: Alabama, California, Colorado, Connecticut, Delaware, Georgia, Illinois, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Nebraska, Nevada, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Washington, West Virginia, Wisconsin, Alaska, Hawaii, D.C. Now being processed are the state RACES plans for Florida, Minnesota, North Carolina and Wyoming. Not yet heard from are Arizona, Arkansas, Idaho, Indiana, Iowa, Kentucky, Maine, Mississippi, Montana, New Hampshire, North Dakota, South Carolina, South Dakota, Texas and Utah. Thus, 29 states, two territories and D.C. now have approved RACES plans, and by the time you read this the chances are good that four more will have been approved. RACES organizers in the states mentioned above as "not yet heard from" should get the ball rolling toward their state RACES plan, if possible. The time to do this is now, not after the bomb falls.



One place where they have successfully combined the AREC and RACES is Steubenville, Ohio, where, under EC/RO W8ERR, this group had the second FCC-approved RACES plan in the state. The main control is located in town, but there is also an alternate control station seven miles out of town. A 20-foot house trailer is being equipped as a mobile alternate control station. The call used for RACES is W8ERR.

In St. Lambert, Que., amateurs are alerted for civil defense by the police station, which receives the warning from the Air Defense Command, RCAF. Only EC VE2EG is called. He then calls two other amateurs, each of whom call two additional amateurs until all personnel are alerted. This process makes it possible to notify all personnel within six minutes after receipt of the alert.

We don't believe we have previously recorded the presence on the FCDA staff of another amateur. He is Jim MacGregor, W8DUA, formerly in charge of Kalamazoo Police Radio and a staff member of WOOD-TV in Grand Rapids. Mac visited us in connection with the April 30th Region I Test, and will work with Charlie Dewey, W8LBM (see April QST, p. 73), on RACES. It is good to know that we will have two active amateurs on the FCDA Staff so intimately concerned with the processing of RACES applications and RACES implementation on a national scale. We hope that their presence will have a salutary effect on the progress of RACES at all levels.

From Key-Klix, publication of the Santa Barbara Amateur Radio Club, we glean the information that the Santa Barbara RACES plan has been approved by FCDA as of March 21st, the first approved plan in California C.D. Region Seven. This was the result of "three years' intensive spadework by c.d. officials in this area," says the bulletin. Frequencies to be used are 29,550, 29,470, 145,460, 145,500 and 147,240, crystals for which will be furnished authorized amateurs. K6BVA is the call that will be used by all stations. Says the editor: "Key-Klix will keep you posted as the red tape is unravelled."

MEET THE SCMs

Edward F. Conyngham's interest in radio dates back to his early childhood when he heard all the wonderful accounts of how the operator on the SS *Titanic* sent out messages reporting the disaster. A few years later an ex-Navy operator gave him first-hand information on the workings of radio and in 1934 he was issued his first license.

WTESJ is housed in a special room and transmitting equipment is comprised of a Navy TBW-3, 803 final; a Navy GP-7 modified, 803 final; a Navy TCS-12, pair of 1625s final; a Viking II; an Elmac AF-67; a Lysco 600; and a homemade rig with a pair of 46s in the final. Re-



ceivers are an S-76, a BC-342, an Elmac PMR-6A, and three Command receivers for monitoring. Antennas regularly used are an 80-meter half-wave, center fed with open-wire line; a 100-ft. Marconi; and a 50-ft. Marconi. For emergencies a PE-108 a.c. generator is used to power the Elmac and TCS transmitters.

Since his election as Oregon's SCM, Connie has relinquished his appointments as Official Observer and Section Emergency Coordinator, but has retained the post of Official Relay Station. He has been issued Public Service certificates for his assistance in Columbia River and other emergencies and also has Rag Chewers Club, Old Timers Club, and Code Proficiency certificates, the latter for 35 w.p.m. While on a destroyer in 1939 he was clocked for 1½ hours receiving press at 52 w.p.m. He holds membership in the Portland Amateur Radio Club and the Amateur Radio Association of Bremerton and is an enthusiastic participant in the monthly on-the-air parties for League Officials.

A retired Navy man, Connie enjoys skiing, sailing, rowing, and watching baseball. His other hobbies are cartooning and drawing (the picture shown here is self-drawn).

TRAFFIC TOPICS

We traffic men have a tough row to hoe during the summer months. The QRN gets worse, the days get longer, other activities get in the way of nets and schedules, and on a national basis "daylight saving" time makes a mess of our NTS time schedule. Nets lose personnel while operators go on vacations. It's a tough time of the year for organized traffic handling, and many have asked us why we try to keep going at all, why we don't close up shop in May until October.

That's a fair question, and it deserves a fair answer. After all, isn't it true that most, if not all, of us traffic men handle traffic because we like it? Never mind *why* we like it — we just do. Do we, then, enjoy it during the summer months, with lightning playing around our antennas, with weak signals and the crash of static in our ears? Are we *really* nuts?

Let's ignore that last question as an interesting but somewhat irrelevant matter of conjecture, and get at the one before it. We think that the traffic man who persists in his efforts to handle traffic when the going is rough does so because he finds challenge in it, and meeting this challenge is a form of enjoyment. Handling traffic under unfavorable operating conditions, whether they be atmospheric, propagation or environmental, is something we would certainly have to do in a national emergency. Those who meet the challenge of doing so, for whatever reason, are the ones who will be the mainstays in any national emergency, while those who throw up their hands and quit during the tough season will find themselves severely handicapped by lack of experience when the chips are down. So we offer this salute to those of the traffic gang who are still in there pitching, making our amateur traffic service a year-around service

instead of a "fair weather" plaything. Our hats are off to you, fellows!

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Miscellaneous reports: (1) W8AMH reports a traffic total of 837 for the Early Bird Transcontinental Net for April, eleven stations participating. (2) The New York State Phone Emergency and Traffic Net handled 255 messages in April, with 1114 stations participating, according to W2GSS. (3) W1LYL reports 678 messages for the First Call Area Section of the Transcontinental Phone Net, with 15 stations participating. (4) The College Net had eight meetings, handled 18 messages; 62 stations called in.

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National Traffic System. Recently someone asked us about the general quality of our NTS leadership personnel. We replied that they were all good, and some were better than others. That's exactly the way we feel about it, too. There isn't a poor manager in the whole of NTS, and never was. Managing an NTS section, regional or area net is no kid's game; neither does the job get harder or more important as you go up in level — if anything, managing a bunch of finished traffic men (such as those at regional or area level) is easier than doing the same at section level, where training has a more important role.

You fellows who participate in NTS owe it to your net manager to do your best to help him out. Volunteer for assignments needed, criticize freely but constructively, and be on deck as often as you can when the net meets. It's your net as well as his. Your participation is not particularly benefiting him, or ARRL, or even yourself; it's benefiting all of amateur radio as well. Keep this in mind, and remember also that the net manager needs your help, advice and interest. Don't leave everything to him, then blame him when the net stagnates. It's up to you, too.

April Reports:

Net	Sessions	Traffic	Rate	Average	Representation
1RN	26	4400	0.60	15.4	92.9%
2RN	52	542	0.26	10.2	93.6%
3RN	48	309	0.43	6.4	86.8%
RN5	45	1370	1.02	30.4	69.4%
RN7	52	325		6.4	33.7%
4RN	16	210	0.88	13.1	75.0%
PAN	27	1149	1.57	42.5	100.0%
Sections*	375	2476			
TCC (Eastern)		153			
(Pacific)		457			

Summary	641	7391	RN5	11.5	PAN
Record	673	8990		17.8	

* Section nets: AENB & AENP (Ala.); TLON (Iowa); NTX (No. Texas); CN & MCN (Conn.); WVN (W. Va.); KYN (Ky.); MSN & MSN Fone (Minn.); GSN (Ga.); WSN (Wash.); QKS, QKS-SS & QKN (Kans.)

Late reports:

RN7 (Mar.) 44 222 5.0 48%

W4BVE has accepted the 4RN managership, so we can begin to look for increased activity from that quarter. RN5, under the managership of W4OGG, exceeded their previous record of April traffic (442) by so much that it



Dave Goggio, W4OGG, energetic manager of the Fifth Regional Net (RN5) of NTS, relaxes at his operating position. Dave has rejuvenated RN5 from low ebb into one of the hottest regional nets in NTS.

"ain't funny." Dave is doing a super job of getting the RN5 sections organized, and getting a lot of support from everywhere but Southern Texas. W6ZRJ is the new manager of RN6, replacing W6JOH; let's give Doc plenty of support. VE7ASR is making a big effort to get 100% representation of sections in RN7, but it's not easy. W9UNJ is resigning as RRN Manager as soon as a replacement can be found. TRN has adopted a thrice-weekly schedule for the summer, but will endeavor to continue 100% liaison with EAN. PAN is going great guns, but Manager W7APF is having TVI troubles.

Transcontinental Corps. No report from Central Area this month. W8UPB reports for Eastern Area that most schedules are holding together, but there are some significant vacancies. Pacific Area is doing excellently, but now that W6HC is an ARRL Director he feels that he cannot continue as TCC Director, so there will be a new TCC Pacific Area Director soon.

AMATEURS SCORE IN TELETHONS

We have eight reports of amateurs participating in telethons connected with the March of Dimes early in 1955. Let's summarize each one briefly, in chronological order except that dateless reports come last.

1) The Panhandle Amateur Radio Club of Amarillo assisted in the March of Dimes Telethon in that area, which started in mid-January. Eighteen amateurs in the area participated, handling 1792 messages and collecting contributions or pledges for more than \$7600.

2) Seventeen members of the Cascade Net of Portland, Ore., were among the participants in the special March of Dimes drive January 21st-22nd. A transmitter at the KOIN-TV studios was set up and operated during a special 4½-hour program. As viewers telephoned their pledges, W7AEF at the studio set-up called the nearest of 19 mobiles spotted throughout the city, which then proceeded to make the collections. During the period, the mobiles picked up a total of \$2215.82.

3) In Broward County, Fla., fixed stations in amateurs' residences were used to radio dispatch mobiles as the calls poured in over broadcast and TV stations. Thirty home stations and 15 mobiles were active in this operation on January 29th-30th.

4) In Nashville, Tenn., Operation Poliothon was a combination AREC workout and a public service venture of Nashville and Davidson County amateurs. Free time was furnished by WLAC-TV for the full period of the Telethon from 2200 January 29th to 1300 January 30th. As telephone pledges were received, a mobile would go out with a member of the Junior Chamber of Commerce, sponsors of the Telethon. Nineteen ten-meter mobiles were used during the operation, with six fixed stations scattered around the city as relay stations whenever the need arose.

5) The Owensboro (Ky.) Amateur Radio Club supplied transportation and communication for the "Mothers' March Against Polio" in that area, covering Henderson and Evansville in addition to Owensboro. A base station was set up at Mothers' March headquarters, and mobiles dispatched to make collection whenever a telephone pledge was received. Amateurs also conducted communications from the various schools at which the Mothers' March had its headquarters.

6) On February 18th, the Calgary Radio Emergency Net assisted the Canadian Legion in a polio drive. The local radio station CKXL broadcast a 4-hour program calling for telephoned bids. These bids were relayed on 75 meters to hamshacks around the town where the Legion had stationed cars, which were then sent around the district to pick up the donations. About \$4000 was collected for the fund. Fifteen amateurs participated from seven stations in Calgary.

7) We don't know the date of the telethon in Longview, Texas, but word from W5AFR via SCM W5JQD is that the Longview Amateur Radio Club and other amateurs in the district assisted in communications between various county headquarters and KTVE. Operation was on 160 and 80 meters, with six amateurs at the TV station, for 21 hours. Donations, says W5AFR, were around \$22,000.

8) In Bangor, Maine, mobiles of the Bangor Civil Defense Corps assisted in supplying communications for the Mothers' March in Bangor and Brewer. The mobiles were stationed at strategic points, with a control station dispatching them to points in the two cities as needed. Twelve amateur mobile units assisted in this operation.

A.R.R.L. ACTIVITIES CALENDAR

July 2nd: CP Qualifying Run — W6OWP
 July 11th: CP Qualifying Run — WIAW
 July 16th-17th: CD QSO Party (c.w.)
 July 23rd-24th: CD QSO Party (phone)
 Aug. 5th: CP Qualifying Run — W6OWP
 Aug. 16th: CP Qualifying Run — WIAW
 Sept. 3rd: CP Qualifying Run — W6OWP
 Sept. 14th: CP Qualifying Run — WIAW
 Sept. 15th: Frequency Measuring Test
 Sept. 17th-18th: V.H.F. QSO Party
 Oct. 7th: CP Qualifying Run — W6OWP
 Oct. 8th-9th: Simulated Emergency Test
 Oct. 13th: CP Qualifying Run — WIAW
 Oct. 15th-16th: CD QSO Party (c.w.)
 Oct. 22nd-23rd: CD QSO Party (phone)
 Nov. 5th: CP Qualifying Run — W6OWP
 Nov. 12th-13th, 19th-20th: Sweepstakes
 Nov. 18th: CP Qualifying Run — WIAW

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for April traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W0SCA.....	8	906	872	15	1801
W0BDR.....	22	847	814	21	1704
W7BA.....	20	749	721	26	1516
W7PZY.....	78	584	553	31	1246
W5TFB.....	12	595	533	62	1302
W4COU.....	42	527	539	23	1131
W4PL.....	4	549	515	27	1095
K4AKP.....	7	543	523	18	1091
W0CPI.....	14	530	468	62	1074
W9NZZ.....	239	341	0	340	920
W9T.....	4	532	377	6	919
W9YWL.....	44	453	339	29	856
W9LD.....	8	415	390	33	846
W5DTA/5.....	18	385	354	50	807
W5MN.....	11	386	348	41	786
W4BLR.....	16	339	286	54	695
W0RLL.....	3	338	323	8	677
W4OCG.....	8	336	290	37	671
W9IDA.....	130	274	260	5	669
W3WG.....	18	330	313	0	661
W3CUL.....	67	293	237	54	656
W3WV.....	17	341	189	73	619
W2RUF.....	20	325	204	37	609
W5KB.....	1	285	291	10	597
W6SWP.....	66	267	209	55	597
W0PZO.....	0	305	288	4	597
W2LPJ.....	22	286	268	18	594
W7APF.....	2	292	292	0	586
W5FEC.....	525	29	18	11	583
W7FRU.....	8	278	249	26	561
W9CSW.....	8	271	52	218	549
W4UHA.....	167	221	154	1	543
K4FEU.....	27	258	243	11	539
W1ARR.....	55	232	183	44	514
W4PJU.....	7	253	240	13	513
W0JUL.....	16	254	245	17	512
W0CXY.....	18	244	238	4	504
Late Report:					
K4AKP (Mar.)	32	377	357	20	786

More-Than-One-Operator Stations

W6IAB.....	29	1565	1314	251	3159
K6BAJF.....	933	693	573	100	2299
K5FFB.....	91	457	491	32	1101
K4FDY.....	88	503	421	26	1038
K4ZMA.....	328	288	277	11	904
K5WSP.....	147	372	362	10	891
W5PML.....	735	31	14	11	791
K6WAY.....	133	249	397	10	789
K7FAE.....	31	281	251	35	598

BPL for 100 or more originations-plus deliveries:

W9V8X	451	W4DDY	121	W0GBJ	103
W4TYU	151	K6FDG	115	W3WBJ	101
W4HDR	149	W1YCG	113	W5NDB	101
W0KEL	138	W8DAE	112	Late Reports:	
W0NTY	134	W1AJX	106	W9V8X (Mar.)	194
W6U8Y	128	W9FEC	106	W4HDR (Mar.)	171
W9SAA	125	W1WEP	104		

More-Than-One-Operator Stations

W6YDK 187 VESDR 126

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W1E0, K2CQP, W3RV, W4PL, W6YHM, W7VAZ, W9AA.

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.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH...258	W6YXO...350	W6MEK...246
W6VFR...254	W8SN...249	W8SYG...248
W6AM...253	W8NBK...249	PY2CK...246
W6ENV...251	G2PL...247	W3JTC...245
W8HGW...251	W3GHD...246	W2AGW...244
W3BES...250	W3KLT...246	W6MX...244

Radiotelephone

PY2CK...239	WINWO...216	W9RBI...210
W1FH...230	W1MCW...215	W3JNN...209
VQ4RR...230	X31AC...215	W9NDA...209
ZS6BW...225	W8HGW...214	W5BGP...207
W1JGX...217		SM5KP...207

From April 15, to May 15, 1955 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

HB9FO...167	W3OVU...104	W4JAT...101
W2DOD...139	DM2ABL...103	W8QPM...101
PY7AN...118	GZ5FA...103	W8NOH...101
AV5FL...110	W4KLI...100	K2EDL...100
DL3IE...106	YV5FK...102	KA4IM...100
DL9GH...106	W1ZDP...101	W4RTX...100
W2CR...105	W4BO...101	SM5AHK...100

Radiotelephone

YV5EC...138	W4ANE...117	W6SYG...101
HB9FU...131	W4DOV...102	1IC8P...101
W3DPS...118	W2JIL...101	PY1RC...100

ENDORSEMENTS

W3EUV...240	W6CAE...144	KP4JE...130
W3GAU...240	W8CKX...142	W2NOY...122
W5EFC...190	K2GFO...141	V3HB...121
Q3HL8...190	W9GDI...141	W7HQC...120
W3ALB...180	G3AAE...141	W9RKP...120
W5NMA...180	F3FA...141	W8RVU...118
1LX...171	W1RAN...140	DL1EE...117
W1LZE...170	ZL2HP...133	EA3GF...116
W1BPT...162	W8MWL...131	W1AW...110
SM3AKM...162	W9KXK...131	W6DXS...110
H89NQ...110	W3ZQ...130	W9DLZ...110
W6LAMZ...152		W9EU...110

Radiotelephone

W5NMA...165	W4RBH...141	W9MWL...120
CO2BL...161	W9HP...141	W8LAV...122
W2EOH...151	W6CHV...140	W3AEV...121
CO2BK...150	W8QJR...130	W4FPS...110

W/VE/VO Call Area and Continental Leaders

W4BPD...241	VE2WW...181	VE8AW...160
W5M18...243	VE3QD...210	VO6EP...190
W7AMX...240	VE4RO...228	4X4RE...210
W9NDA...243	VE5QZ...140	ZS6BW...232
VE1EG...215	VE6GD...108	ZL1HY...238
	VE7HC...209	

Radiotelephone

W2APU...202	W7HIA...181	VE3KF...163
W4HA...180	W0AIV...179	VE6RO...127
W7HIA...181	VE1CR...120	VE7ZM...140
W6AM...205	VE2WW...102	OD5AB...170
W6DI...205		ZL1HY...106

BRIEF

The Connecticut 'Phone Net is finding certain information made available by the telephone company's central and regional offices most valuable. For delivery of radio traffic the NCS and many net members are using the publication *Connecticut Localities Telephone Exchanges*, available to subscribers on request. This lists all Connecticut towns and under what main city exchanges they come. Another helpful publication is *Central Office Names*, also free on request from the New Haven office of the Southern New England Telephone Company. W1LG suggests that traffickers in other parts of the nation secure parallel publications to aid in delivery of radiograms.

DXCC NOTES

Our DXCC Note this month will clarify the case of Corn Islands with regard to our DXCC. QSLs for Corn Islands count for Nicaragua only. Information currently originating with the United States Department of State indicates Corn Islands are solely under the administration of Nicaragua. Our FCC is fully cognizant of the position taken by the

Department of State. Therefore, any QSL submitted for DXCC credit from Corn Islands must be viewed with attention to Rule #7 of the DXCC rules which provides that only the calls issued by the administering government or licensing authority will be recognized.

The question of the distance of the Corn Islands from Nicaragua was raised in some correspondence. In view of these being only 35 miles removed from the parent country there would be no adequate precedent to justify country status on the basis of distance. (See page 68, May QST, Country Considerations, point 2.)

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 11th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run from W6OWP only will be transmitted on July 2nd at 2100 PDST on 3590 and 7138 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 will be made from W1AW each evening at 2130 EDST. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. 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.

Date Subject of Practice Text from May QST
 July 5th: The "Z-Match" Antenna Coupler, p. 11
 July 8th: Automatic Mobile Antenna Tuning, p. 14
 July 12th: Vertical Multiband Antennas, p. 19
 July 14th: Six Meters for the Beginner, p. 22
 July 18th: Easy Shielding for Ninety Watts, p. 25
 July 21st: The All-Electronic "Ultimate" Keyer, p. 38
 July 26th: 21st ARRL Sweepstakes Results, p. 44
 July 29th: The World Above 50 Mc., p. 57

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.

Note: W1AW will be closed from 2230 July 3rd to 1300 July 5th in observance of Independence Day. From July 25th through August 25th, W1AW operating-visiting hours weekdays will be from 1900 to 0100, to provide for attendants' vacations.

A mimeographed local map showing how to get from main highways (or from HQ. 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, 7125, 14,100, 21,010, 52,000, 145,600 kc.
 'Phone: 1885, 3945, 7255, 14,280, 21,350 kc.; 52,145.6 Mc.

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 on page 70, May QST, 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 11th and August 18th instead of the regular code practice, W1AW will transmit certificate qualifying runs.

SCM AREC ORS CP SEC OBS TCC OO
Station Activities
 OBS AIOPR EC DXCG CLUBS RM OPS RCG

• 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, W. H. Wiand, W3BIP—SEC: IGW, RM: AXA, PAM: PYF, F. Pa. Nets: 3610, 3850 kc. Notice to all amateur radio clubs of E. Pa.: Your SCM will be happy to include all information such as news items and announcements of interest to all in this column each month. However, in order to be certain that this information can be used, kindly use the following as a guide. (1) Mail your news items to the SCM (address page 6) no later than the first of each month. (2) Two months will have elapsed between the time it is received by your SCM and its appearance in this column. A club bulletin is fine but in most cases it is not received in time and does not contain items that will be of interest to the gang two months later. Make it your duty as a member of a club to bring this to the attention of your president so that he may appoint someone to furnish the SCM with the items you want to appear in this column. The West Phila. RA reports concentrating its Field Day efforts in the two-transmitter class with operators being AHP, BVD, DVP, FMI, OWK, RKP, VCE, YDB, YHM, and ZIA. The Mike Farad Radio Club, with club station YDX located in the Tech. Rep. Division of the Philco Corp., operates the Mike Farad Traffic Net daily from 12:15 to 1:15 P.M. EST and is on for ragchews every Sat. morning on 3815 kc. Members of the Abington Township ARA presently in the armed services took leave in order to be present for Field Day. RFI came all the way from El Paso, Tex., while PDJ drove up from Baltimore. The newest member of the Club is AUF, the son of QV. He will have a 10-meter mobile unit in his 14-ft. outboard boat. Bill Shaw, ex-3AAD, is back on the air with a Viking 1 and an 8X-71, plus a new call, BUR, FPC, NJS, VNP, and VSC, members of the South Phila. AR Klub, received citations for their work during Hurricane Hazel. AXA reports the date of the E. Pa. picnic will be Aug. 14th. The place, a central location, will be announced later. The Phil-mont Mobile Radio Club is planning a documentary film on its activities. With 25 present it walked off with the prize at the Old Timers' Nite Roundup for having the largest club attendance there! Traffic: (Apr.) W3CUL 656, OK 233, BFF 208, WUE 155, OZV 107, WJL 104, GES 88, DUI 82, YAZ 81, AXA 52, VVV 50, UQL 36, PYF 34, UOE 33, ELI 26, VPY 21, PVT 14, EAN 9, ZBD 9, TTV 8, ABT 5, JNQ 5. (Mar.) W3UOE 35, ELI 25, BES 4.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, John W. Gore, W3PRL—Maryland has at last been added to the list of states now having laws granting the issuance of automobile call letter license plates. This move was initiated originally five years ago and after having been passed and vetoed twice by the Governor, it finally passed again and was signed by the Governor on Apr. 26, 1955. The Law becomes effective Mar. 1, 1956 and provides that call letter license plates may be displayed only on radio-equipped vehicles. Meetings have been held with the Commissioner of Motor Vehicles Office for the purpose of establishing procedures for applications for tags, and a tentative program has been formulated. However, after same has been finalized, information will be sent to all Maryland amateurs for their guidance. YQD discussed "Simplicity and Portability of 220-Mc. Gear" at the Chesapeake Amateur Radio Club on Apr. 25th. UE is looking for stations north and northwest of Baltimore to QNI on MDD C.D. Nets at 1915 EST on 3850 kc. for traffic-handling. ERW now is active on 20-meter phone from Harundale with a new homemade Minibeam. WFP has a new DX-hound Minibeam antenna. MCG made 66 contacts in 25 sections in the CD Party after his return home from three weeks in New Mexico. WV is considering keeping the MDD Net open throughout the summer instead of closing down as usual. WV was one of the Guests of Honor at the recent Old Timers Round-Up in Trenton. The Eastern Shore Amateur Radio Club presented a movie "Basic Electricity — A Must for the Novice" at the Dutch Inn,

Laurel, Del., on Apr. 29th. BKE is looking for schedules, any band, any time. CDQ is looking for instructors for the Washington Radio Club code class, which is going strong. EEB has returned from a trip to South America and visited KV4AH, P2CCJ, and CP7NM. DRD is building a new final for a pair of 4-125As. The Pikesville Amateur Radio Klub has just been formed with the station call CBWV. RV has been busy assembling test equipment for the building project reported last month. BW7 and AKB are temporarily off the air because of moving to a new QTH. PKS has been appointed SEC for the Mid-Del.-D.C. section and WG has been appointed EC for Prince Frederick County, Traffic: (Apr.) W3WG 661, WV 619, WBJ 404, UE 249, MCG 86, COK 83, RV 76, PKC 36, QOS 15, FQ 12, EQK 11, OYX 10, BKE 2, BUD 2. (Mar.) W3ONB 94, MCG 22, HC 18.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2EG—SEC: ZVW, PAM: ZI, Early reports on the April 30th RACES Test indicate high participation and plenty of traffic handled, especially at area level. The Burlington County Radio Club members, under the direction of UA, the Radio Officer and EC for Area 10, installed the equipment at Area 10 Headquarters and manned it during the Test. The Camden County Area was well covered during the test by SJRA mobile units, with EWN directing the net. RG was alternate net control on 3505.5 kc. ZI reports very favorable results in the Mercer County Area. K2CEF is doing a swell job reporting on activities in the Pleasantville-Atlantic City Area. DZU is the proud owner of a Johnson KW. GCP has a new receiver and K2CIR, K2HBA, and W2INI also are owners of new equipment. CEF reports increased 2-meter and s.a.b. interest in Atlantic County. K2HBA had received his General Class license. YRV is heard nightly on the 2-meter traffic net. ATI, Mt. Holly, has a new transmitter. BDA is building a Field Day rig. CFP also is building for the big day. Again DVRA put over a swell Old Timers Nite. JWA is to be congratulated on the swell job he is doing as editor of DVRA News. K2HZR has a new 100-watt rig and reports DX worked in addition to traffic handled. K2CPR has received the Empire DX Award for his efforts. Jack also is an Official Observer. HDW is heard consistently on NJN. Many thanks for the fine reports and for the interest shown in the section publicity. Keep up the fine work, fellows. ORA reports increased activity on 6 meters. Traffic: W2RG 288, ZVW 80, K2HZR 75, JKC 71, W2HDW 24, ZI 21, K2BG 12, W2ASG 11, K2CPR 5.

WESTERN NEW YORK—SCM, Edward G. Graf, W2SJV—Asst. SCM: Jeanne Walker, 2BTB, SEC: UTH/FRL, RM: RUF, PAMs: TEP and NAL, NYS meets on 3615 kc. at 6 P.M. and 6:30 A.M.; NYSS on 3595 kc. at 5:30 P.M.; NYS on 3925 kc. at 6 P.M.; NYS C.D. on 3509.5 and 3993 kc. at 9 A.M. Sun.; TCPN 2nd call area on 3970 kc. at 7 P.M.; SRPN on 3970 kc. at 10 A.M.; ISPN on 3980 kc. at 3 P.M. K2DJN and K2DJO were appointed co-chairman of RAWNY Field Day. K2HZV is spending the summer at Lake Placid. K2CLA says his messages handled should be upped when he gets the 813 perking. UTH has a 20-A s.a.b. exciter. K2CEH has a pair of 820s on 2 meters at 300 watts. The RARA V.H.F. meeting was held at the QTH of ELX. TKO represented W.N.Y. at the 1st annual meeting of the low-frequency RTTY in N.Y.C. A c.d. surprise alert in Erie County saw 80 stations out of a possible 84 alerted in less than one hour. Congrats to SSC for being top man for W.N.Y. in the SS. The wishes of your SCM have been realized with the reactivation of the amateur club in Svrauce and vicinity. The first meeting was attended by 90. Meetings are held at the NMP auditorium the 1st Wed. of each month. The KBT meeting was devoted to Field Day planning. K2BRV is at A.F. Base in South Carolina signing 74 and would like to QSO some of the Lockport, Niagara Falls, and vicinity hams any evening on 7265 kc. after 1900 hours EST. He is operating AF4AFI using a Globe King at 400 watts with a 75-A2 receiver. Corning QRM states that Dan Rosetti of the American Red Cross spoke at a meeting on "What to do with a Barbequed Ham." First aid was required to revive a ham after an inadvertent contact with a 3000-volt plate supply. WS is active on 40 meters. CXM was QRP until another Variac could be installed. K2CQO left for France and expects to be on 20 meters soon. New RAWNY officers are JPE, pres.; KLF, vice-pres.; TAX, treas.; ICZ, corr. secy.; K2DJN, rec. secy. PPL and DVD are having fun with 2-meter walkie-talkies. RARA officers for the coming year are CTA, pres.; PFI, vice-pres.; SNI, secy.; ZHB, treas. RARA Mobile Club officers are K2ACO, pres.; AKM, vice-pres.; ZZS, secy.-treas. The next meeting will be devoted to a transmitter hunt with FTF in charge and YUT doing the

hiding. QAA is on with a 150-watt Heathkit. K2AMZ has a new B&W. K2KQK dropped the "N" from his call. MHU and K2LWF are on 6 meters. The speaker at the Elmira meeting was Maj. Bill Fields. KN2LBS is a new ham in Machias. Traffic: (Apr.) W2RUF 609, BNC 164, ZRC 116, K2HVZ 111, DSR 92, CLA 78, W2EMW 74, OE 67, K2DJN 64, W2GBX 61, K2AMZ 48, W2HKA 48, COB 33, IEP 30, RQF 20, ZIU 15, FEB 13, UTH 10, KN2JVH 2. (Mar.) W2ZRC 82, WS 12, K2JZT 10.

WESTERN PENNSYLVANIA—SCM, R. M. Heck, W3NCD—SEC: GEG. RMs: UHN, NRE, NUG, and GEG. PAM: AER and LXE. The WPA Net, UHN manager, will operate on 3585 kc. at 1830 EST during the summer. ZKY and VEF are Field Day co-chairmen for the Bucktail Amateur Radio Club. TYC worked the YL/OM C.W. Contest with 30 watts. OLB is now K2KZJ. KYK is active on 160- and 75-meter phone. SUL is 10-meter mobile. LEL is on 3.5-Mc. c.w. and 220-Mc. phone with code practice most nights at 2030, 5 to 10 w.p.m. on 223.3 Mc. RMX, on 10-meter mobile, is getting better results with PTU at home trying better 10-meter antennas. ZKY is working out well with 25 watts on 75 meters. The Indiana ARC, using club station BMD, joined with other amateurs in a system of tri-state five-city junior rite match shooting from Grand Rapids, Detroit, Toledo, Pittsburgh, and Indiana, the winners being determined via reports by amateur radio. VKD had fine DXing on Apr. 23rd, getting W4AACW, PY6CO, YK3AZ, ZSOTE, KA2SL, and W4DUZ, plus VK9SP and several ZS stations later that day. The Beaver Valley ARC plans a tour of the Greater Pittsburgh Airport communications, radar, and blind-landing equipment. I.P.J. gave a report on the Toledo s.s.b. meeting. VFR and BFR reported on the Dayton Hamfest. CXX and VFR are mobile. The Cambria County C.D. Net maintained a station. UUY, on the 10-meter defense frequency during the Home Show held in the Johnstown War Memorial Arena. The Broeze Shooters Net, Mon. on 29 Mc. at 8 p.m., has SJK giving code practice for beginners between 7 and 8 p.m. Mon. on 29 Mc. A second station, ZDK, will be on soon with practice sessions on Sat. The South Hills Brass-pounders and Modulators hamfest will be held Aug. 7th at South Park. TFU has been forced to drop his SHBPM newspaper activities. The present staff consists of OMP, QOQ, and ZSP. QNI attended open house at Bethel High School, which has a radio club of its own. WFR visited UJP on 10-meter mobile and in person. NBQ and TTB are on 10 meters. RUX has completed mobile and is on 10 meters with a fine signal. LDB is figuring on adapting his mobile to his truck. VKU is furnishing the truck for the SHBPM Field Day. The Radio Association of Erie has placed its summer hamfest in the capable hands of QPP and NXX. The RAE Field Day will be under the chairmanship of TXZ, assisted by WDK and STK. New calls around Erie are WN3s BUY, BYM, BVR, BVQ, and BQE. The RAE has crystals available for use by the Novices. Traffic: W3NRE 222, LMM 199, UHN 52, GEG 30, KUN 27, NCD 16, SIJ 14, KNQ 13, VKD 12.

CENTRAL DIVISION

ILLINOIS—SCM, George T. Schreiber, W9YTX—Section Nets: ILN, c.w., Mon. through Sat. 3515 kc.; IEN, phone, 3940 kc. SEC: HOA. RMs: BUK and MRQ. PAM: UQT. EC Cook County: HPG. The Chicago YLRL observed its second anniversary Apr. 23rd with an open house for the OM and dedicated the club station, DEQ. The president is SEZ; secretary is GME. Speakers at the dedication were LZ, QCWA pres.; HPG, Fritz Franke; Bill Halligan jr.; and your SCM. More than 85 Novices have been graduated from the QCWA code class, which has closed down for the summer. The class totaled an average of 125 per session. Instructors and examiners were CYD, EVA, and MIK. More than 1000 amateurs are represented by the Chicago Area Radio Club Council, it was announced by President HPG. MD values his collection of old-time photographs representing early amateur radio in the section. EPI would like to see a tri-state (Central Division) c.d. drill and talks it up. UQT, the Central Division Director, gets around visiting clubs and ham gatherings. DO, YWL, CSW, IDA, and VSX made BPL this month. It's the 13th BPL for DO. DKW, formerly of the Starved Rock Club, now has plenty of room for skywires, he writes from Prescott, Ariz., and will be on 40 meters soon. ABS is talking about getting on the air from the new QTH in Rock Island. LIG is enjoying 20 meters after more than a year's absence. K4ATN visited Vice-Director QLZ, ZEN, and many others of the down-State gang. ZEN hopes by this time to have his cruiser launched on the Illinois River. PHE had frequency drift in the rig but eliminated it with the help of IPA. Now he is going to tackle repairs to the beam. FRP has moved his shack into a new trailer home. USI now puts out Official Bulletins on 40, 6 and 2 meters as band activity indicates. IDA now is on s.s.b. and likes the s.s.b. session of IEN each Wed. at 1730. PVD obtained a 35-foot pole for a skywire. SKR is busy trying to eliminate chirp in the BC-459. Novice JZK has a new Globe Scout. New Novice calls are PCB and NST. BA has been busy organizing a back-up net in Belleville for the city police; now the sheriff wants the same thing. HUX has his vertical perking and likes it. Congrats to BRJ and his XYL on the

arrival of a second jr. operator. If it's a contest you are listening to you always hear GDI, while his brother LI hardly ever stirs from 20 meters. Both KJ and BUK now have their kw. rigs going and BUK won his fight with the Evanston village fathers, who finally gave him permission to erect a 60-foot tower. EVA says we insulted him last month when we associated him with a teletypewriter. It's a teleperforator, he says, which sends out dots and dashes. HPI, one of the leading f.m. exponents, was heard on a.m. and working off the frequency of 147.5 Mc. UZ deplores the fact that so many new General Class licensees rush to build modulators. The Cenosis Amateur Radio Assn. gets out an interesting news letter. Officers of the group are MUD, TLE, and UFR. C.d. seems to be picking up. SEC HOA announced the issuance of EC certificates to GLR, BLO, EAD, SAX, VSX, MRT, and NGG, all active hams. NGG incidentally works a police circuit all day for the State Police at Pontiac but still enjoys hamming. Traffic: (Apr.) W9YWL 856, DO 846, IDA 669, CSW 549, VSX 454, AA 243, SMIE 132, QOQ 116, VHD 54, CEB 42, YIX 40, BUK 34, MRQ 29, ZMJ 26, LXJ 22, USI 22, VEY 21, VER 14, CTZ 12, FRP 12, BA 8, PHE 4, STZ 2. (Mar.) W9VSX 203, BA 7.

INDIANA—SCM, George H. Graue, W9BKJ—The Indiana Radio Club Council met at Purdue University April 17th. Delegates from 24 clubs approved plans for a section Field Day Contest with a plaque to the winning club. The agenda for the Central Division Convention at South Bend Oct. 15th and 16th was presented. Those making BPL for the month are NZZ, TT, and JUI. NZZ received the G. E. Co. Hurricane Edison Award for 1954 and also received a plaque from England for traffic-handling for a scientific expedition in the Far North from 1952 to 1954. WWT reports traffic for IFN as 151. EHZ reports CAEN traffic as 35 for 19 sessions. The XYL of SNT is TNW at Stroh. RBX is 2-meter mobile. FJS is the new Vermillion Co. EC. JSV has a code class of 19. N9VAI is new at Rockville. BYN has a new B&W rig. IU has a new Mosley 40-meter beam. BHF made WAS in 5 weeks. N9UBF is new at Elwood. ZGC is rebuilding. AB again is active on IFN daily. WTY is the new station manager of club station AB. RBE is new at Borden with a Viking II. HSG has 6146s in a homebrew rig. NTA reports 50 sessions with a traffic total of 202 for IFN. NTA and GHK took a Cub Scout Troop on a tour to Grassfork Fisheries. PNE has worked 20 countries on 160 meters. BBE finally has his TR-75 working on 20 meters. FHA has a Viking Adventurer. YZO has WAS on 75-meter phone. TT has the new rig working FB. JUJ may be inactive until September. VNV and KDV are on a vacation cruise in the Mediterranean Sea. DHJ now has seven states worked on 2 meters. N9SIX and TDI are new at Jeffersonville. LSJ has a new VFO. N9RYH is new at Peru. ZIB has a new B&W rig. FSA is active on 6 meters. DKR has an RME-55 converter in the car. FWRC is changing the mobile net from 10 to 6 meters, with about 60 units to change over, plus the same number of converters to build under a club project. UDD is heading this change. Traffic: W9NZZ 920, TT 919, JUJ 512, TQC 180, EHZ 138, WWT 120, UQP 96, JBQ 80, WBA 76, TG 62, STC 58, VNV 58, WRO 58, BKJ 57, DHJ 52, ZYK 49, PQA 47, QYQ 37, NTA 35, CTF 33, QR 31, SVL 26, HRY 23, AZF 21, FGX 19, AQR 13, KDV 12, ZRP 12, CMT 11, ACN 10, CC 10, DOK 10, GD L 10, AB 8, PPS 8, ZIB 8, BDP 7, EQO 6, FSA 6, DGA 5, YVS 4, DKR 3.

WISCONSIN—SCM, Reno W. Gotsch, W9RQM—SEC: OVO. PAMs: ESJ and GMY. RMs: LXA, RTP, and UNJ. Nets: BEN, 3950 kc., 6 p.m. daily; WIN, 3685 kc., 6 p.m. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. CCO worked a KL7 and reports he will be leaving for the Navy in October. WN9UBC is new in Plainfield. BTN is running 700 watts to a BC-610. KXA has returned from overseas, and has resumed skeds with OM KJWJ from 3PQT. In the April CD Party RKP made 51,695 points while DIK finished with 29,600 points. IJU built a new Heath DX-100 transmitter. Net certificates (WPN) were issued to CFO, GHJ, GHT, KKK, KKM, and UTN. WYE has a new Harvey Wells Deluxe and is active on 50 Mc. DVM is using a Viking Ranger, NC-183D, Matchbox, D104, and a VHF-152A. 0TLE was guest speaker at NWRC's April meeting. New officers of the WVRA (Wausau) are JBF, pres.; FZC, vice-pres.; CFN, secy.; LED, treas.; RQM, custodian. TSI, ZJZ, YZS, MQC, and IAL of Rhineland, and SJL, YUB, and SQJ, of Minocqua, are new members of WVRA. IAL has a new SX-43 and is new MARS member and OBS. ZJZ operated portable from the high school in a demonstration. WN9MLO has a TR-75 and an SX-42. WN9UMK runs 30 watts to a 616 and S-20R. During the Apr. 15th opening on 144 Mc. LEE worked KPS, EQC, EHX, PPA, AAG, QWT, LJV, GFL, and GDP and heard 4PCT. AFS is back on 7 Mc. with a Globe Scout. FIA and AQN are working 4-Mc. phone. AFS and QGR are looking for former instructors of AACs schools at Trux and Scott. ZNA is building a radio-controlled plane. YNB is scouting for DX on 7 Mc. OJU now has the mobile set for rapid band change. New ECs: AVJ for Ashland and Bayfield Co., and FFC for Waushara Co. VIA and JBF have hand-talkies in operation on 29,620 kc. Plan now to attend the Central Division Convention at So. Bend, Ind., Oct. 15-16. Traffic: W9CXY 504, SAA 251, CCO 139, FFC 108, BTN

(Continued on page 88)

“More Roads to Rome Than One”

SELECTIVITY in the last few years has become more and more of a major interest to the radio amateur, not only from a theoretical discussion but also from a practical operating standpoint, because of the recent advent of at least three manufactured receivers offering a degree of selectivity that was unobtainable at almost any price just a few years ago.

THE theoretical analysis and mathematical tools to develop narrow passband systems are not basically new, having been first presented in text form by Shea in 1929. Shea's original work covered filters only from an electrical standpoint, but from his concepts, others (such as Mason in 1942) have developed low-pass, high-pass and band-pass networks for acoustic and mechanical systems. Today, therefore, the electronic engineer has quite a few choices as to the method of achieving the selectivity requirements of the customer.

IN a theoretical radio receiver, the ideal location for all the selectivity is directly after the antenna and before the first tube of the receiver. As yet, no one knows a practical method of obtaining the required high order of selectivity that is also tunable over a wide band of frequencies. Hence the practical receiver obtains some selectivity in successive stages by variable tuned circuits until the signal is converted to a convenient fixed intermediate frequency at which point the maximum and final selectivity is obtained.

AT the I.F. frequency the designer has the choice of only two basic systems and each is composed of resonant elements: the first — electrical resonance and the second — mechanical resonance. To some it may seem somewhat strange if quartz crystals are used in the filter; the filter should be properly described as a “mechanical filter” as the piezo-electrical properties of quartz actually cause a change in the shape of the filter element and therefore the crystal is mechanically vibrating at some specific frequency.

THE corollary can be drawn that other materials exhibiting similar characteristics, such as the magnetostriction effect, could also be employed as filter elements. However, magnetostriction effect, at present, is used mainly for transducer elements in certain mechanical filters. Certain Ferro-ceramic compounds are useful in filters only because of this magnetostriction effect.

FOR most amateur work it is a practical necessity that the degree of selectivity be varied over a fairly wide range to encompass different modes of transmission and different band conditions. Thus the design engineer is now faced with another decision: Which of the two basic types of filter systems will meet the customer requirements better and still be economically practical? Of even greater importance, which of the two systems is worthy of further research for possible application to amateur receivers and transmitters?

AT the present state of the art the only system whose passband can be varied over the necessary range without complete substitution of a new network is the “electrical.” The mechanical systems offer somewhat better skirt selectivity (for a given physical size) but at a considerable increase in cost and, to change the passband, complete additional filters must be added. Thus, at the present date, it seems that the electrical system is way out ahead from the important cost point.

THE well-known bandwidth formula $BW = \frac{Fr}{Q}$ clearly shows that when Q can be maintained the electrical systems are primarily for low frequencies, 25 to 200 kc. At these frequencies a mechanical filter becomes quite large. For example — some 50 kc. filters that we made were $\frac{1}{2}'' \times \frac{1}{2}'' \times 14''$. At higher frequencies the physical size of mechanical resonating elements becomes so minute that production problems become insurmountable. Thus, mechanical filters employing elements other than quartz are practical at present only in the frequency spectrum from about 250 to 700 kc.

FOR the higher frequencies we have only one alternate to consider, and that is mechanical filters employing the piezo electric effect. Of all the materials exhibiting this effect only quartz has the necessary physical properties, permitting the fabrication of thin, small elements which can be combined into a filter network. The upper frequency limit of quartz filters is quite high and may reach as much as 15 to 20 Mc.

THE fabrication of quartz crystals has progressed amazingly since 1940 and, likewise, the scientific knowledge of the application of quartz elements in bandpass networks. It seems logical, therefore, that further research may soon find methods of obtaining adjustable passbands with one crystal network, thus affording a very versatile new device for the design engineer.

—Fritz Franke *Buelhalligan, Jr.* *W. J. Halligan W9AC* for **hallicrafters**

NOW

a BROAD-BAND* LINEAR

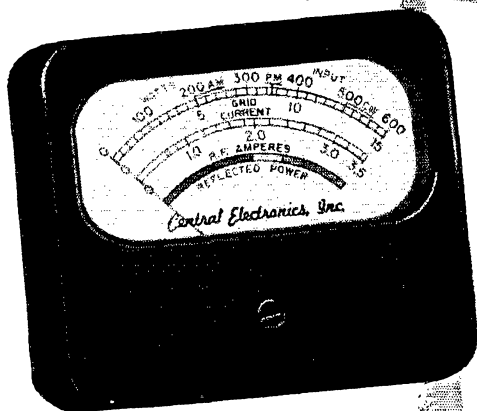
MULTIPHASE
600 L
NO TUNING
CONTROLS

SINGLE KNOB
BAND-SWITCHING
10-160

FOR USE ON
SSB, AM, PM & CW



WIRED, WITH TUBES AND
BUILT-IN POWER SUPPLY **\$349.50**



Another C.E. First!

METER FEATURES NEVER BEFORE
FOUND IN A TRANSMITTER

- Reads power input directly in watts
- Reads grid current
- Instantly reads output in RF amperes — no lagging thermo-couple
- Indicates reflected power caused by mismatched load
- Calibrated input levels for AM, PM and CW.
... and switch the meter to any position while transmitting!

*PATENT PENDING

WRITE FOR LITERATURE

a new concept in linears

CENTRAL ELECTRONICS takes pride in presenting a product of intensive research — the new Multiphase 600L Broadband* Linear. "It is destined to change the entire concept of RF amplifier design in the military, commercial and amateur fields." There are no tuning controls, servos or moving parts other than band-switch.

- Single 813 in Class AB₂.
- New band-pass couplers provide high linear efficiency: 60 to 65%.
- Designed for 50 — 70 ohm co-axial input and output.
- Easy to drive — Approx. 2 watts effective or 4 watts peak drive power required for 500 watts DC input.
- Built-in power supply — bias and screen regulation, 45 mfd. oil filled paper output capacitor. Excellent static and dynamic regulation.
- Extremely low intermodulation distortion.
- Automatic relay protects 813 and RF couplers.
- Excellent stability — complete freedom from parasitics.
- Effectively TVI suppressed — RF compartments thoroughly shielded and Hypassed.
- Choice of grey table model, grey or black wrinkle finish rack model.
- Table model cabinet size — 17 $\frac{3}{8}$ " W, 8 $\frac{3}{4}$ " H, 13" D.

MULTIPHASE

EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave.

Chicago 13, Illinois

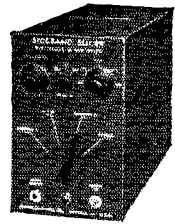
Watch for early announcement of other new
CENTRAL ELECTRONICS
equipment.



MODEL AQ



MODEL DQ



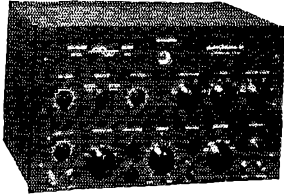
MODEL B SLICER

NEW MULTIPHASE "Q" MULTIPLIER AVAILABLE THREE WAYS

1. It's built-in the new Model B Sideband Slicer.
2. Plug it into your present Model A Slicer.
3. Attractive Desk Model, for installation directly into receiver.

The new Multiphase "Q" MULTIPLIER is a tunable IF electronic filter that provides tremendous receiver selectivity for peaking or rejecting a signal on AM, CW or SSB. It employs a new two tube circuit* with a special very high "Q" pot core inductor. Continuously variable selectivity from 60 cps to normal IF pass-band. Nulls out interfering heterodynes without affecting speech intelligibility. Peak the desired signal; interfering carriers are attenuated up to 50 db.

*PATENT PENDING



MODEL 20A

- 20 Watts Peak Envelope Output SSB, AM, PM and CW
 - Completely Bandswitched 160 thru 10 Meters
 - Magic Eye Carrier Null and Peak Modulation Indicator
- Choice of grey table model, grey or black wrinkle finish rack model.
Wired and tested.....\$249.50
Complete kit.....\$199.50

458 CONVERSION KIT

Basic 458 Conversion Parts Kit, 15 to 160 meters, with dial, etc.....\$15.00
458 Deluxe Case and Panel Kit, matches size and appearance of Slicer...\$10.00

NEW — FOR 10 METERS

MODEL 458-10 xtal controlled converter package to extend 458 VFO into 10 meter band. For use with above 458 Conversion Kits.
Wired.....\$37.50
Kit.....\$27.50

MODELS

MODEL AQ

"Q" MULTIPLIER for installation in Model A Slicer. Includes new front panel. Power-IF cable plugs into accessory socket.
Wired...\$29.50 Kit...\$22.50

MODEL DQ

Desk Model "Q" MULTIPLIER for use with any receiver having 450 to 500 KC IF. In attractive case 5 1/2" W, 4" H, 5" D, with connecting power-IF cable. Power requirements, 225 to 300 VDC at 12 ma., 6.3 V at .6 amps, can be secured from receiver. Can provide added selectivity and BFO for mobile SSB or CW reception.
Wired...\$29.50 Kit...\$22.50

MODEL B

Sideband Slicer, same as Model A Slicer but includes built-in "Q" MULTIPLIER. AP-1 not needed.
Wired.....\$99.50
Kit.....\$69.50

Check These Features NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- New Calibrate Circuit. Simply talk yourself exactly on frequency as you set your VFO. Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- New Gold Contact Voice Control Relay. Extra contacts for muting receiver, operating relays, etc.
- Accessory Power Socket. Furnishes blocking bias for linear amplifier and voltage for optional VFO (Modified BC458 makes an excellent multiband VFO.)
- 40 DB or More Suppression of unwanted sideband.

SIDE BAND SLICER

MODEL A IMPROVES ANY RECEIVER



Upper or lower sideband reception of SSB, AM, PM and CW at the flip of a switch. Cuts QRM in half. Exalted carrier method eliminates distortion caused by selective fading. Easily connected into any receiver having 450-500 KC IF. Built-in power supply. Reduces or eliminates interference from 15 KC TV receiver sweep harmonics.

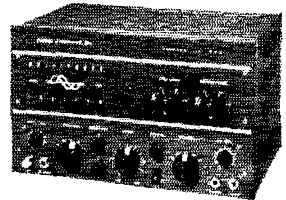
Wired and tested.....\$74.50
Complete kit.....\$49.50

AP-1 ADAPTER

Plug-in IF stage — used with Slicer, allows receiver to be switched back to normal.
Wired and tested, with tube....\$8.50

NEW AP-2 ADAPTER

Combined AP-1 and xtal mixer. Allows Slicer to be used with receivers having 50, 85, 100, 915 KC and other IF systems. One xtal suffices for most receivers. \$17.50



MODEL 10B

SUCCESSOR TO THE POPULAR MODEL 10A

- 10 Watts Peak Envelope Output SSB, AM, PM and CW
 - Multiband Operation using plug-in coils.
- Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.
Wired and tested.....\$179.50
Complete kit.....\$129.50

QT-1 ANTI-TRIP UNIT

Perfected Voice Operated Break-in with loudspeaker. Prevents loud signals, heterodynes and static from tripping the voice break-in circuit. All electronic — no relays. Plugs into socket inside 20A or 10B Exciter.
Wired and tested, with tube....\$12.50

WRITE FOR LITERATURE

MULTIPHASE
EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave.

Chicago 13, Illinois

See Trade Publications on Multiphase "REJUV-A-TUBE" — A New CRT REJUVENATOR



New

Heathkit VFO KIT

MODEL VF-1

\$1950

Ship. Wt. 7 lbs.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical

and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

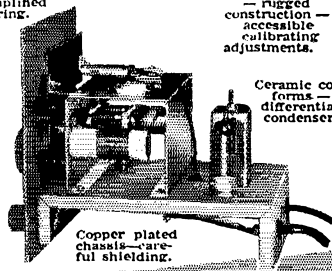
This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mlls. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard 1/4" crystal holder. Construction is simple and wiring is easy.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Open layout—easy to build—simplified wiring.

Smooth acting illuminated dial drive.

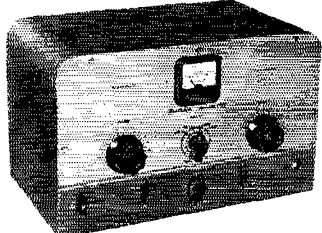
Clean appearance—rugged construction—accessible calibrating adjustments.



Ceramic coil forms—differential condenser.

Copper plated chassis—careful shielding.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

\$2950

Ship. Wt. 16 lbs.

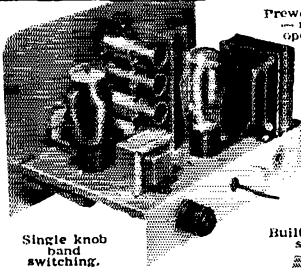
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AC7 Oscillator-multiplier
6L8 Amplifier-doubler
504G Rectifier
105-125 Volt A.C. 50-60 cycles, 100 watts. Size: 8 1/4 inch high x 13 1/4 inch wide x 7 inch deep.

Crystal or VFO excitation.

Prewound coils—metered operation.

Rugged, clean construction.



52 ohm coaxial output.

Single knob band switching.

Built-in power supply.

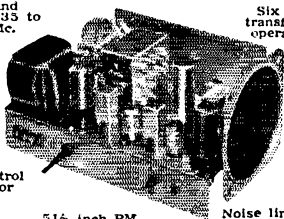
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit. Incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT

Four band operation 535 to 35 Mc.

Stable BFO oscillator circuit.

RF gain control with AVC or MVC.



5 1/2 inch PM Speaker-Headphone Jack.

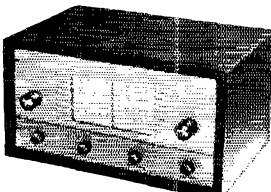
Six tube transformer operation.

Electrical bandspread and scale.

Noise limiter—standby switch.

SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 Mixer-oscillator
12BA6 I. F. Amplifier
12AV6 Detector—AVC—Audio
12BA6 B. F. O. oscillator
12AE6 Beam power output
5Y3GT Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.



MODEL AR-2

\$2550

Ship. Wt. 12 lbs.

CABINET:

Proxylon impregnated fabric covered plywood cabinet. Shipping weight 5 lbs. Number 91-10, \$4.50.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

HEATH COMPANY
BENTON HARBOR 9, MICHIGAN

New HEATHKIT DX-100

PHONE AND CW TRANSMITTER KIT



MODEL DX-100

Shpg. Wt. 120 lbs.

\$189.50

Shipped motor freight unless otherwise specified. \$50.00 deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_p Final I_c, I_p, and E_p, and Modulator I_p. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20 7/8" W x 13 3/4" H x 16" D.

Heathkit

GRID DIP METER KIT



MODEL GD-1B

\$19.50 Shpg. Wt. 4 lbs.

The Invaluable Instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasites, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

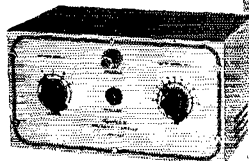
Covers 80, 40, 20, 11, 10, 6, 2, and 1 1/2 meter Ham bands. Complete frequency coverage from 2-250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at \$3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial

with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit

ANTENNA COUPLER KIT



MODEL AC-1

\$14.50 Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 86 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

Heathkit

ANTENNA IMPEDANCE METER KIT



MODEL AM-1

\$14.50 Shpg. Wt. 2 lbs.

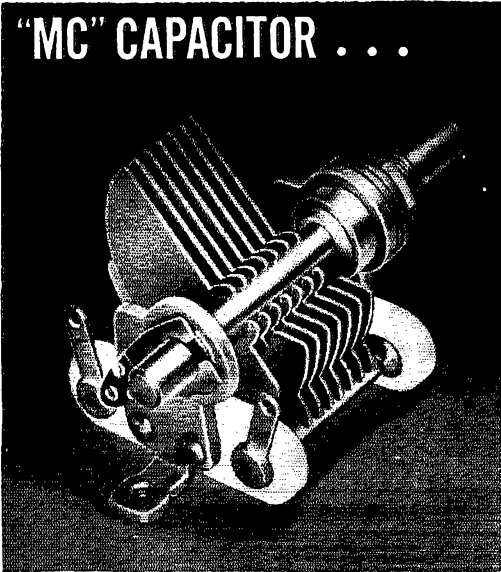
Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 µa. meter employed. Covers the range from 0 to 600 ohms. Cabinet is only 7" long, 2 1/4" wide, and 3 1/4" deep. An instrument of many uses for the amateur.

HEATH COMPANY

A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 9, MICHIGAN

"MC" CAPACITOR . . .



Offers Wide Choice of Characteristics!

The "MC" is a versatile single-section tuning capacitor designed to give a choice of mountings, connections and capacity characteristics. The threaded brass front-bearing and tapped aluminum end-brackets permit panel or base mounting. A rotor stop permits 180° clockwise rotation for increasing capacity. For optimum performance all Hammarlund "MC" capacitors have silver-plated beryllium copper wiping contact, silicone-treated steatite insulation, soldered nickel-plated brass rotors and stators. The rotor shaft is supported on bearings at both front and rear of capacitor. "MC's" are available with capacities ranging from 5.5 mmf. to 320 mmf.



The Hammarlund Capacitor Catalog lists the complete line of standard capacitors sold by responsible dealers from coast to coast. For your free copy, write to The Hammarlund Manufacturing Co., Inc., 460 West 34th Street, New York 1, New York. Ask for Bulletin C-7.

HAMMARLUND

(Continued from page 70)

92, RTP 64, IXA 47, SZR 41, KWJ 34, GMY 24, RQM 10, UTV 15, UIM 14, YZA 10, DIK 9, BVG 8, IJU 5, AEM 2, RKP 2.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, J. W. Sikorski, W0RRN — Asst. SCMs: Earl Shirley, 2YQR, and Martha Shirley, 2ZWL. SEC: GCP. PAMs: GDE, BNA, NEO, and PRL. RM: SMV. More than 50 amateurs and civil defense officials met at Mitchell Apr. 17th to make plans for amateur participation in emergency communications. QXC was elected State Amateur Radio Officer and a committee consisting of GDE, PRL, RRN, YOB, GCP, HYQ, and DKJ was appointed to assist him in emergency planning. SMV is trying out a vertical antenna. KXZ signed 5 new AREC members and an Assistant EC for Brookings County. The South Dakota Convention, sponsored by the Prairie Dog ARC, is scheduled for Sept. 3-4 at Yankton. Prizes, in order of scoring, in the second annual SODAK QSO Party were won by PRL, RMK, GDE, TAS, SCT, BNA, IUK, DIY, TYC/b, ZWL, NWM, MZJ, and CTZ. Ray Isechka, ex-40IQ, is operating 14 Mc. from Greenland as KG1FR and DTB, operating as CN8GN, wants akeds with South Dakota. Net calls: KN9AOR, and KN9ACX. Net reports: N1Q Net, average QNI 20, traffic daily average 4.5; 8L75, total QNI, 1196, traffic daily average 8; 150 Net, April 1-15, QNI 152, traffic 13. The 160-Net has suspended operations until Oct. 1. Traffic: W0SMY 153, GDE 114, GCP 55, SCT 44, BNA 28, BQH 27, RRN 11, AXD 9, RSP 4.

MINNESOTA — SCM, Charles M. Bove, W0MXX — Asst. SCM: Vince Smythe, 0GGQ, RM: DQL and KLG. PAMs: JIE and UCV. The St. Paul Radio Club held its annual election. Results were: TRD, pres.; LPX, vice-pres.; PAK, secy.; and EUW, treas. After a nice trip along the California Coast QNY and his XYL returned full of vigor and set up a new net to cover Northern Minnesota. It is to be known as the Koochiching Emergency Net and meets Thurs. evenings on 3930 kc. for traffic and emergency drills. This will make a total of nine nets operating in this section. The Marshall Hamfest sure was a big success with an attendance of over a hundred hams from Minnesota and the Dakotas. Principal speakers were Division Director PHR, SEC GTX, and Civil Defense Director Mathies. TLE gave an excellent talk on s.s.b.c. with demonstrations on its operation. URQ displayed some of his emergency transceivers that he had written up in one of the trade magazines. KJZ says the YLs are planning a YL net on 3838 kc. to meet at 11:00 A.M. on Tue. It will be called "The PI Net." BUO has built a 5BP1 into his rig for a modulation monitor. The Single-Sidebanders had a big day at Willmar with a big dinner and plenty of speakers. According to SW the only way to get the greatest occupancy of the existing bands is to operate s.s.b. VBD has a new wired and TVI-tested Viking II on the air. QDP built a two-element beam for 15 meters. 7RNV has been mobilizing in the State and has been working a lot of the gang. TQQ is back home after a three-month vacation in Hawaii. MXC and his XYL attended a Hawaiian mobile club meeting while out there. The KH6s use 40 meters on their mobile hunts. CO has a new 75-A4 and is chasing 10-meter DX. LUX built a new four-element beam for 20 meters. Traffic: W0KLG 228, MVH 159, KEL 139, QDP 130, WMA 116, DQL 97, TKX 89, IRJ 71, KJZ 67, KFN 62, TUS 55, MVJ 52, RVD 46, HGW 45, GTX 36, MBD 34, UCV 32, LST 28, HUX 27, RLQ 27, LUX 23, OSJ 17, IKJ 14, UKY 14, VBD 14, BUO 11, KNR 11, FCU 10, TOK 8, OPA 7, MXC 6, PUO 6, LIG 5, QVR 5, VOA 5.

DELTA DIVISION

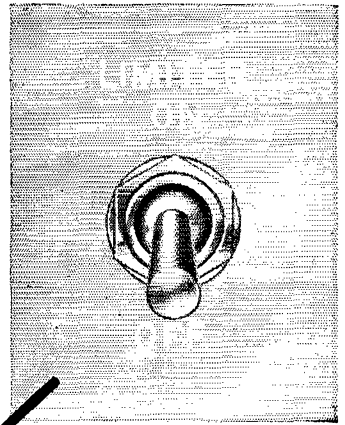
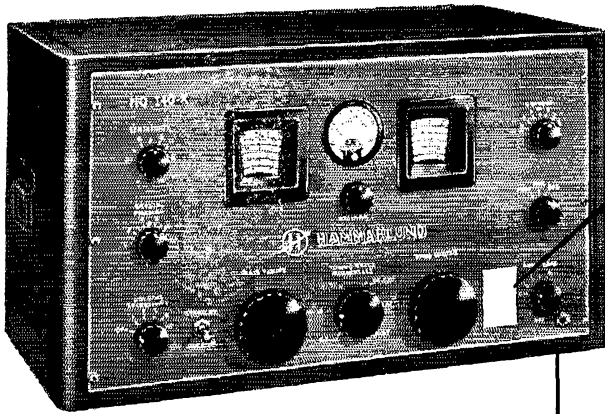
ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — New appointees are VAN, CAF, and MU as ECs; JZL and WUN as ORS; and TIA as OES. YHT writes from Germany that he is in the Air Force Signal Corps operating DLATA with 500 watts on 20 meters, usually on 14,190 or 14,310 kc., and hopes to hear some of the gang. YZI reports his code class at the Ozark Academy is about ready for the Novice Class examinations. Both the c.w. and 'phone nets are getting along in fine shape, so get your traffic on 3790 or 3810 kc. and we can put it almost any place. Gang, let's have more news. Radio clubs, please appoint a reporter to send in the news. Traffic: (Apr.) W5CAF 64, 8XM 47, WUN 44, FMP 23, PX 3, JZL 2. (Mar.) W5SXM 26.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — A single-sideband dinner was held at Baton Rouge with ABS, ACS, DLA, EKY, DGB, GXO, KC, IMT, VEU, SUM, HHT, LFF, UKQ, MWP, MUG, NOH, ZNI, Z8F, and 9NMI/5 attending. All were presented "3900 Club" certificates and are charter members. The picnic on Sunday, with an attendance of 250, was highlighted by many activities, including a meeting of all ARRL CD appointees. TKV and RRO are new ECs. FKA, now OPS, is the Mayor of Lindsay. SQJ made WAS and WAC. NG, our RM, is trustee for the University High RC. He is busy building an 813 p.p. c.w. final. VIC's jr. operator took the Novice Class exam. UGJ now is an OPS. MXQ is the proud owner of a PE201. UGJ is going mobile. PQD wants to trade a tri-band for a

(Continued on page 84)

THE HQ-140-X...

**KEEPS NOISE OUT!
KEEPS SIGNALS IN!**



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The extras show up in performance. In addition to a low noise level, the HQ-140-X receiver gives you:

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EXTREME SELECTIVITY—sharp signal separation even in the most crowded bands.

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The HQ-140-X is available either as a cabinet model, or for rack-mounting. For complete details, write to The Hammarlund Manufacturing Co., Inc., 460 West 34th Street, New York 1, N. Y. Ask for Bulletin R-7.



HAMMARLUND

SINCE 1910

2-meter Gonset converter. KSI, ex-K6AFW, is on 40, 20, and 15 meters looking for W6 buddies in Southern California. New mobiles in Lake Charles include DOE, UGJ, GFA, and ZAK. ARG, ARH, and ARI are new KN5a. APH is rebuilding the rig to high power. BWZ is building a new ham shack. IIQ is a new ham at Hackberry. BMK hopes to have a new LX-100 on the air before long. The S. W. La. Emergency Net held a picnic hamfest the first part of June. ORS, OPS, EC, OO, and other appointments are open over the entire State. Drop a line to the SCM, RM, or PAM for details and applications. Thanks for the reports and keep them coming. Interest is rising in emergency communications and nets. Several good emergency nets are now in operation and a few more are getting started. Traffic: (Apr.) W5NDV 219, MXQ 149, FA 98, NG 86, SQI 18, UGJ 10, YDC 6. (Mar.) W5KRX 180, NG 133, NDV 49, SQI 6, VIC 6.

MISSISSIPPI—SCM, Julian G. Blakely, W5WZY. SEC: PFC. RM: WZ. PAM: JHS. MRN-NCS: IGW. The EC program still is under way and applications are being processed each day. A few of the active ECs are: W5OTD, VQE, EWE, KYC, IHP, LFG, DAT, VME, NYO, ZNY, WZZ, YBH, KNA, AKM, GG, DT, RLP, NPO, JJA, ART, and FKS. The Mississippi Rebel Net has a few openings to give more complete coverage. Check in with IGW at 7 p.m. on 3785 kc. daily. The Interstate Net, with EWE as NCS, still is doing business, with 135 stations checking in this month. Congratulations to 9APY/5 on winning the section award for c.w. in the last Sweepstakes with 72,371 points. ONL/5 followed right behind with a score of 35,105. Both ran less than 100 watts. WZY claimed the section phone award with 14,000 points. EWE has joined the mobile ranks. WZ has a new transmitter on the air. RIM really clears the frequency with his kw. IGW is running high power, 400 watts complete break-in with a heterodyne VFO. Traffic: W5IGW 197, EWE 145, VME 109, YFJ 105, JHS 50, EDE 48, WZY 36, KYC 24, RNB 23, RIM 15, YBH 11.

TENNESSEE—SCM, Harry C. Simpson, W4SCF. SEC: RKKV. PAM: PFP. RM: WQW. PHQ announces that a Bull Throwers Award will be given to the Hillbilly Net member making the highest score in a 3-month period. The Bays Mountain Club is going strong. TYU received a GE Hurricane Citation. VNE received his DXCC, his third postwar DXCC (others were overseas stations). UWA sends a nice bulletin from the Cookeville ARC and reports the Upper Cumberland Net has been discontinued. SGU, WXLL, ETL, APD, UWA, BER, WIJ, ZJY, and BWQ had a Field Day dry run. PVD visited NJE and VJX. WOX and YRI have a new a.s.b. rig. WQT demonstrated a Sideband Slicer to the Clarksville Club. CVM worked 130 stations in the CD Contest before becoming ill, but WQT upheld the tradition by rolling up 69,750 points. After having been General Class only 60 days, K4ACG already had 20 countries. W8RUW/4 has shipped out to Germany. KFK and MSZ are going RTTY on 80 and 40 meters. RN5 Mgr. OGG reports 50 sessions with 12.5 QTC average. TDZ says the Chattanooga 10-meter Net is going nicely. UIO is building a 75-meter mobile which will QSY the entire phone band from up front! UOA and DZW had an exhibit at the Science Fair at Vanderbilt. PRY has resigned as NCS of the Davidson County 10-meter Net. OEZ has announced DMU will be the replacement. The Humboldt ARC has received its ARRL charter of affiliation. CLS is president. IGW secretary. HQM and WCI are building 10-meter mobiles. Another new affiliate is the Watauga ARC. Johnson City, whose secretary, KN4ARZ, announces that club meetings are held the 2nd and 4th Mon. During the Memphis flash flood LVW and FRB used their boats for evacuation. BAQ, UDL, BCA, DCH, CRP, DIX, PKI, SCF, BAO, AFB, WTI, JU, and IQX assisted with traffic and reconnaissance. Six-meter activity is looking up, with HHK, 9FFF/4, FGG, NMM, YEL, BAQ, PJG, and VDW either on the air or in the process. His many friends will be sorry to hear of the death of BYN. Traffic: W4PL 1095, OGG 671, K4FEU 539, W4TYU 319, IIB 104, TJD 97, PFP 94, YMB 82, HIB 63, WQW 63, SCF 59, VJ 41, SJ 33, CXY 25, UV 25, UOA 22, VNE 20, RRV 19, RMJ 16, BZQ 16, UVS 15, UVP 12, NDC 10, YPG 8, HUT 7, SON 5, TIE 5, YXA 5, DCH 4, LRO 2, TDZ 2, ARZ 1, CLQ 1, DMU 1, IGW 1, KFK 1, PVD 1, RHK 1, UIO 1, WOX 1, WQT 1, YRI 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert E. Fields, W4SBI—SEC: CDA. RM: KKW. Acting PAM: NIZ. The newly-organized KPN (Kentucky Phone Net) shows the following statistics for the month of April: Average number stations per session, 19,833; average messages handled per session, 4; total number stations participating, 595; total messages cleared, 121; stations participating, 50 per cent or more, 13; 20 per cent or more, 23; 10 per cent or more, 34. Activity for March of the KYN (Kentucky C.W. Net) shows these figures: 75 sessions; traffic total 310, with an average of 4.01 per session; 48 active stations. ZDA and ZDB make up an OM-XYL team on the KYN as both are NCS. BAZ is working on plans to get Kentucky's first RACES net started with civil defense in Frankfort. JUI has been working 20-meter DX lately. WNH is mobile on 80, 40, 20, 15, and 10 meters. According to JHU, the Logan County Novice Net has been changed to the Kentucky Novice Net (KYNN).

All Novices in Kentucky and surrounding states are cordially invited to participate. Stations which call into the net will be put on the roster and later sent a copy of the roster. The net time is 2 p.m. CST each Sun. on 3735 kc. Traffic: W4KKW 207, NIZ 128, SBI 112, ZDB 56, RPF 48, CDA 44, ZLK 43, QCD 42, SUD 40, ZDA 36, JHU 28, K4FAV 21, W4LXA 18, BAM 15, SZB 12. OMW 9, JUI 4, WBD 4.

MICHIGAN—SCM, Thomas G. Mitchell, W8RAE—Asst. SCMs: Bob Cooper, 8AQA (phone); Joe Beljan, SSCW (c.w.). SEC: GJH. New appointees are AIJ as OPS and HFA as OES. Congrats to both. The Allegan V.H.F. Picnic date has been changed to Aug. 14th. Fewer stations reported traffic this month, but our total is about the same as for March. The biggest news for this report is that the Michigan ComPlan for RACES has just been approved by the FCC and FCDA. This plan has been in the works for five years and represents the efforts of our SEC and his associates over that period. Our thanks to them for the work to date, but the job of forming a working RACES organization requires the support of stations in this section. To all who have been waiting and wondering what we in Michigan are doing about our role in c.d., here is your chance to offer your services and become RACES licensed stations. Remember, in the event of an emergency, only RACES licensed stations will be allowed to operate. Register via AREC registration forms, which are available from this office or from any EC. As yet, the ComPlan has not been coordinated with the Michigan Office of Civil Defense (MOCD), but this work is in process and printed copies will be circulated through the AREC organization to all concerned. TBP and TIC both report EC activity continuing in the Muskegon Area. FX, still waging war on demon line noise, is longing for a rural QTH like HKT's. IUJ is back after his operation, as his traffic total indicates. AQA is the new vice-chairman of his AIEE section and is very QRL. PHM is going into MARS work and PHA regrets that he can't use his MARS traffic totals on the Form 1 reports. WOX has been QRT overhauling the rig and rebuilding the antenna that "went with the wind." NUL's new buffer stage puts him up in the 35-watt class and PDF is QRP because of loss of his final plate transformer. Traffic: (Apr.) W8NOH 320, PHA 243, NUL 172, SBRK 165, ILP 152, IRO 119, IBB 93, DAF 87, ZLK 85, NTC 66, FX 65, WVL 65, DLZ 58, SJF 58, SWG 51, QJX 40, QOO 37, HSG 34, IUJ 33, RAE 30, IV 29, ZHB 21, AQA 14, PHM 14, PDF 12, SCW 9, HKT 8, MGQ 8, INF 7, AUD 2. (Mar.) W8TBP 11, INF 7, WOX 7.

OHIO—SCM, John E. Siringer, W8AJW—Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 80VG. SEC: UPB. RMs: DAE and FYO. PAMs: EQN and HUX. JDN and JHH are new OFOs. On Apr. 30th the OCARC met in Columbus. The Council will award both club and individual trophies in future ARRL DX Contests. Officers elected were HNP, chairman; GQ, vice-chairman; VHO, secy.; and AL, treas. DAE makes BPL for the third successive month, the fourth Ohio amateur to qualify for the BPL medallion. EQN, OCARC Contest Manager, reports the following scores in the Ohio Intrastate QSO Party: AJW-7295, JHH-4300, MEI-2210, JDN-2040, PIJ-1564, TAQ-1218, VTR-936, EQN-561, MQQ-345, AL-336, HUX-320, BTW-288, LGY-272, JDK-240, RO-198, DAE-150, JSV-130, BEW-130, GHT-60, DCJ-42, FRD-40, YPP-16, THJ/M-12, CRA-9, IFX-4, EPB-1. The unofficial club winner was Forest City with 7643 points. We deeply regret the death of HIF, EC for Lucas County and Asst. C.D. Communications Officer to HNP in the Toledo Area. The Springfield Radio Club has become incorporated. On June 12th the Tusco group held a mobile roundup and summer hamfest at Dover Fairgrounds. Amateur Radio Week in Ohio, as proclaimed by Governor Lausche, is scheduled to include ARRL Field Day week end. The old-fashioned hamfest of the Findlay Radio Club will be held Sept. 11th. The Dog House Net elected PGQ, pres.; TJD, vice-pres.; CRS, secy.; and HUX, treas. On April 17th the Toledo Mobile group conducted a successful scrap drive to help defray the high costs of Field Day. New Novices in the Dover/New Philly Area are VXA, VTR, WFE, WFL, and WMI. HNP was instructor in radio and communications at the Camp Perry C.D. meeting on May 14th. K8FAD is the call of the Wright-Patterson AFB Radio Club. GDQ, of 160-meter DX fame, was appointed Lorain Co. c.d. amateur radio operator. The Lorain Co. Amateur Radio Assn. elected LCE, pres.; OYN, vice-pres.; VMD, secy. Medals were awarded AJW and BF, CWA horseshoe-pitching champs, by JNF. The Intercity gang elected HTO, pres.; OZZ, vice-pres.; and QXD, secy. May QST reported HPP as having a romantic interest. This was a tremendous understatement as she has been elected queen and sweetheart of the Lockbourne AFB. The OVARA *Ether Waves* reports that a picnic is scheduled for June 12th. GCARA's Mike & Key informs us that twenty 10-w.p.m. code certificates have been issued to the present code class. According to its good bulletin *Key Klix and Feed Back*, the Hocking Valley Radio Club is building up the club treasury by a project of raffing off fishing gear. Dayton's *RF Carrier* informs us that 6-meter activity is gaining in the area with HOH, INQ, and NEE leading the way. RCJ advises that PTS is in charge of a new code and theory class for the Lake-

(Continued on page 86)

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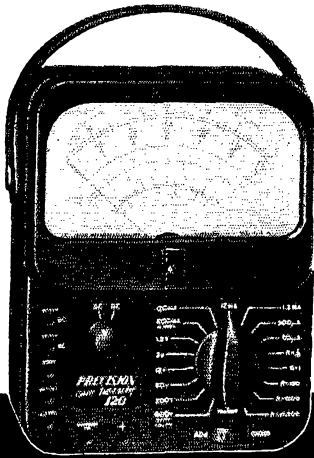
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Geauga Club. Hamilton's *Feedline* states that OFL was chief speaker at the last meeting. The Club meets the 1st Fri. of each month at the YMCA. Springfield's Q-5 informs us that the annual banquet was a screaming success with Gen. Mgr. Budlong, Director Brabb, and UPB, the SEC, in attendance. This group meets at the local YMCA. Write DCJ for particulars. Toledo's *Shack Gossip* reports RZV passed his General Class exam; TTY moved from Perrysburg to Toledo and new Toledo Radio Club officers are BIQ, pres.; BN, vice-pres.; RZQ, rec. secy.; RBX, corr. secy.; and RZM, treas. The Columbus *Carascope* relates that WAB, former CARA member, is proxy of the Tiffin Club; JUM has been working mobile from Harrisburg, Penna.; and TSE has gone mobile. Northeastern Ohio's *Ham Plashes* tells us that WHF, WJP, and WNR are Novices at Greenford School; CYN, of Garrettsville, recently passed away; CMS has made WAS on 6 meters; JW is the 75-meter phone DX man in the area; and ZFZ is Nile's standout DX man on 15 meters. The Ohio Phone Net meets at 5:00 P.M. EST, Mon. through Fri. on 3860 kc. HFP is NCS. The Ohio Council of Amateur Radio Clubs wants all clubs in the State, affiliated or not, on its mailing list. Send club name, officers' names, date of annual election and meeting night dates to HNP, council chairman. Traffic: (Apr.) W8FYO 461, DAE 250, UPB 190, MVJ 151, ARO 98, IIR 78, AMH 56, MQQ 54, IFX 51, HNP 50, AJW 46, ZAU 44, RO 42, IJH 37, LZB 34, HPP 24, AJH 20, QXH 18, TLW 12, LMB 11, GZ 8, HUX 8, ET 7, MGC 8, QIE 5, BF 4, EQN 4, HFE 4, LGR 4, ABO 3, BLS 3, VTF 3, AYR 2, CRA 2, DG 2, MBI 2, KXN 1, VUS 1. (Mar.) W8MVJ 81, WAV 22, PBX 7, QXH 7, DL 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC: RTE, RMs: K2BJS and W2TYC. PAMs: GDD and IJG. The E.N.Y. Council of Radio Clubs is now in full operation. The first official meeting was held at the Nelson House in Pok on Apr. 16th and the following officers were elected: ILL, pres.; GTC, vice-pres.; K2DRV, treas.; and EFU, secy. Delegates from 60 per cent of the E.N.Y. clubs attended as well as many guests, including Director Cooke, OBU. Plans are under way which will be of much benefit to all of our member clubs. All interested clubs should write the Council secy. for information. EC WWK has recovered from a recent illness and reports that the Schenectady Co. AREC Net meets every Sun. at 1400 on 3950 kc. Section Net certificates were awarded to K2s DKM, DXP, BBJ, GOB, and EKE for activity on NY-SEPTN. K2EDH has a new beam on 14 Mc. plus a new wire for 3.5 Mc. Jon is an ORS and is very active. K2HVN is active on NYS (3925 kc.) and the Tuckahoe C.D. Congratulations to AARA on the publication of *B Plus*. The bulletin contains much useful information and news. K2BNI is the editor. Club officers are ONE, pres.; GPC, vice-pres.; KN2HQI, secy.; and K2CT, treas. RTE and ILL each received a citation awarded by the Edison Committee for activity during the hurricanes of last year. New officers of the HHRL are AAD, pres.; K2DRN, secy.; K2AVZ, treas.; and OIT, act. mgr. MHE is a proud papa for the fifth time. It's a girl. A good club member pays his dues and thus supports his club. Let's all keep our clubs alive and be good club members. New officers of the RVWARS are EYG, pres.; JKJ, vice-pres.; BEC, secy.-treas. The Club is planning many interesting activities. Traffic: K2EDH 120, EHI 33, W2LRW 26, K2EKE 22, HJX 20, W2EFU 16, K2HVN 15, ETU 11, W2ANB 5, K2BE 2.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Asst. SCM: Harry J. Dannals, 2TUK, SEC: ZAL PAM: NJL. RMs: VNJ and LPJ. The new PAM replacing JZX is NJL. Vi had to relinquish the PAM post because she and the OM, JDG, are moving to New York City. VNJ is anxiously looking for business on NLT (3710 kc.), the section slow-speed training net. LPJ could use an NCS on 2RN for the Mon. and Thurs. late sessions. Most AREC and RACES nets were active for the April 30th drill. DSC, with operators JOA and K2s BJS and EOF, relayed from NYC phone nets to NYS c.w. nets with simultaneous-operated rigs. K2DDU is sporting a new NC-183. K2ECN's new 300-wattier is doing a fine job. K2HYK has new Viking II and VFO. VDT built a new antenna tuner for his B&W 5100. LGK's jr. operator passed the Novice exam and is awaiting his call. IYS completed his "Ultimate" key. PF reports that the Radio Club of Brooklyn, founded in 1919, is the oldest amateur radio club in New York. Officers of the Club are PF, pres.; CCD, vice-pres.; BKP, secy.; AAZ, treas. AOD uses AX9903 finals on 144 and 435 Mc. MDM now has a 40-meter ground plane. K2GWV finished the new transmitter using a pair of 1825s. GXC has joined the 2-meter ranks. Ditto AEE for the first time in its 41-year history. LG, one of the Tu-Boro Club's charter members, now is on 10 meters. AZY is the latest addition to the Tu-Boro caravan. K2AED has completed a 2-meter converter. '55 officers of the Mid-Island RC are JBQ, pres.; KTF, vice-pres.; STG, secy.; and AZT, treas. K2KXZ dropped the "N." Ex-K2GSZ now is KP4ICI and is looking for NYC-LI friends on 10-, 15- and sometimes 20-meter phone with his Ranger and 220-ft. Vee. KN2LDL has the rig set up in his office. WCR, the V.H.F.

(Continued on page 88)

Introducing...

the Eimac

4X250B

Radial-beam power tetrode

- Higher Power
- Easier Cooling
- Longer Life



ACTUAL SIZE

4X250B, a new, superior radial-beam power tetrode by Eimac—originators of the famous 4X150A—is now available. Unilaterally interchangeable with the 4X150A in practically all applications, this amazing new bantam for modulator, oscillator and amplifier application from low frequencies into UHF, offers these advantages:

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niques in grid production, high vacuum out-gassing and product evaluation are among the features that insure uniform incomparable quality and more hours of top performance.

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(per tube, frequencies to 175mc)

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D-C Plate Voltage	2000v	1500v	2000v
D-C Screen Voltage	250v	250v	350v
D-C Grid Voltage	-90v	-100v	-60v
Zero Sig D-C Plate Current	—	—	50ma
D-C Plate Current	250ma	200ma	250ma*
D-C Screen Current	12ma	10ma	5ma*
D-C Grid Current	22ma	23ma	0ma*
Peak RF Grid Voltage	114v	125v	60v*
Driving Power	2.5w	2.9w	—
Plate Power Input	500w	300w	500w*
Plate Power Output	400w	240w	325w*

*Maximum Signal

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MODEL VPA1015-2	2 El. 10, 11 or 15 Meter Beam. (formerly \$49.95)	NOW \$39.89
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Increased sales volume, permitting more advantageous raw material purchases and the use of more efficient production methods, make possible these new low prices. The practical, rugged designs and careful workmanship have won world-wide recognition for MOSLEY "V-P" Rotary Beam Antennas. These qualities — despite reduced prices — will be constantly improved!

Ask your favorite Ham Equipment Supplier or write direct for Free copy of MOSLEY Catalog H-55.

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Institute station, soon will be heard on 220 Mc. K2GHS is spending a lot of time with the new HQ-140X. The Five Towns RC has elected the following officers: BFN, pres.; K2EWB, vice-pres.; K2CFF, secy.; and KRP, treas. KN2KRJ is working for WAS award. Another "ham" family is OM K2HZC, XYL KN2LUS, and jr. operator KN2LUR. K2JNE dropped the "N." RZH is back on 20 meters again. The Levittown RC has a new Communicator and an HQ-129X. JVO demonstrated his s.s.b. to the North Shore RC with a KH-6-Land contact. LR soon will be heard as DL4LR. New members of the NYRC are K2s HVM and JVB and KN2LYV. A new call at HJ is KN2LYC. GG added 4-400 A linear on 20-meter s.s.b. WFL has a new Viking Ranger. The Chamaine HS RC boasts more than 50 members. The Fieldston School Radio-Electronics Club uses an AT-1 and a RC-348N. The Humlinger Net, a training net, meets on 7220 kc. at noon with PEQ as NCS. 1RTV/2 now is K2MQV. YHP added 4 new states in the recent 2-meter opening. DBI is leaving for overseas. Traffic: (Apr.) W2LFF 594, AEE 386, VNJ 331, JOA 280, MUM 110, OME 69, K2CRH 47, ABW 41, W2DSC 38, GQX 34, K2BYK 30, W2GXC 23, YDT 20, K2GHS 18, W2LCK 18, K2AMP 14, DDU 13, W2IN 6, IVS 5, PF 5, TUK 4, K2CMV 3, W2EC 3, (Mar.) W2GXC 86, AEE 16, LCK 14, HJ 8, AZS 7, K2BAH 5, HYK 4, DVT 3, AED 1, (Feb.) W2LZX 4.

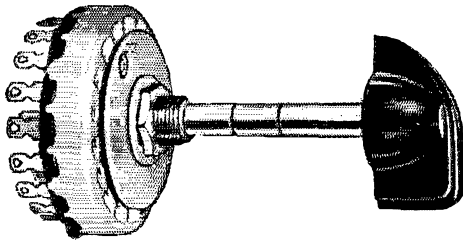
NORTHERN NEW JERSEY — SCM, Lloyd H. Mannon, W2VQE — SEC. IIN, PAM: CCS, RMs: NKD, CGG, and EAS. K2EUN is off the air because of antenna trouble. CXW completed his 740th QSO with G6BY. He has been keeping skeds with G6BY since November, 1950. K2EUN is leaving the section soon and will next be heard from W5-Land. KN2LVZ had his shack attacked by squirrels. Result: one speaker cone and one output transformer are no longer with him. CCS needs more New Jersey 75-meter phone stations in TCPN. 3970 H daily from 1900 to 2000 hours EDT. How about some of you fellows lending a hand? It will be sincerely appreciated. VYB is out of the Navy and on the air again. CFB is busy lending a hand to prospective new hams. Harry asks that anyone in his area, which includes towns adjacent to Toms River as well, who is interested in getting started in amateur radio see him at any time for instruction. CVW soon will have a new QTH in Sayreville. KN2IVJ and KN2EVJ passed their General Class exams. WFK is about to move to Boston. The Irvington Radio Amateur Club Auxiliary reports great progress since its organization a few short months ago. All YLs and XYLs in the Irvington Area are invited to attend meetings. If interested, contact Debbie Klarfeld at Hillside, Tel. WA 6-4642. QLF has a brand-new XYL. Mr. & Mrs. have established their residence in Jersey City. Northern New Jersey Novices active on 80 meters are KN2a LRF, KJT, LSX, JIA, and JXL. KN2KHZ is quite the DX man and keeps the Globe Scout list busy these days. ZPD again is congratulated on his endless hours of work in the RACES program in Bloomfield. K2DHE temporarily is QRL. It looks now like the wedding bells will ring for him very soon. NIE is getting the antennas in his back yard all fixed up after a long winter's work. GUM and his new Ranger sound great on the air. It's good to have him back with us. K2ICE is going great on 144 Mc. with his two towers and his horizontal and vertical arrays. Traffic: (Apr.) W2EAS 234, CQB 196, K2EUN 127, GFX 84, DSW 74, W2PPI 47, K2BWQ 40, KN2IVZ 33, K2EQP 30, W2CXW 25, CCS 24, HXP 15, CFB 6, VYQ 5, CJX 4, NY 3, CVW 1. (Mar.) K2EUN 74.

MIDWEST DIVISION

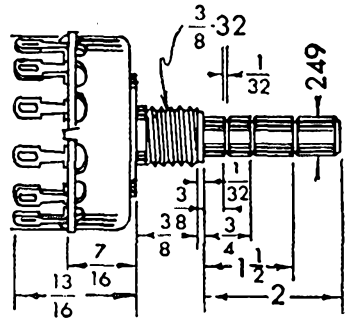
IOWA — SCM, William G. Davis, W0PP — By the time this report appears BDR will be your new SCM. Please give him the cooperation you have always given me. The officers of the Iowa 75 Phone Net for the next year are BSG as NCS; DWD, KJH, ERP, and TTT as alternates; TTT, BDR, FLM, DWD, ERP, and FMX as directors. Officers of the newly-formed and incorporated Fairfield High School Amateur Radio Club are UEG, pres.; LFV, vice-pres.; WDC, secy.; and CFC, treas. and act. mgr. Two KN0 licenses and W0WDC have been acquired since the club was formed in January this year. WDC is a YL operator and very active. W0ZSL, a newcomer to Iowa, reports for the Davenport gang. The club station, 0BXK, is going strong on 75 meters since the weather has warmed up. HMM's classes still are going strong. CBY received a QSL saying he had the best list on the air. He's only been at it 30 years. The number of mobiles in Cedar Rapids is astounding. BDR and SCA took the entire output of messages from K5USA over Easter, a total of 531, and made BPL in 48 hours. PKX has his Ranger debugged. LJW says the HQ was worth waiting for. LJW and his band are on WOC-TV every Mon. at 9:30 p.m. SFT has a new Viking Adventurer. KN0AAH has a new Globe Scout. New on TLCN: 8GXMB. KVJ reports he was heard by QVA, 140 miles, with his antenna grounded. PAN handled communications for Boy Scout simulated emergency. SQE made the highest scoring Novice award in Iowa Traffic: (Apr.) W6SCA 1801, BDR 1704, UZO 597, CZ 192, QVA 112, KVI 106, LJW 76, BLH 32, PAN 27, SQE 20, LFZ/0 16, NGS 7, FDM 6, HWU 4. (Mar.) W0PZO 464.

(Continued on page 90)

MALLORY HAM BULLETIN



To solve switch problems around the ham shack... in portable test equipment... in Civilian Defense gear...



USE MALLORY SERIES 3100-3200 ROTARY SELECTOR SWITCHES

It is probable that most amateurs are familiar with the operation of Mallory 3100-3200 series rotary selector switches when used in antenna changeover circuits of the type commonly employed in converters, signal boosters, and RF pre-amplifiers. However, it is doubtful that very many amateurs are fully aware of the extent to which these compact switches can be used around the ham shack to solve other switching problems.

In many respects, the Mallory 3100-3200 series switches offer more genuinely useful features to the amateur designer than any other switch, or family of switches, made. They are small and compact, which means they can be extremely useful in portable test equipment or Civilian Defense gear. Their axially positioned solder lugs reduce the over-all panel space required for mounting, and at the same time permit more convenient wiring.

In spite of their small size, the Mallory 3100-3200 switches do not sacrifice efficiency or reliability of operation. Each terminal-contact is fabricated from a single piece of metal to reduce circuit loss and the possibility of intermittents. At 6 volts DC, these contacts will carry 10 amperes of current without excessive heating. At 250 volts DC, 50 milliamperes may be made and broken continuously without harm to the switch. Triple X grade phenolic insulation, used throughout, assures excellent high frequency operating characteristics for coil and crystal switching in either transmitters or receivers.

The unique Mallory 3100-3200 switch design has been field-tested thousands of times as an important component in expensive commercial test equipment. Research laboratories use it daily as a part of precision measuring devices. And it is recommended consistently time after time in published plans detailing the construction of ordinary and highly specialized electronic apparatus.

Yet, the same switch is available to you from your regular Mallory Distributor at no extra cost.

For your information, the Mallory 3100-3200 switch is made in 12 circuit combinations, in either shorting or non-shorting styles. Switches of 12 positions or less (30° indexing) are 1 1/4" in diameter; all others are 1 1/8" in diameter, have up to 17 positions depending upon the number of circuits, and feature an adjustable stop mechanism. Bushings are standard 3/8" in diameter and have a #32 thread. Shafts are 1/4" x 2", and are pre-grooved at popular lengths to permit accurate cutting. An attractive molded knob is supplied with every switch.

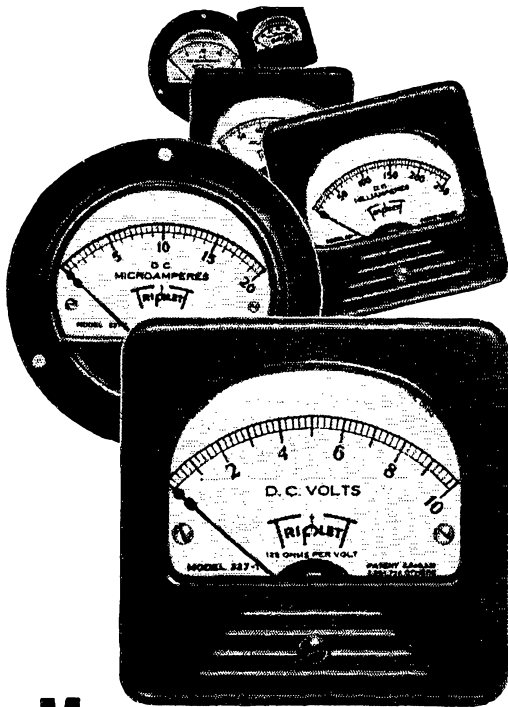
Why not visit your Mallory Distributor today, and see these useful switches first hand? And while there, don't forget the other dependable Mallory parts you may need... controls, rheostats, potentiometers, pads, tubular capacitors, transmitting capacitors, dry electrolytics, disc rectifiers, vibrators, vibrator power supplies, and enamelled resistors.

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KANSAS—SCM, Earl N. Johnston, WJICV—SEC: PAH. RM: KXL/NIY. PAM: FNS. Hope to see you at some of the picnics this summer. The CKRC held its first Annual Award Banquet May 1st, giving out five awards. PSL took top honors as c.w. man, DUG as the outstanding 'phone man, MVG took the honors for v.h.f., the achievement award went to WNØYGF, and the special merit award to JAS. The KVRC has held several surplus equipment auctions to raise expense money for Field Day. The Wheat Belt Radio Club has extensive plans for Field Day. The QTH, 11 miles north of Herndon, looks very promising. UOL is installing a Morrow converter and a Lyaco in his car. ZCG and RGB are building 813 rigs with pi-network and adequate shielding for TVI. KNØATA and KNØATB, father and son, are new stations in Eldorado. KNØADV also is a new station in Eldorado. News items are slim this month, but look at the traffic reports! Thanks, fellows, and would appreciate it if you would remind those you know handling traffic to report it. Traffic: (Apr.) WJBLI 677, NIY 427, KØPDL 255, WØUAT 178, FEO 114, MXG 90, EOT 69, FNS 63, SQX 52, ABJ 48, ECD 48, FDJ 41, ICV 31, LOW 27, REP 26, LBJ 25, SAF 21, RKO 20, YXB 20, TNA 19, VFC 17, YJU 16, ECD 15, QGG 15, WNØYVM 14, WØKAJ 13, YFE 11, UAU 10, DEL 8, LIX 8, WWR 8, LYF 7, WNØWSZ 7, KNØAHW 6, WØLQX 5, SVE 5, KØNAB 4, WØRJL 4, ZYI3, WØCET/Ø 2, RXM 2, TTX 2, WAIV 2, CLK 1. (Mar.) WØSYZ 6, UOL 3.

MISSOURI—SCM, James W. Hoover, WØGEP—SEC: VRE. PAM: BVL. RM: OUD and QXO. The Show Me Net operates on 3580 kc. at 1600 on Sun. BUL, MFB, and ORF, net control stations for the Missouri Emergency Net, have received OPS appointments. KØAXY will be operating from his bed at St. Joseph's Hill Infirmary, Eureka, Mo. SUV has been elected chairman of the Transcontinental 'Phone Net for districts 9 and Ø. CPI and SUV are the net control stations for these districts. RTR has been appointed EC for Rolla. The Suburban Radio Club, St. Louis, has received incorporation papers and has finished a new kilowatt transmitter. HJO is using a new electronic key. ECE has a new S-85 receiver. GCL is the Communications Officer of CAP at Rolla. RTW has a new 50-ke. frequency standard. OMP is going to Anchorage, Alaska, and his mother, OMM, will be operating on 20 meters more often. RUK is working on a new 100-watt transmitter. LJS is teaching a Morse code and theory class for a Boy Scout Troop. The St. Louis University Radio Club is getting a new 32V-3 transmitter. Traffic: (Apr.) WØCP1 1074, GAR 414, KØFBO 354, WØGBJ 352, BVL 194, CKQ 134, OMIM 114, VTF 73, SAK 64, RTW 57, OUD 43, KTK 41, IIR 34, RUK 32, RCV 31, HUI 26, WAP 26, LIS 19, EBE 17, RTO 17, BUL 10, GEP 8, MFB 4, TCF 3, QMF 2. (Mar.) WØJIS 62, ECF 12, HJO 5. (Feb.) WØJIS 72.

NEBRASKA—SCM, Floyd B. Campbell, WØCBH—Asst. SCM: Tom Boydston, ØVYX. SEC: JDJ. The North Central Nebraska Amateurs recently organized the Elkhorn Valley Radio Club with RAM, pres.; PDH, treas.; RMO, secy. A new call at North Platte is UH with ex-EXP at the mike. LRK and KXD built a nice-looking (and working) 'scope. RHL still is plugging away on his Nebraska homebrewed kw. The Omaha boys were on the ball recently when a call came to provide communications for the practice evacuation of Omaha and vicinity. RNIH has closed down for the summer. AIN built a VT keyer and Q multiplier. The Sidney and Potter boys recently received a nice write-up with a picture in the *Sidney Telegraph*. They were the only means of communication during a snow storm. The Wheat Belt Radio Club consists of members from Kansas and Nebraska. We sure need an EC from that part of Nebraska. Any takers? Employees of Union Pacific, don't forget to contact WR for your membership in the Union Pacific Radio Club. The North Platte Club has changed from Mon. to Tue. at 7:30 p.m. on 3950 kc. Traffic: WØZJF 259, DDT 128, HTA 57, LJO 51, FTQ 45, KDW 41, RNIH 40, AEM 39, FUX 32, MAO 23, VYX 23, ERM 22, ORW 22, DJU 20, PUT 19, KVM 13, FRS 12, FMW 11, NIK 10, EGQ 9, VGH 9, CII 7, CBH 6, KØFBD 6, WØKFZ 6, OOX 6, BEA 5, AGP 4, IRW 4, RAM 4, THX 4, ZNI 4, BOQ 3, IAY 3, SZL 3, VRE 3, AIN 2, HQE 2, POL 2, UJI 2, PZH 1.

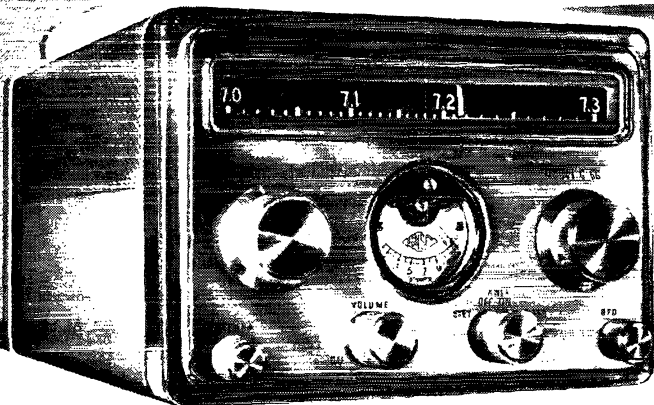
NEW ENGLAND DIVISION

CONNECTICUT—SCM, Milton E. Chaffee, W1EFW—SEC: LKF. PAM: LWW. RM: KYQ. MCN and CN 3640 (0645 and 1845), CPN 3880 (1830), CTN 3640 (Sun. 0900), CTN 29,580 kc. The traffic total on CN hit a spring peak, with 219 in 26 sessions. KYQ and RGB were QNI 23 times, LIG 22, and YNC 20. On the early session, MCN fell back to 115 in 23 sessions, being plagued with rough conditions. YYM, RGB, and IBE took QNI honors. CTN reports reduced attendance. Aren't there any who want practice or is it an inconvenient time? We are interested in your comment. CKA, CLD, and ZFK report new General Class tickets. RAN is doing his stint for Uncle but managed activity during time off plus a new 6146 three-band portable job. YBH again is high on the traffic list—all on 'phone. BVB has forsaken 80 for 40 meters, where he finds QSOs more plentiful. TYQ is a regular on CN and MCN between nights to HZ-Land. WX reports much activity in the

(Continued on page 98)

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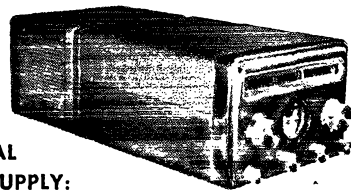
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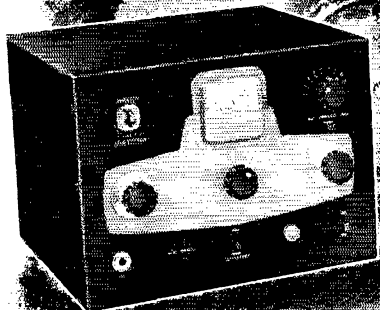
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W A S E C A, M I N N E S O T A

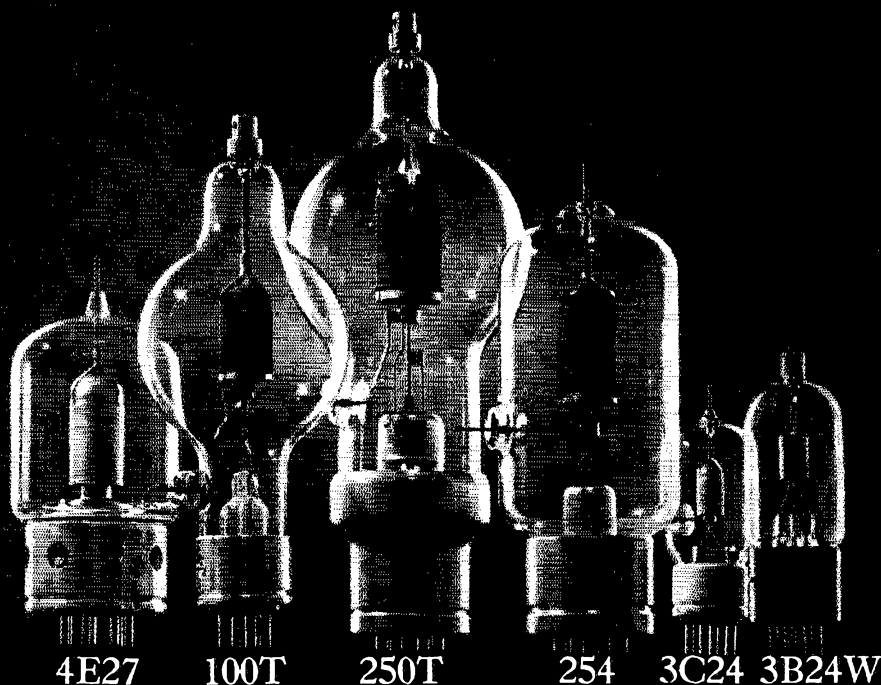
Fairfield Area. New ORSs include UED and RRE. Other new appointments include DVO and ULY as ECs, while OPZ and RMT renewed EC appointments. EGS and EGX are new Novices in the Middletown Area, while Novice ELQ joined the ranks in Southington. EDUI is the call of the Middlesex RA. RDV has moved to Windsor Locks. Several clubs report plans for Field Day so we can expect to see their scores mount up. NMT reports on Hamden c.d. and the need for further inspiration to maintain interest. DX was the speaker at the Apr. 31st meeting of the HCARA Operators at TJJ for the Apr. 30th C.D. Test included STT, RGB, WHR, and PHP. Amateurs in south-east Connecticut soon will be mailing out novel QSL cards which picture the vacation attractions of their area. Any operator in the area will be able to obtain a supply of these cards from the Public Relations Department, Electric Boat Division, General Dynamics Corporation, Groton, Conn., by writing and asking for them. More news from all the gang would be appreciated. Club secretaries any news from your group? Nice bulletins are received from the MRA. How about others? Traffic: WIGUH 203, YBII 195, AW 176, KYQ 163, LIG 119, RGB 98, LV 87, EFW 81, VYM 68, UED 67, RRE 64, BDI 53, ZDX 38, TVQ 26, HYF 21, BVB 18, RFJ 16, YNC 16, AYC 12, KV 12, RAN/2 11, CID 10.

MAINE — The section's operators were saddened by the death of the SCM in April. The Sea Gull Net observed a period of silence on 3960 kc. during the funeral services. Activities reports are presented as compiled by the SEC. TVB, while an SCM election is in progress, LIA and BPI/VYA were nominated as SCM candidates. Nets: The Pine Tree Net meets Mon., Wed., and Fri., on 3595 kc. at 7 P.M.; Banyard Net Mon. through Sat. on 3960 kc. at 8 A.M.; State of Maine Phone Net Mon. through Sat., on 3940 kc. at 5 P.M.; the Maine c.d. drill Sun. on 3993 kc., at 11 A.M. and 3503.5 kc. at 9 A.M. BDP and BBS, Myron and Kay Hilton of Freeport, are on with new rig, Wel-ome to two new Novices in Portland, Maynard Bray and his XYL. Good luck to the new Teen-age Forest Net, which meets Sat. and Sun. on 3900 kc. at 10 A.M. Teen-agers in the first call area are welcome. The State of Maine Phone Net is well supported. All will look for the Sea Gull Net when standard time rolls around again. VZI and her OM are planning a trip to Kokadjo for the season and taking along the emergency rig. SNE, AMR, and RSC are back from warmer climes. VWT, of Gray, is back home from overseas with a new rig on the way. Two meters is gaining headway in the State because of c.d. The many stations on 2 meters include DEO, AMR, ACO, BPI, LHA, GVV, LBJ, and ZBN. Maine lost two fine operators when Jim, YGO, and Hope, YGP, moved to W3-Land, PS now is on top of Mt. Washington in the WX service. We miss him on 29.5 Mc. We're indebted to PAM Happy Hamlin, WRZ, for a consolidated report on Sea Gull Net operation. From Sept. 27th to Apr. 22nd an average of 51 stations called in per night for 148 nights — 223 different stations called in; 14 NCS with traffic total 593 messages. The highest number of call-ins was 80. Traffic: W1WGT 205, ZME 105, LKP 78, NXX 60, UDD 54, BX 37, LYR 32, ZMK 18, OTQ 13, ZUL 13, SQV 12, TWR 9, TKE 6, BDP 5, DNV 5.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr. W1ALP — New appointments: BEI Medfield, WK Quincy, and WNP Concord as ECs; VYI and UKO as OPSS. Appointments endorsed: WAG Taunton, AWO Wenham, FEC Middleboro, QGJ Woburn, XHY Fall River, AWA No. Reading, BWH Attleboro, LLY Arlington, ICU Amesbury, J8M Waltham, and VVZ E. Bridgewater as ECs; PXH and J8M as OESs; QGJ, DJ and SS as OPSs; PYM and SS as ORSs; TVZ and AYG as OOs; SCS and AWA as OBSs; AWA as PAM for the 6-meter band. New officers of the South Shore Radio Club are AJU, pres.; QMJ and QOI, vice-pres.; MME, secy.; TZQ, treas. Heard on 2 meters: QF mobile, RMF, EGY, DYQ, EMY, NAR, ZVS, and EPL, YVL is mobile on 10 meters. On 75 meters: ACC, SNZ, NWS, and LSA. ALP visited the Scituate Club, EQU is SNZ's boy. JIQ flew out to California on a trip. ALP and CTR visited the Framingham Club. Radio Amateur Open House had SX give a talk on s.s.b. Officers of the Nashoba Radio Club are WNP, pres.; TRD and ZML, vice-pres.; CAN, secy. WXC is getting out well on 10 meters. DWO is making an s.s.c. exciter. RCA and DJA are on 2 meters. New officers of the Braintree Radio Club are UIR, pres.; ZSU, vice-pres.; CTR, secy.-treas. The Wellesley Radio Club had an auction. VVI operated as Region 1 FCDA on 75 meters in the Apr. 30th drill. WU has a new rig with 813s for 20 meters. The Cape Cod & Island Net has a new certificate designed by TWN/BLM. New Novices: EOI, EQM, EPP, EYF. Tech. Class: E0Z. General Class: AEG, DLF, and DFY. New officers of the Norfolk County Radio Assn. are GDY, pres.; HTR, vice-pres.; ALK, secy.; CQN, treas. IIP is a new member. IXI is working on the house. WTP will have a new tower on the house. ALK is on 80 meters with 200 watts. WHC is

(Continued on page 94)

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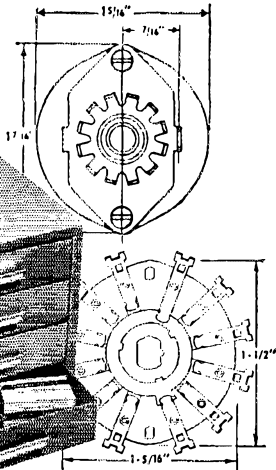
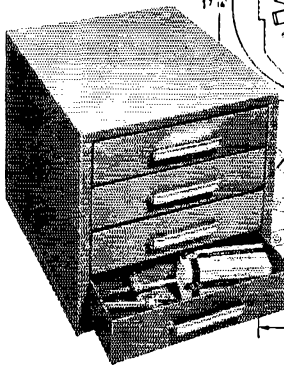
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on 75 meters. A new club in Waltham is the Middlesex Amateur Radio Club. Officers are SAD, pres.; DYK, vice-pres.; AEG, secy.; ZPY, treas.; BTX/DED, chief eng.; DWII, act. mar. The South Eastern Amateur RA will move into new quarters. Fifteen New Bedford hams have received an Edison Radio Amateur Award. AZU has a Alath Box for his antenna farm. New Bedford's RACES frequency is 29,610 kc. for mobiles. WKM took part in the Apr. 30th drill with CCA/1 as Sector Hq. station at Fall River. CTZ is Radio Officer and WGN Alternate. The Wellesley Amateur Radio Society held a meeting with a talk by GWD of Raytheon. BEI will be on the air soon. In a Sector 1-B test drill the following were on: TYN, WUW, VPR, ISU, MME, FWS, CLF, ALP, YYZ, LOS, HSN, KWD, VAN, DUO, SH, FWS, GNK, YFA, and DW. ALP has a Viking VFO for his rig. The Lexington 2-meter C.D. Net is on 147.1 Mc. Sun. at 9 P.M. The Cape Cod & Island Emergency Net did a nice job during the snow storm in April. Traffic: (Apr.) WUKO 338, EMIG 239, VYI 227, EPE 109, AVY 73, IBE 62, UE 49, NUP 44, LM 43, CLF 35, TY 24, WU 13, BY 10, DUO/TYN 9, BB 5, AHP 3, ZDX 2, ALP 1, CTR 1. (Mar.) WIVYI 225, WU 9.

WESTERN MASSACHUSETTS — SCM, Osborne R. McKeaghan. W1HRV — SEC: RRX, RM: BVR, PAM: QWJ. The WM C.W. Net meets on 3560 kc. Mon. through Sat. at 1900 EDST. The WM Phone Net meets on 3870 kc. Wed. at 1800 EDST under the guidance of MNG. The Central Mass. Amateur Radio Assn. has trained 34 Novice operators this year, many of them now General Class. The ICRA's annual banquet at Toto's was a huge success with 84 members, friends, and visitors enjoying a fine time. New ORS are ZUU, YCG, and AJX. WCC made BPL in March with originations. WEF and AJX made BPL in April with originations from the Springfield Technical High Science Fair. Tech High has six hams: WEF, ZIO, AJX, AOT, AOU, and DMT. AJX received the WANE award. RRX, TVJ, and NNI received Edison Hurricane citations. UVI made up the maps accompanying the WM C.W. Net bulletin. TAY is drawing up the RACES plan for Amherst. LIB, Webster, reports himself, AJV, CJW, ABW, QEA, AVW, and WN1BHC signed up and operating a c.d. net. LRA is the new Westfield C.D. Radio Officer. TVJ reports 19,200 points in the CD Contest with an average of one QSO every 3.86 minutes. AEW transferred from Pittsfield to Holyoke. SPF reports his regular bulletin transmissions are looked for by many in the Worcester Area. The new EC for Fitchburg is STR. SRM received a WAV certificate from Vasteras Sweden Amateur Radio Club. K17BHG, Fairbanks, Alaska, ex-W1TAB, writes he is working W1s regularly on 14-Mc. c.w. and looking for more contacts. YCG made BPL with originations and deliveries from Amherst College. JYH has a new antenna and a 4/125A final. WN1ZVZ passed the General Class exam and has a new rig. Traffic: (Apr.) WUKR 384, YCG 187, BVR 163, TVJ 154, AJX 133, WEF 128, HRV 86, MNG 63, TAY 46, RRX 44, DVW 34, AMI 28, ABD 23, ZIUU 20, UVI 17, JYH 7, LIB 3, HRC 1. (Mar.) W1TAY 38.

NEW HAMPSHIRE — SCM, Harold J. Preble. W1HS — SEC: BXU, RM: CRW, PAM: AXL, CNX is the proud daddy of a new rig, operator named Scott born Apr. 14th. AVJ has a new granddaughter. The 1st Region RACES test held Apr. 30th went smoothly in New Hampshire but needs coverage in Carroll and Coos Counties. The Manchester Radio Club soon will be on the air with a new rig using a 4-250A on all bands. WUU has a new QTH in Manchester and expects to be back in net operation soon. IP is trying out the new SX-99. General Merrill is sponsoring the N. H. Dept. of P.W. and H. Radio Club, which meets every Thurs. evening 7 to 9 for code practice. ARR made BPL in April. RZD has a new position with the U. S. Dept. of Education in Washington and we hope to hear him on the air as a W3 soon. Welcome to Novices DVK, DZZ, ECA, and EBA. TNE now is K2KWN. Concord amateurs had an FB set-up at the recent Hobby Show in the N.G. Armory and handled considerable traffic. CRW has been reappointed RM, ORS, and OPS. CO3HD wants New Hampshire contacts on 40-meter c.w. 5 to 6 a.m. ZLICH needs a New Hampshire contact for WAS. He is on 7002 kc. around midnight EST. We need more items from the eastern part of the State. Traffic: (Apr.) W1ARR 514, COC 45, IP 31, HOU 16, CCE 15, HS 14, PFU 14, FZ 9. (Mar.) W1CCE 21.

RHODE ISLAND — SCM, Walter B. Hanson, Jr., W1KKR — Almost the whole section had something to do with the April 30th combined RACES and AREC drill, and there's no doubt about it, gang, little Rhody did a grand job. The BVARC is almost ready for Field Day with 6 meters. DDD now has 400 watts and a new NC-125. IHW, ZEZ, AUT, and DPA discussed "Amateur Radio in Emergencies" on the Kiwanis Forum broadcast from station WWON. The Providence College Club has received the call DKG. K2LYE has been operating there. TRX is heard regularly on the Newport County Emergency Net and the R. I. Phone Net. 4CVO/1 reports nine off-frequency reports during the DX Contest. TBY has announced the formation of a new club in Bristol with URA sparking the deal. Seventeen members attended the organizational meeting, and the Club plans to affiliate with ARRL. Bristol County includes the towns of Bristol, Warren, and Barrington. New MARS affiliates include ZXA and AUT.

(Continued on page 96)

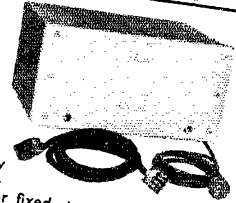
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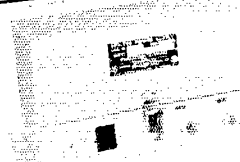
R-9



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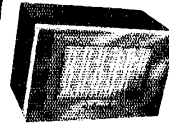
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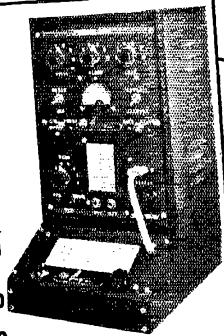
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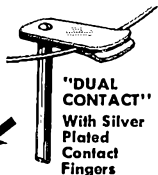
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ZXA boned for final exams with the prospect of an HQ-140X as a reward. VXC reports increased activity on the R. I. Intercity Net on 29.260 Mc. at 7:30 P.M. Traffic: W1BXN 116, BTW 98, VXC 85, UTA 80, TRX 62, TGD 52, ZXA 17, W4CVO/1 12, W1BIS 4.

VERMONT—SCM, Robert L. Scott, W1RNA—VTPN meets on 3860 kc. Sun. at 0930-1030 only; VTN on 3520 kc. week nights; GMN on 3860 kc. week days at 1200-1300 hours; Vt. c.d. nets Sun. at 1000 hours on 3993 and 3501.5 kc. ZWP, the Putney School Amateur Radio Club, Putney School, Putney, Vt., advises the Club has 12 members as follows: W1N1s DPE, DQN, LFD, DRY, DLE; W1s YAY and ARU; K2GRB. They operate mostly on week ends on 220 and 144 Mc., also 75- and 40-meter phone and c.w. Week-day operating is done at 0740-0820, 1320-1400, 1600-0820 (??), and 1900-2200. This is done between the dates of Sept. 10th and June 10th, the school year. The license plates seem to be bottled up in the committee to which it was first referred. Traffic: W1OAK 105, AVP 80, RNA 63, BJP 43, IT 39, VVP 27.

NORTHWESTERN DIVISION

ALASKA—SCM, Dave A. Fulton, KL7AGU—There seems to be an increase of mobile activity with the coming of longer days and the summer months. The Anchorage mobile gang hangs out on 3986 kc. and is planning a lot of interesting mobile activities for the summer months. AWB will be leaving soon for W5-Land; after working real hard on the Alaskan DX certificate Joe now is going to W-land to try and earn one for himself. That is one for the book; work real hard to design a certificate and then move so you can qualify for it. DX seems to be improving in KL7-Land. Are we really over the worst of the sunspot cycle or is it our imagination? AMS is the proud owner of a new mobile receiver. ANG is back on the air mobile after a long silence. RE should be on soon sporting a new all-band vertical and a Globe King.

IDAHO—SCM, Alan K. Ross, W7IVU—Shelley: ACD is on 50.1 and 50.4 Mc. with 500 watts and a four-element beam and needs only Montana and Utah for WAS on 6 meters. Caldwell: EYR reports most of his time is spent on 20 meters trying for DX. Gifford: VWS is busy working the gang with his Adventurer and had 106 QSOs for April. He is planning to go to college in Arkansas. Kellogg: RQG is plagued with power-line noise. At this writing he and FL, of Sand Point, are running the GEM Net. Emmett: TYG plans to teach school in Wilder this fall. Boise: BNU with Whitefish, Mont., trailer-parked in town for three weeks. NVO is active in the FARM Net and MARS-Army. New stations on the 145.44-Mc. net are WN7YUX, WN7YXX, and KH1M. There are about 12 stations on this frequency around here now. More reports from you fellows would be appreciated. We don't know what you're doing if you don't tell us. Traffic: W7RQG 26, TYG 22, NVO 3, EYR 2.

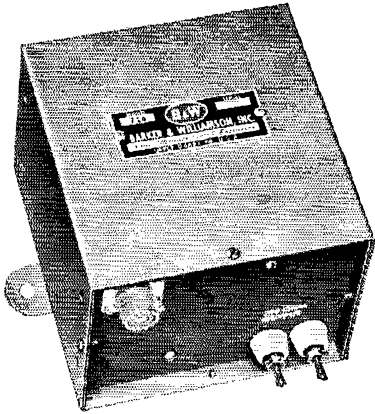
MONTANA—SCM, Leslie E. Crouter, W7CT—MQI has been appointed Emergency Coördinator for the Billings Area. MQI's station is located in his store where he can monitor the net frequencies throughout the days and evenings. Mon. through Sat. UZN will be operating mobile from Silver Gate during the summer months. YHS is a new call on the air, operating both fixed and mobile rigs. YXQ, another new licensee, is an engineer at KBMY. Ted is busy winding chokes and power transformers for a kw. rig. VZN, who is purchasing agent for the American Chrome Mining Co. at Nye, also is a new licensee and operates mobile. OQI, the Billings Club, is reconditioning the Club's emergency generators and gear, anticipating more and better activity in the very near future. IWW is in the process of installing a new rig in the new Cadillac. The SBC, KUH, recently visited the Billings gang. MQI is delving into the mysteries of the galaxies with the aid of his recently-acquired telescope, a present from the XYL, KGF, KGF, and YZQ have also been "star gazing" in Carl's back yard. Activities have not been too well reported. How about sending them in, fellows? Traffic: W7MQI 11.

OREGON—SCM, Edward F. Conyngham, W7ESJ—PQJ, in doing OO work, has noted many Novice stations on second and third harmonics, outside the bands. VJT reports that the McMinnville Amateur Radio Club set up a portable at a Rotary Club meeting to display message-handling during an emergency. The EC, SYB, described the operation, while THV and VPT handled some traffic. The operation was a success and did a good job of convincing the Rotarians of the value of amateur radio. APF still is able to make BPL, although battling TVI. PRA has the big rig down for repairs and is using the small 75-watt. THX put up a new bantam beam on 40 meters and his first call raised Ireland. As of May 1st the total League membership for Oregon was 614; attendance at the OARA Convention was over 700. Most of the League members were there. Northwestern Director CPY gave an interesting talk on League affairs. K6BJ gave a timely talk on tetraodes as Class B linear. Wes R. Schum gave a very interesting talk and practical demonstration of s.s.b. KDR gave a talk and demonstration of vacuum-tube construction. Lt. Col. Schuerra, sixth Army MARS director, gave an interesting talk on MARS. Lt. Paul McAfee covered electronics in

(Continued on page 98)

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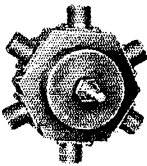
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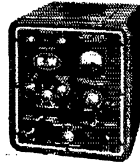
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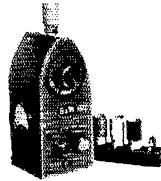
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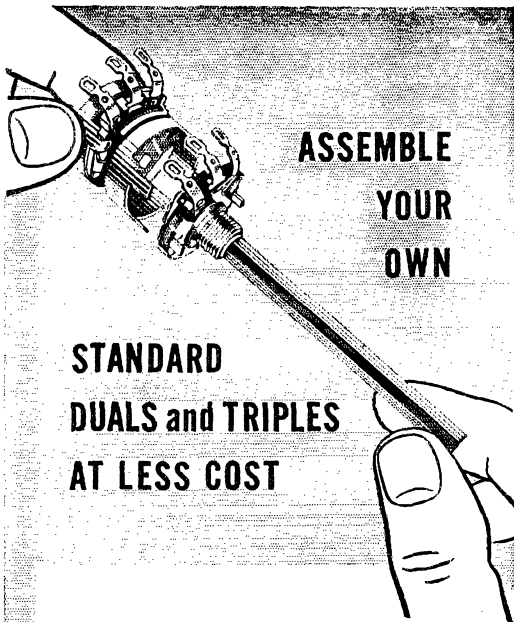
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the Navy today. 6AM illustrated his talk on DX stations in Europe with colored slides. The engineer in charge, FCC monitoring station, Portland, covered monitoring. We regret the loss of 11V, who died of a heart attack. Traffic: W7APF 586, ZFD 390, BLN 194, WLL 141, ILDN 66, BDU 50, WAT 50, OMO 31, BVII 25, NFZ 22, THX 22, PRA 17, LT 11.

WASHINGTON — SCM, Victor S. Gish, W7FIX — The Puycallup Club (YU) reports: Mobiles JJK, QJC, MCU, HMQ, and portable MPH helped coordinate the annual daffodil festival parade as it passed through Puycallup: VJC is running a Novice Net; MCU is on RTTY on 2 meters. PVZ reports from Olympia: CMX is on RTTY on 2 meters; FWD and FWR were seen at the local radio dealers party looking very FB; the Capitol City Radio Club is going all out for Field Day. TWQ would like to hear from other high school radio clubs and exchange papers from the Marysville High Club. BA reports all rumors about getting a kw. are false — band conditions on 20 meters are much improved in the evenings. QYN is on with an 813. AIB has a new inverted L antenna 125 feet long on a Ranger. LVB complains of power line noise during rains and blows. Contact their interference man, Roy. BMK is completing a 250-watt final. CWN is going mobile. UQY reports Richland Club activity in the WAS Contest, and YFO has a new electronic bug. UKI is planning portable gear for summer use — not much activity on 420 Mc. HDT reports: UJA still is fighting BCI; FM has mobile in the new car; PKR gave up trying to convert surplus gear and bought a Heathkit DX-100. OEB is remodeling the house and will be off the air all summer. KAA has moved to Eugene, Ore. DWG is busy with traffic on 40-meter c.w., and is lining up the AREC activity in Kitsap County. RCM, our SEC, has been doing a fine job of lining up new ECs and getting reports. Several EC appointments have been cancelled and new ones have been appointed to fill the vacancies. The section is showing promise of much better AREC activity in the coming months. Traffic: (Apr.) W7BA 1516, PGY 1246, K7FE 598, W7PRU 561, VAZ 406, J50 132, RCM 96, HKA 84, QE 83, UIN 66, APS 62, RXH 56, FIX 45, UYL 45, EHH 40, QYN 24, PXA 17, AHV 16, AIB 14, EYF 10, LVB 9, TGO 9, K6BDF/7 8, W7AMC 8, EVW 6, GAT 6, BMK 3, CLZ 3, JFY 3, UZB 3, AHQ 2. (Mar.) W7OEB 41, GAT 14, ETO 10, ZU 5.

PACIFIC DIVISION

HAWAII — SCM, Samuel H. Lewbel, KH6AED — This was a busy month for your SCM. Our RACES application was approved by the FCC. AFQ is now the Deputy Radio Officer for the Hawaii County C.D., ABF for Maui County, and ABI for the Oahu C.D. The Kauai appointment still is to be made. In each case your SCM is appointing those who are ECs. The following appointments are being made: BHH, EC for the Windward Oahu Club; KC, EC for the Honolulu Mobile Club; and ANR, EC for the Leeward Oahu Amateur Radio Club. AUJ is now an OBS. She transmits Official Bulletins on 7150 kc. Mon., Wed., and Fri. at 1700Z. The license plate bill passed both houses of the legislature and was signed May 5th by Acting Governor Turner. Get in touch with your local civil defense office for application blanks. Traffic: KH6AJF 2299, KA2MA 904.

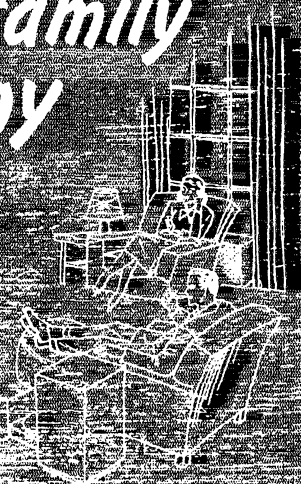
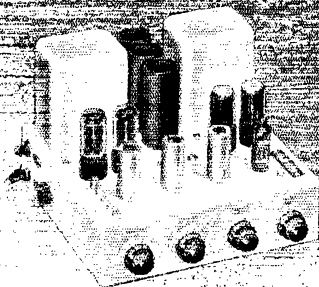
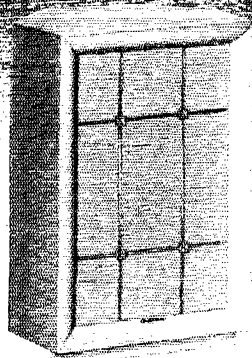
NEVADA — SCM, Ray T. Warner, W7JU — SEC: WVQ, ECs: PEW, PRM, TVF, TJJ, and ZT. OPSs: JUO and UPS. ORSs: MIV, PEW, and VIU. OBS: BVZ. Nevada State Frequencies: 'Phone, 3880 and 7268 kc.; c.w., 3660 and 7110. UPS will be operating portable for the next few months at Wendover, on the Utah-Nevada state line. WN7ZKD is a new Novice in Elko. It looks like the 7th call area soon will blossom out with "K" call prefixes. The Southern Nevada Amateur Radio Club is furnishing mobiles for the Las Vegas "Hellorado" parade control. A booth has been provided in "Hellorado" Village where a ham station will be placed in operation. INJM, our National Emergency Coordinator, spent a restless week in Las Vegas awaiting the recent atomic blast which pulverized "Doom City." 9KJM now is ZHT in Las Vegas. ARRL appointees are reminded to send in monthly activity reports by the 1st of each month.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — Another correction in the listing of club officers for the NPEC as sent in by MNG: the vice-president should read KN6EWG. A new call in South San Francisco is KN6KOJ. Eddie is the son of QJE. ZXS is finishing a new heterodyne exciter. We have received *Dils* and *Daha*, the paper of the Camp Gordon Radio Club, Camp Gordon, Ga. The editor of the paper is none other than 6OIF. AIT is going higher power with a new final. Irv needs more power to do better in traffic nets. K6BBD's CD score for c.w. was 47,800. Dick's MARS call is AA6BBD. EXX has a new 144-Mc. converter using 417 in cascade all set for Field Day and also will use 6 meters. K6BAM needs West Virginia and some W1 states for his WAS. NX's new 75A-4 sure cuts out QRM, according to Frank's story. Next comes a vertical all-band antenna, then watch the tree leaves get burned by r.f. around his QTH. FON is very busy keeping us informed about the latest on the license plate bill. ACN puts information out on several of the nets. In listen-

(Continued on page 100)

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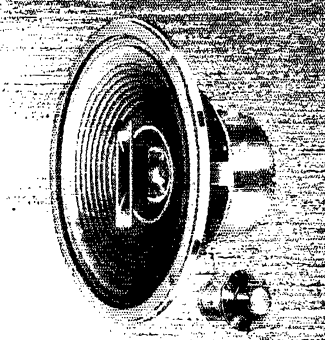
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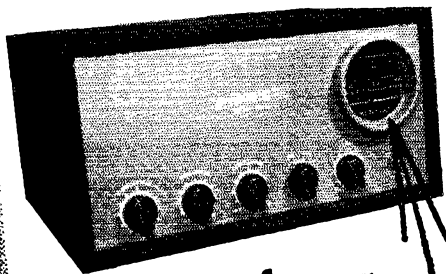
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ing on frequencies of some of the c.w. nets we find that RN-6 seems to be lacking for NCS. Several times no directed net sessions have been heard. What's the matter, boys? Come on, you code artists, let's give the nets some help. Volunteer for duty once a week. Traffic: K6BBD 170, W6FON 84, UTV 62, K6BAM 48, W6AIT 26, EXX 6.

EAST BAY — SCM, Guy Black, W6RLB — Asst. SCMs: Oliver Nelson, 6MXQ, for v.l.f.; and Harry Cameron, 6RVC, for TVI. SEC: WGM. RMs: JOH, EPD, and IPW. ECs: K6GK, K6ERR, W6CAN, FLT, ZZP, and QDE. PAM: LL. Your Acting SCM spent ten days at Camp Mercury, Nev., during April participating in the atomic bomb test "Operation Cue." This was a test of civil defense, and the State of California provided a 20-man communication team as a service function. Among the members of this team, besides RLB, were JN, ASI, CTS, LY, CV, OU, and WYT. There were lots of other hams there besides. K6ERR is the newest OO appointee. The Oakland Radio Club is to be congratulated on its fine old-timers night. EY's reminiscing was one of the high points of the evening. Prexy FJJ deserves great credit for the way he has been sparking the ORC for the past two years. YDI is one of the most faithful reporters among the OPS gang. Unfortunately Bland does not get much traffic over the Mission Trail for Martinez. One of the newest hams to have an official appointment, K6EPC is already a hot traffic man and is working DX besides. VSV and UOV keep referring to this monthly write-up as the "wasted space column," but they seem to have read everything in it. Who is kidding whom? At Travis AFB the traffic load for April was carried entirely by 3AMZ. ZRH is supervising a radar team near Washington, D. C., and reports meeting VSV and DXJ back East. Bob's QTH is 9584 TU, Sig. Corps Eng. Lab. Pld., Sta. No. 4, Fort Meade, Md. ZVV, in Berkeley, is a new AREC member. K6GK is full of ideas on how to organize traffic and sends in a new batch nearly every month. HBF soon will be active on 20 meters. All RTTY men should consider joining the MARS RTTY Net at 7:00 p.m. PDT Wed. on 3275 kc. AGVPC is net control. See Buck for more details. Traffic: K6WAY 789, PDG 115, GIK 103, W6HBF 40, K6EPC 38, W6ITH 20, EJA 12, YDI 2.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — Asst. SCM: William T. Nakalura, 6GHI, KEV, staff member of the Product Engineering Group of Eitel-McCullough, gave a talk and demonstration entitled "Effect of Varying Currents and Voltages in Beam Tubes." A kw. final using 4 x 150 tubes with final and power supply fully metered and in actual operation into a dummy load was used. The Club also enjoyed listening to a talk by 1BUD about the ARRL from its start to the present. The 6-meter net now has an official name, christened so by the HAMS. Hereafter it will be called the HI 50 Net locally. BDX came in first in the April 29ers Club hidden transmitter hunt. BIP and 8Y trailed in second. KN6HTC, Sonoma County Radio Club secy., reports that AJF will be guest speaker at the next meeting. The Club enjoyed an hour of movies, compliments of the telephone company. BZT, stationed at Hamilton Air Force Base, requested membership in the AREC. SLX has joined the Naval Reserve Electronics Unit. Two more of the boys in the Humboldt section hope to receive tickets soon. The S. F. Naval Shipyard Club and HAMS (Red Cross Club) are making plans to edge out UW on Field Day. Having already won twice UW would get to retain the plaque permanently if they come out on top for the third round. The recent YLRC/SF drive for new members brought in ten applications from the ladies in the surrounding vicinity. KZF is busy making cars for his new hobby of miniature railroading. He has a beautiful set-up sharing room with the ham gear. K6CQE is getting good results via 10 meters on his new 10-meter beam. GTY did himself and the local amateurs the honor of winning the National Company's contest for receiver suggestions. The prize was a complete \$1000 ham shack. JZ's board meeting at the University of Calif. brought in many local club representatives. K6GPX passed the electronic test and now is working for S.P. at Shasta, Calif. He joined the Mission Trail Net so he still could contact the boys via the net. 7TJY visited San Francisco on company business and some of the local boys joined him for dinner and a ragchew. AF6JWF and AF6GCG met many of the net members at MARS activities at the McClellan Air Force Base dinner May 23rd. PHT collected prizes for the MTN Roundup. RBQ's XYL reports that Bill is improving in health and hopes to be allowed visitors soon. SWP received the Edison Radio Award Certificate of Merit for emergency service during the 1954 hurricanes. Pat reports that he needs only Delaware to complete his WAS. YC says that LU3HR is planning a visit to San Francisco and hopes to attend club meetings here. QMO entered his first CD Party on phone and made 29 contacts in 14 sections. GQA says OO work was slow in April. CTH spent two weeks in the hospital with a ruptured appendix. GHI celebrated his 25th wedding anniversary with a nice dinner party. RUR and 2CDT are operating an R/C boat on Spreckles Lake on 27,225 Mc. ZLQ, CDT, and RUR hope to go 6-meter mobile soon. Traffic: W6SWP 597, GQY 292, QMO 208, GGC 50, GQA 2.

SACRAMENTO VALEY — SCM, Harold L. Lucero, W6JDN — As soon as K4AQQ receives his W6 call he will

(Continued on page 102)

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be our new RM. Al obtained the required experience for this office while in Wisconsin. To all clubs: The Council of Amateur Radio Clubs would like to have each club send a representative to its meetings. Address queries to MARS Station Bldg., T-561, McClellan AFB, Calif. HSCM, K6ER is doing a wonderful job as OO. A letter has been received from the FCC with information that clubs having an examining committee can have the exams in order to give to new aspirants. HIL is the new Radio Officer for c.d. K6AKF is net control. K6ECP reported on the recent emergency in the High Country. K6BJO, on a trip to Southern Calif., kept in touch with home via radio and WYW. CMA would like to hear you check in on the CVN when you can, also keep up the good traffic count. ASL, CIS, and JN all went to the Nevada A Bomb Test for the California C.D. HTS and HSB have new B&W 5100. HVS moved to a new QTH. FNS has a new vertical at the new QTH. ZF worked CIS/7 at the bomb site in Nevada and relayed one message. DTW is active on 75 meters with a Viking Ranger. MIWI has a new Viking Ranger. RNR is on 20- and 75-meter phone. GDO moved to a new QTH in Sacramento. K6JVI has a new mobile and formerly was at KL7AUI. LLR is busy as NCS on MARS Central Div. Net. No. 1. JDN received an FB supply of MARS surplus equipment. Traffic: WGCMA 25, JDN 4, ZF 2.

SAN JOAQUIN VALLEY — SCM, Edward J. Bewley, W6GIW — SEC: EBL. RM: K6EVM. PAM: WJF. The valley clubs and groups were well represented at the sub-directorate meeting held in Berkeley. Once again we were impressed with the manner in which hams can discuss their problems and combine their thinking for the good of the majority. The Fresno Club is working very hard on convention plans and we can expect a wonderful convention, according to reports. The American Legion Net, with GRO as NCS, once again demonstrated the value of ham radio as a public service by alerting the highway patrol to free 200 snowbound motorists on Donner Pass. GRU/M was among the cars and contacted the ALN for help. Credit goes to EPB, K6EJT, and K6ECP for their work in the emergency. W6ERE has been appointed Radio Officer for Stanislaus County. K6BMM is taking over the EC duties in Merced. K6DUU is running a nightly code practice at 1800 on 1815 kc. A2 omission, by special authorization of the FCC. The Pleasant Valley Radio Club has received the call K6K6K. The Delano Amateur Radio Club will issue a Certificate of Achievement to any amateur in the world who has made complete two-way QSOs with at least five members of the Club since Feb. 1, 1953. Application should be made to the secretary, BYE. A simple listing of Delano hams contacted with the date of QSO is all that is necessary. QSO with the club station, K6BLI, will count. Members now active on the air include: ARI, BRP, BVM, BYH, EFV, HT, K6BLZ, W6HYK, WNX, ZEK, ZVP, KN6JSY, KN6L(B), KN6GZY. Traffic: (Apr.) W6FEA 337, AFB 72, K6EVM 39, W6WJF 25, EBL 24, (Mar.) W6ADB 78.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Charles H. Brydges, W4WXZ — SEC: ZG. PAM: ONM. RM: VHI. AGI is permanently on 40-80-meter c.w.-phone. AKQ will operate the station most of time except during the summer months when YZC and YE from Virginia will be at the helm. AGI will be active in CD Parties as an ORS. KN4AVC has a new S-86 receiver and is on 40 and 80 meters. EOU is back in Blowing Rock and is working on MARS gear. ZYC was elected NCS of the Tarheel Net for the month of May. YPY is getting good results with DX on 20 meters with his Globe Scout at 40 watts. A very nice picnic was held at KN4BVQ's cabin on the Catawba River, with members of the Charlotte Amateur Radio Club attending. BDU, VHH, and WXZ were active in the C.W. CD Party. HVK is mobile in the Charlotte Area. The Confederate Teen-age Net on 3900 kc. is going very well. You older fellows are invited to check in. BUA is building a 36-tube receiver. SOD has a Viking Kilowatt and has applied for OBS appointment. HKB reported in the Virginia Phone Net to help with disaster traffic out of Bowling Green, where the big forest fire had caused much destruction. WXZ also relayed. I have received a few letters from interested people about the traffic net to be held on Saturdays. If interested, please drop me a line so plans can be made soon. EJQ needs only South Dakota for her WAS award. The OM, EJP, has 43. All has some TV antennas above his 120-foot high 20-meter beam, and receives 8 channels, not to mention all the DX. If you want convenient monthly report cards to send in to the SCM, just send your call and address on a post card and they will be mailed right out to you. Traffic: W4WXZ 208, YPY 28, AGI 2, EJP 2.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — The Florence Club was host to Ed Tilton, V.H.F. Editor of QST on May 6th. TSU is building a new kw. rig and is now working 20 meters. FM reports that maintaining batteries for his emergency rig did not prove practical so he converted it to a portable rig that will operate from a car battery in a pinch. LXX reports that he recently became member of the OJC. PGX is on 40-meter c.w. looking for South Dakota and Idaho for WAS and placed 3rd for South Carolina in the SS Contest using 40 watts

(Continued on page 106)



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FX-1 .0025%	\$6.75*	\$5.25*	\$3.75*	\$4.75*
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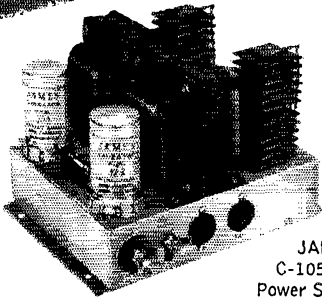
*Prices are for crystal only. To insure this tolerance crystal must be purchased with oscillator factory wired and tested. For total price add \$6.95 to price of crystal desired.

HOW TO ORDER: In order to give the fastest possible service, crystals and oscillators are sold direct. Where cash accompanies the order, International will prepay the postage; otherwise, shipment will be made C. O. D.

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AUL is building a 500-watt rig. K4AIB reports from the Greenville Club that members are building 2-meter rigs and looking for a new club room. K1AQQ/6, formerly of Myrtle Beach, now is located in Susanville, Calif. The following have qualified for SC C.W. Net certificates: AKC, ANK, CHD, KYN, RPV, YAA, FML K1AQQ, and W9JBN/4. If you have qualified and did not get the certificate, contact W4AKC. The SC C.W. Net has closed down for the summer but members are requested to get together on 3795 kc. for rag chews during the off season. Traffic: (Apr.) W4HDL 217, ZIZ 140, ANK 12, FM 3. (Mar.) W4HDR 237, TSU 16.

VIRGINIA—SCM, John Carl Morgan, W4KX—SEC: RTV. Your SCM had nice visits with the Richmond ARC and the Rappahannock Valley ARC and now is a member of the latter. Club activity is at an all-time high. The Blue Ridge ARC (Roanoke) threw a nice hamfest. BYZ reports a new club has been formed in Danville. PXA sends a roster of the Southwest Va. ARC, representing Wytbe, Montgomery, and Pulaski Counties, and having 100 per cent AREC members. The VFN picnic is scheduled this year at HQN's antenna farm in Bumpass, NV, host heretofore, is QRL with the Tidewater Area gang's preparations for the Division Convention at Old Point. Summer doldrums and QRN are hitting the nets. VSN and VN have curtailed until fall. VFN continues 7 nights a week. PXA, VN mgr., wants volunteers from among the newer hams for summer NCS tricks. BLR took traffic honors in April. Kay made BPL in the process! PCF's total took a dive because operator 3QQE was QRL rifle range. Don, of K4MC, had his overseas orders cancelled and now is getting 3WDP/4 fired up. BLR took high c.w. honors, and HLF high combined c.w./'phone in the YL/OM Contest. JUJ got a WANE certificate. CIT and DQI combined for the exhibit station at the Arlington Science Fair. SPE, MCL, WJJ, JFV, and UGO are sidebanding. AAD is completing the kw. rig and planning s.s.b. AJJ reports KN4ASI was drafted. LW and YKB are QRL Navy cruises. K4ASU is turning in good traffic totals and meeting all Virginia nets. A QSL was received from KFC as the anniversary of the last exchange 20 years ago when we were 6KFC/3KU. He wants to repeat in 1975! YZC reports he, pappy YE, and kid brother KN4CAX will summer in North Carolina operating as AGI. Traffic: W4BLR 695, K4ASU 105, W4AMZ 46, TVO 42, YKB 32, K4MC 28, W4AAD 13, AJJ 12, IA 9, RGZ 7, BYZ 5, IF 3, CGE 2, LW 2.

WEST VIRGINIA—SCM, Albert H. Hix, W8PQQ—SEC: YPR. PAMs: FGL and GCZ. RMs: DFC, GBF, HZA, and JWX. BWK is quite active now, as is PZT. The Princeton Club held a big picnic June 5th. GCZ started a code class last fall for seven boys; five now have their Novice tickets. Congratulations, fellows. Let's hear from you. A new Novice in So. Charlestown is WN8WHQ. Welcome to the fold. SHG is plugging away at WAS. CHP is doing a good job with the Globe King. NYH has new Match Box and Coax Ratiometer and is well pleased with them. PZT has a Wheatstone tape punch and keyer which sure sounds good. JWX has a new Johnson rig and is doing a bang-up efficient traffic job. GCN is on s.s.b. and has a very good signal. SNP is getting along very well with his bug. The Tri-City Club meets the 1st Fri. of each month at the Naval Reserve Armory, South Charleston. All are cordially invited to attend. CLZ has a new Johnson KW. He installed a key-click filter in the Ranger which sounds very good. Traffic: W8GBF 139, JWX 126, GEP 87, IZA 87, PZT 70, BWK 35, DFC 16, UYR 16, NYH 6, KDQ 4, PQQ 4.

ROCKY MOUNTAIN DIVISION

UTAH—SCM, Floyd L. Hinshaw, W7UTM—GPN, in support of the ARC of Ogden, conducted another simulated disaster test Apr. 15th. Emergency power was used with communications being carried on 75 and 2 meters. JPN now is all set up and waiting for openings on 6 meters. Hal also advises the local activity on 2 meters is improving. RGT and the Ogden Club held another hidden transmitter hunt with FB eats after 'The June V.H.F. Party will find QDJ and his Davis High pals atop a nearby mountain in an effort to increase the DX possibilities. NIB is busy fabricating a new steel tower and waiting for the new fishing season to open. SF has rebuilt and overhauled his 6-meter gear and will be on hand when the openings come. Traffic: W7JPN 12, UTM 6.

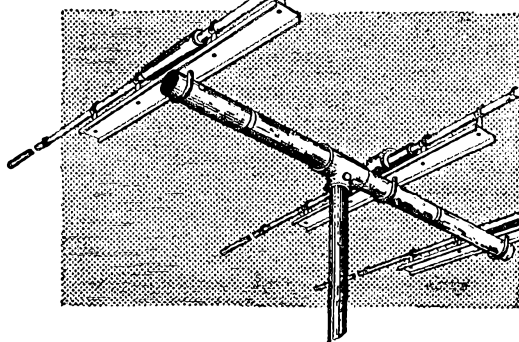
WYOMING—SCM, Wallace J. Ritter, W7PKX—Pony Express Net members handled all National Guard communications during the recent National "Minute-Man" alert in professional manner, thanks to the organizing of MWS and the excellent cooperation of all who participated, those who helped clear frequencies, etc. Congratulations, fellows, on a job well done. The Sheridan Radio Club had a display and station JMN in operation during the annual Arts and Crafts Exhibit with some traffic handled. HIDS, with the help of NCS PAV, is collecting weather reports on the morning session of P. E. Net for the U. S. Weather Bureau at Cheyenne. PAW is doing lots of mobile work while commuting to and from work. Because of the work of LRU and PMA (EC), the Sheridan ARC now has ground allotted by the County for a club house and start of a c.d. emergency

(Continued on page 106)

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The New -- 15, 20 and 40 Meter



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20 Meter, 2 Element Shortbeam

6 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 14,250 Kc. Approximate weight 15 lbs. Longest element 16 feet.

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AMATEUR NET

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20 Meter, 3 Element Shortbeam

16 ft. boom. Forward gain 4.8 db over full size reference dipole. Front to back ratio 20 db. Tuned 14,250 Kc. Approximate weight 20 lbs. Longest element 16 feet.

MODEL R.S. 3-20
AMATEUR NET

\$59⁹⁵

15 Meter, 2 Element Shortbeam

6 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 21,350 Kc. Approximate wt. 15 lbs. Longest element 13 feet.

MODEL R.S. 2-15
AMATEUR NET

\$44⁹⁵

15 Meter, 3 Element Shortbeam

12 ft. boom. Forward gain 4.8 db over full size reference dipole. Front to back ratio 20 db. Tuned 21,350 Kc. Weight approximately 20 lbs. Longest element 13 feet.

MODEL R.S. 3-15
AMATEUR NET

\$54⁹⁵

40 Meter, 2 Element Shortbeam

12 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 7250 Kc. Weight approximately 30 lbs. Longest element 33 feet.

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communications center. The "YO" Net, on 3610 kc., is going fine with approximately 15 regular check-ins, and would like to see more of the Pony Express gang QNI c.w. Traffic: W7PKX 280, HDS 128, PAV 25, AINW 17, VVX 12, ILL 7.

SOUTHEASTERN DIVISION

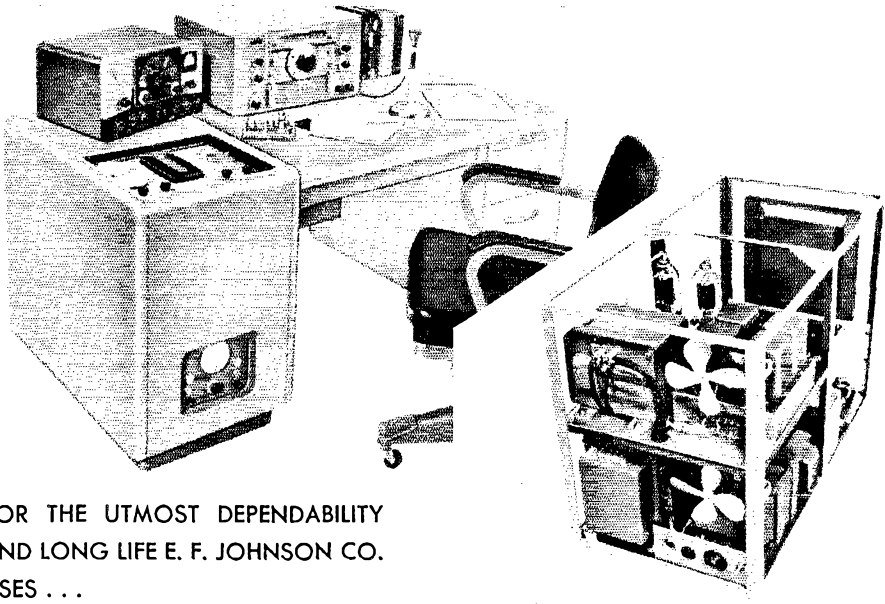
ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL RM: KIX, PAN: RNK. The section has lost a most active member in George, chief operator at K4FDY and a mainstay on AENP, who has been transferred. Montgomery's new local emergency net, AENK, is doing an excellent job with HYT as manager, averaging twenty calls each Sun. at 1300 on 3940 kc. ZSQ is warming up to c.w. and has plans for a battery-powered emergency rig. RNK reports that his 30K is in good shape again. VIY has moved into the new home and has the "power house" going strong again. KN4BJY has the DX fever and says the gang at St. Bernard includes GUR, BFT, WN4FTO, WN4HFZ, KN4BJY, and KN4ASJ. K4AOZ jacked up the antenna another 25 feet, installed baluns, and is laying down a good signal with the Viking 1. K4APP, the XYL of K4AOZ, is a new member of the Southern Belles Net. GET and OLG are new Asst. ECs in Birmingham, and EBD reports that AENR had a total of 134 call-ins during April. Reports on April activity were received from three Novices. Let's have more reports on the doings of our newcomers. Traffic: W4COU 1131, K4FLY 1038, W4UHA 543, HKK 107, WOG 107, KIX 92, EJZ 81, ZSQ 49, TKL 37, CEF 35, ZSH 25, RLG 20, HYI 19, RNK 14, ZWE 10, CAH 9, TXO 8, USM 2, VIY 2, KN4AJG 1, BJY 1.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — The numerous letters I receive tell a remarkable story of ambitious amateurs wanting to get things done for ham radio. Emergency preparedness is certainly the watchword. Special praise goes to our work horses, the Emergency Coordinators. Gainesville: The GAS (100 per cent AREC, too) mobileers held their first simulated drill on 29 Mc. and EC WEM reports perfect county coverage. TJU, mgr. of TPTN, issued the first net bulletin, *The Unmodulated Carrier*, and opines, "A traffic net is a series of breaking stations interrupted by messages." Key West: ELS is using 'phone patch. So long to ZUS, who will be a VO3 on a.m., c.w., and s.s.b. LaBelle: HDU is using a Viking Ranger. Lake City: YNM says the USNR station is K4NCS. Lakeland: UMI reports hams will hold a series of open-house balls for the public. Melbourne: BWR reports increased AREC membership. Miami: IYT reports the Assistant EC for Coral Gables is IQF. The town is providing complete facilities for the AREC/DEN at the police station. PBS says the DEN was called out for the ENG alert/mobilization. PBS and IQF called a surprise DEN drill. IYT and PBS report that Radio WAHR (LUS, prop.) carries "Calling CQ" each Sat. a.m. for a half hour. Your SCM would like to have comments from anyone hearing this program. PBS is remodeling the shack, St. Petersburg: Convention? It was the best. Tampa: New club officers are LAW, YDI, ALP, and YFI. Jacksonville and Miami were enthusiastic about the visit of Ed Tilton. Jacksonville will set up an Armed Forces station again. The RACES plan has been approved for Orange, Dade, and Sarasota Counties. Traffic: (Apr.) W4PIU 513, TJU 221, ELS 148, HWR 109, YJE 74, WS 70, LAP 68, K4ANW 42, W4WEO 42, ZIR 37, IYT 29, IM 27, SVB 23, FSS 17, BZI 18, LMT 15, PBS 10, KN4AAA 8, W4RWM 8, DES 7, HDU 6, WEM 6, FWZ 5, EHW 4. (Mar.) W4LMT 47, RWM 21, EHW 1.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE, ECs: MFY and HIZ, K4AKP makes BPL the second month in a row. GMS is looking over s.a.b. gear. BGG wants mobile gear for the Ford. AXP is reworking the main power supply that failed during LO Nita. We regret to report the passing of UCY's mother. CCY wants more and more power. DAO, RZV, PQW, ZUN, HJA, BZX, TTM, UUF, and MUX all meet the gang on the Pensacola Party Line each Sun. a.m. UUF keeps the 144-Mc. DX under control. QK meets the Hurricane Net and enjoys late-hour QSOs. KN4CLJ is keeping the air hot with his Adventurer. KN4CLK is another newcomer in Pensy. KN4HBE is gathering the QSLs. PAA wants new tower and beam. MS wants a 51SB to go with the 5100. ZPN and VR are the 7-Mc. c.w. men. JPD keeps 7-Mc. 'phone hot. KN4AEP has antenna troubles. FHQ keeps an ear on the bands. HQG is planning a get-together with UUF. EAR wants to increase power. Traffic: (Apr.) K4AKP 1091. (Mar.) K4AKP 786.

GEORGIA — SCM, George W. Parker, W4NS — SEC: OPE, PAMs: ACH and LXE, RMs: MTS and OCG. Nets: The Georgia Cracker Emergency Net meets on 3995 kc. Sun. at 0830. Tue. and Thurs. at 1900. The Georgia State Net (GSN) meets on 3590 kc. Mon. through Fri. at 1900. BWD now is on 40-meter c.w. with an ARC-5. DDY is going great guns on 80 meters and has made BPL for two months now. KN4BXD is a new Novice in Quitman. HYY now is Radio Officer of the Atlanta Metropolitan Area C.D. YUM now is active on 15 meters. YWP has a new IQ-140 and has rigs ready to go on 6 and 2 meters. KN4CZR is the XYL of CFJ. New appointments: DWE as EC for Hart and

(Continued on page 108)



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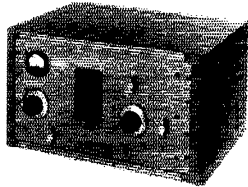
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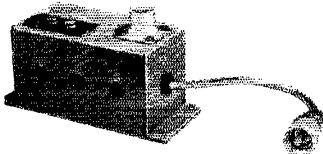
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Elbert Counties, KGD as EC for Lumpkin and White Counties. The Georgia Cracker Club will hold its annual meeting and picnic at Lake Blackshire, near Cordele, on Sun., Aug. 21st. Nine new Novices are awaiting their calls after completing the course offered by the Atlanta Radio Club. ZD, MTS, and KOR, the licensing committee, and instructors have announced the formation of a new series of classes for Novice and General Class. Thanks for the nice crop of reports this month. WKP now is mobile. CVY is getting the bugs out of his new mobile rig. PVR has a new Elmac receiver and transmitter. Let's have a little news along with those reports, fellows. Traffic: W40CG 151, DDU 143, PIM 105, CFJ 82, YWP 79, ZDP 55, DJW 45, HYV 35, ZUF 29, ZID 26, NS 24, BWD 22, ZWT 20, MTS 16, HYW 8, YTO 8, YUM 7, BKV 4.

WEST INDIES—SCM, William Werner, KP4DJ—WR is new Aguadilla District EC. QR is on with a new Viking II, Matchbox, Windom antenna, and HQ-140 receiver. WT reports to the Weather Net on 3865 kc. daily at 7 A.M. and 5:30 P.M., plus the AREC Net on Wed. at 8 P.M. on 3925 kc. ABD and NY have new Globe King 500 transmitters. CO's emergency battery-powered transmitter is a Collins TC59 working off 12 volts. QR's ground consists of a b.c. station's 120-wire radial system. UT has both a 12-volt and 110-volt power supply for new PMR6 receiver. DV is using an Elmac mobile rig to drive the kw. final at the home station. TZ transferred to Fort Sheridan. WR uses a Windom antenna on 80 and a folded dipole on 20 meters. WV burned out the power transformer in the receiver. PZ uses three-wire folded dipole with 640-ohm line on 75 meters. VA, the College of A.&M. station, uses a pair of 813s and speech clipping. PZ is building a speech clipper. AZ and JE are using vacuum-tube keying. RL has a Viking I. DJ is using half-wave 600-ohm line for 80-meter operation. NCSs of the 3559-kc. Net will look for answers from Novice stations on 3700/3750 kc. ABA is building an 813 transmitter. ABI is using a pair of 807s. ABD and ZC built 20-meter beams. RA is using a 40-meter antenna on 80 with an antenna tuner. RM bought a Non-Key. ABA received a QSL for the first IRL QSO on 3.7 Mc. CB joined the AREC. AAC was the section's high scorer in the SS. The PHARC has formed a ladies' auxiliary. Traffic: KP4WT 45, ZW 38, DV 2.

CANAL ZONE—SCM, Roger M. Howe, KZ5RM—KZ5FL, HK3AA, KZ5NM, and HC1CB did a line job on some emergency traffic and probably saved a man's life by getting an iron lung from the Canal Zone to Bogota, Colombia, in a very short time on Apr. 24th. Also FL is keeping the civil defense sited with W4B while DG is on her vacation Stateside. DG and GD were hosts for the radio club party at their home recently. Kurt Carlsen, W2ZXM/mm, was in Canal waters recently but did not get a chance to come ashore. KP, a charter member of the "washer gang," now has a 10-over-15-over-20 array. JD, DG, GD, JF, EP, RM, KA, PL, and VP are among those reported to be on vacation Stateside. Vice-President AE is doing a good job of running the CZARA while Prexy JD is on leave. BE checks into the traffic exchange on 7165 kc. daily at 1930 EST. Traffic: KZ5WA 70, CF 40, DG 22, BE 21, KA 13.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, W. J. Schuch, W6CMN—SEC: QJW. RMs: GJP and BHG. We regret to report the passing of Horace Bodine, LUJ. The Two Meter and Down Club will miss him very much. The Hamilton High School Radio Club has a new Viking Ranger. New officers are QXH, pres.; QIB, secy.; and K6JLY, parliamentarian. The Club also has a new all-band ground-plane antenna. K6IYF has joined the Mission Trail Net. PZN has 600 watts to an 806. K6COP has a new Q multiplier and 8-meter on his NC-88. QJW reports the section leads the nation in activity under AREC/RACES for any section with 1428 AREC members, including 487 RACES authorizations. BEQ raised his 7-Mc. antenna and the wind immediately lowered it for him. AM is installing his fifth final. HIF is back at work after a long illness. Good luck, Walt. K6KMJ has a new Viking II. RW now has 242 countries worked with 232 confirmed. MBW has a new 818 rig and is active on SCN and TC.RN. KN6HOV now is on 40- and 15-meter c.w. with 75 watts. BUK has a new Dodge and is QRL installing mobile. USY skeds KA2USA on 14 Mc. The Pacific Radio Club had a party and guests were UID, K6GHP, EEO, CEO, and BFC. ZDO has a clean bill of health from the TVI Committee on his 50-Mc. rig. CMN is polishing up fish hooks for his vacation in June and July. KN6HPZ has a Johnson Adventurer rig and has worked about 20 states so far. QWN finished basic training and moved on to Denver Armament School. K6D1K is active on 6 meters. QVS has a new s.s.b. exciter. K6DQA now has 10-meter mobile in the car. KL7NXI now is W6KWS. Traffic: (Apr.) W6GYH 313, K6EJT 289, W6USY 276, CMN 211, WPF 208, MBW 158, BHG 154, K6DQA 144, W6MLZ 108, CAK 96, GJP 65, HIF 54, KN6JN 41, K6BWD 40, COP 37, EA 33, W6ORS 27, VVJ 21, KN6HOV 18, W6TDO 15, CK 14, BYH 12, K6IYF 7, W6AM 6, PZN 6, CBO 5, NTN 3, BEQ 2, K6ELX 2, (Mar.) KN6JN 24.

SAN DIEGO—SCM, Don Stansifer, W6LIRU—Asst. SCMs: Tom Wells, 6EWU; Shelley Trotter, 6BAM; Dick

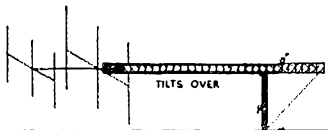
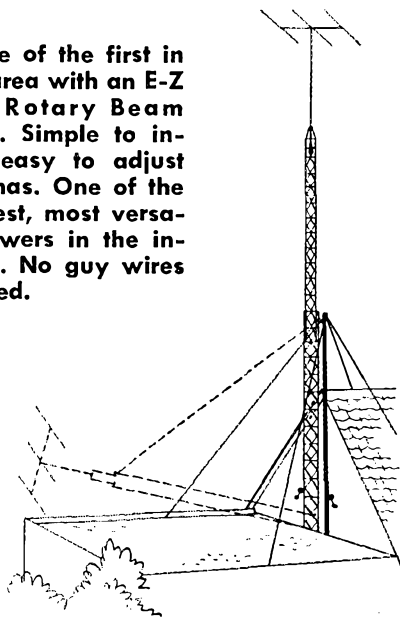
(Continued on page 110)

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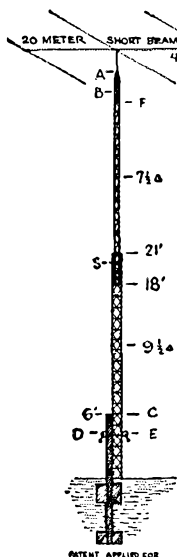


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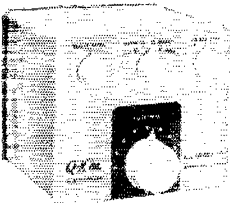
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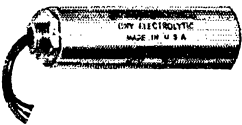
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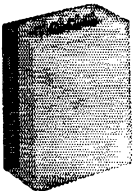
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Huddleston, 6DLN. SEC: VFT, ECs: BAO, BZC, DLN, HFQ, HIL, HRI, IBS, KSI, KUU, and WYA. RM: ELQ. The annual Upper Ten Picnic will be held on July 10th at Glenn County Park near Cardiff. The usual good time is assured. IZG again is handling traffic after a switch in QTH to National City, BAm, an old-time DX and traffic man, is checking into the SCN when work permits. K6DBG, W60ZO, PEJ, TGB, KN6IBY, and GPG provided ship-to-shore communications for the Orange County Outboard Club, with help from K6BEC, fixed, and FBF, mobile, in San Diego. New officers of the Coronado Club are K6AZW, pres.; K6BCG, vice-pres.; EDG, secy. VJT, president of the Upper Ten Club, has resigned because he was called to duty. K6BPK is offering code and theory classes to interested YLs and XYLs. The Palomar Radio Club had a fine program with IAB, at Camp Pendleton, for Armed Forces Day. The Orange County gang continues to have one of the finest mobile groups in the State. SYA and his wife vacationed to Florida with their new house trailer. The c.d. drill held by members of the Gillespie Amateur Radio Club was an outstanding success. Operating was done under conditions not expected for that time of the year, with rain, hail, snow, and extremely high winds. The entire group provided excellent communications and the results were beyond all expectations. With summer here all points toward camping, fishing, and that long-awaited vacation. Happy traveling to all, but please keep me posted so our column will continue to have more than just a heading to it. Traffic: W6LAB 3159, YDK 453, IZG 231, K6DBG 34, W6KVB 30, BAm 1.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — Greetings from your new SCM and thanks for your support. New appointments: W6REF/6 as RM, K6ATX as OES, K6IPF as OBS, 3RNY is the new operator of K6CST at Point Mugu. AGO was appointed Act. Mgr. of the Paso Robles Club. TOP is back in Chicago for special training. MSW is the proud papa of a YL harmonic. CMR won a scholarship award. FYW says all he gets is more cats. Hii, K6CJ, Santa Maria; K6BOU, San Louis; and W6JFP, Guadalupe, are new stations on 2 meters. DX hounds take note: KN6IRM passed the Tech. Class exam. That buzz you hear from GH is not his rig, but a bee hive in the wall of his shack. The Santa Barbara Radio Club was 35 years old in May. Congrats! MWA now sports a half-gallon rig. IGH is installing all-band mobile in the new car. The new section c.w. net (SBN) meets Mon., Wed., and Fri. at 1845 DST on 3600 kc. K6NBI tops in traffic again. Traffic: K6NBI 279, W6REF/6 132, QIW 20, YCF 14, FYW 3.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM, PAMs: PAK and IWQ. RMs: PCN and QHL. OXI is ex-IAYG, formerly an SCM. BPT reports KN5ADI is a new Novice in Palestine. The Abilene Amateur Radio Club elected ANL, pres.; VEP, vice-pres.; DEG, secy.-treas. The North Texas C.W. Net handled 169 pieces of traffic in 16 sessions. The DARC is active in civil defense planning. ZTG has a new 4-125A rig on the air now. HKF reports the Terry County Radio Club is making contacts on emergency power. The Odessa Amateur Radio Club sponsored a successful hamfest recently. NW acted as MC at the barbecue luncheon served by the famed Chuck Wagon gang. AFR reports on the East Texas Amateur Radio Club's annual hamfest. RHP won a Ranger. RRM was the principal speaker; MCs were LZV, IQW, and WIJ. The 75-meter transmitter hunts were won by QWJ and OLD; the 10-meter transmitter hunts by RMH and ITUU. The Texoma Amateur Radio Club of Sherman had emergency duty on April 6th, when a tornado struck in the area. Those participating were UTB, LDZ, POG, LDG, SCR, DGG, and UIQ. Public recognition of the part played by amateurs was written up in the Sherman paper by Civil Defense Director Dick Ragsdale and Auxiliary Police Chief Raymond Tucker. The East Texas Amateur Radio Club participated in the Warm Springs Foundation Telethon on March 19th and 20th. Stations participating were ZJM, MAW, HBD, OIS, CTF, HAJ, IYJ, VAM, YYH, IWQ, FOY, YIU, AFR, AFB, AFW, IZU, and WVH, who reported. Traffic: W6TFB 1202, K5FPB 1101, W5YFA/5 807, KPB 597, ACK 220, AIC 199, EJB 194, UBW 194, ASA 78, TTU 57, CP 24, ZTG 20, PCX 13, BPT 8, OCY 8, FIT 7, EOZ 6, TEP 5.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Camdy, 3GIQ, SEC: KY, RM: GVS, PAMs: PML, SVR, and ROZ. New officers of the Tulsa ARC are SWJ, pres.; AAH, vice-pres.; DCE, secy.; EYK, treas.; KY, pub. rel. New officers of the Pittsburg Co. ARC are UAO, pres.; OQM, vice-pres.; GXH, secy.-treas.; AEH, pub. dir. Tulsa Central H.S. has plans for a station. ORH has 300 watts mobile on a.s.b. PZW has moved to Kansas City, Mo. TEC pulled two awards at two college science fairs for a photo-voltaic-cell powered transistor audio oscillator. The ACARC has incorporated and now has 55 members, all ARRL members. FCV is a new ham at Enid and flight surgeon at Vance AFB. GVS reports increased activity on OIZ, the Oklahoma c.w. net, which expects to continue operation all summer. An attempt is being made to better the present auto license plate bill to

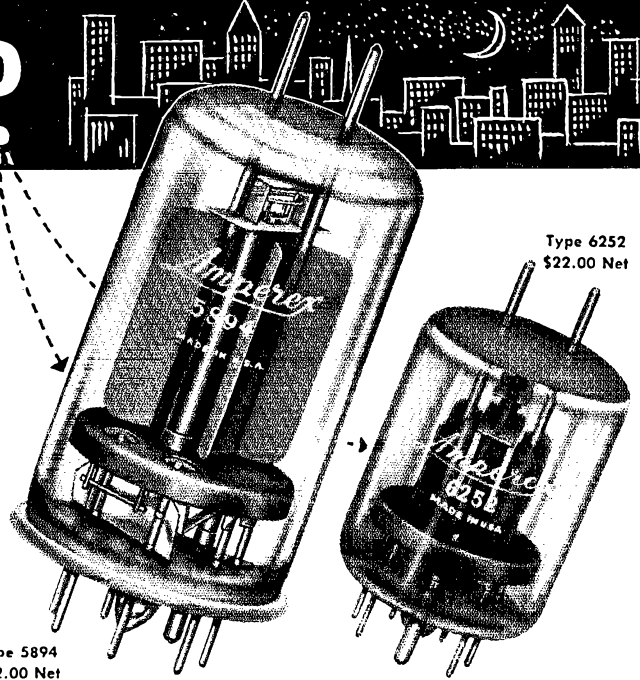
(Continued on page 112)

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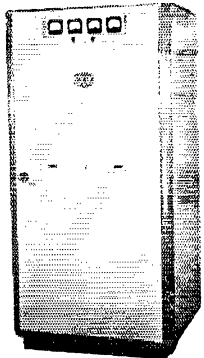
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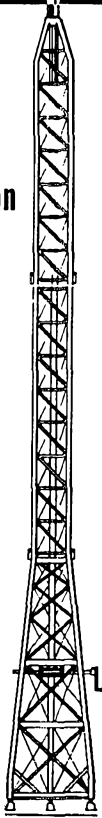
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provide two plates in lieu of the regular plate and available for mobiles only somewhat similar to the present Texas and Virginia laws. Thanks are due Senators Wilson and Frazier and Rep. Norman for authoring the bill and we should do all we can to persuade its passage. We cannot stress too strongly courteous driving practices and extreme caution while mobiling. The h.f. bands are on their way back, as witness the 15-meter band which is very hot at times. Traffic: W5PML 791, FFC 583, GVS 322, JXM 251, HCG 144, MGK 78, SVR 67, GXH 63, ZKK 58, QAC 52, PU 48, CBY 46, PNG 45, ADC 44, TNW 42, MFX 31, RST 31, CFG 29, MQI 16, CXM 11, ESB 8, ITF 8, SWJ 7, UCT 3, PAA 2.

SOUTHERN TEXAS—SCM, Morley Bartholomew, W5QDX—DTJ and ZIN are fighting it out to see who gets WATC (Worked All Texas Counties). MN still is spending most of his air time handling traffic. YXII is building a new kw. c.w. rig. Vince says the jr. operator, EDG, is crowding him. Congratulations, Vince, on qualifying for Class 1 OO. GQ is on 75 meters with a 20A a.s.b. exciter. JKC and LDU have moved to Fort Worth. UB gave a talk on a.s.b. advantages to the SARC members at their regular meeting. SMG received his "Greetings" from Uncle Sam. We'll miss him around these parts. FJX is back on the air at his new QTH in San Antonio. The Austin mobile gang is active on 29,200 Mc. Hidden transmitter hunts are staged every Saturday night. QEM is your new SEC. If you are interested in becoming EC for your city and are willing to devote the time to it, contact Roy. QZJ is EC for the Austin Area. Mobile operators: Now is the time to fill out and file Form 53 for your 1956 call letter plates. You must make applications each year. October 1st is the deadline. Traffic: W5MN 786, DTJ 24.

NEW MEXICO—SCM, Einar H. Morterud, W5FPB—SEC: KCW. PAM: BIW, V.H.F. PAM: FPB. RM: JZT. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club every morning except Sun. at 0700-0900 MST on 3838 kc.; the NM C.W. Net daily on 3633 kc. at 1900 MST. Balloting for SCM resulted as follows: FPB 100, BIH 69. K5AQK reports into the Breakfast Club from Clayton. Other calls heard on 3838 kc.: BRV, AGX, KMC, BWV, BLO, GZG, GQA, DVA, FHU, VIA, HVE, FEF, COS, BCT, RNG, EFT, CHX, GGO, and HOE. New officers of the Hobbs ARC are: RES, pres.; JVX, vice-pres.; Harold Windle, secy.-treas.; FTP, act. mgr. ZU, as retiring SCM, wishes to thank all who diligently reported activities, and the gang who were always in there for net activities. Let's have more make BPL to qualify for the BPL traffic medallion described on page 73, May QST. QR has had bad dust static during recent months at Presbyterian Sanatorium and is unable to get on because of his health. AKR reports hospital QRM. Traffic: K5WSP 891, W5RFF 134, JZT 110, CEE 49, ZU 23, BZB 13, BZA 7, BXP 4, DWT 4, HOE 4, WBC 2.

CANADIAN DIVISION

MARITIME—SCM, Douglas C. Johnson, VE1OM—Asst. SCM: Fritz A. Webb, 1DB. SEC: RR. New appointees: FH, Cape Breton EC; AAY, N.B. EC; ABZ and WK as OPs. Ex-1HT now is WP. ZL is ex-1EB and VO6EP. SM7MG was a recent visitor to Halifax. UE is active on 75 meters with 35 watts. Newt depends on a 500-watt plant for power. ACL reports formation of the PEI Emergency Net. DQ is heard from his Grand Lake summer QTH on 75 meters. LZ is with CBC in telecine work. VO2B has left for Ottawa. VO1T assumes duties as c.d. communications officer. VO1D is an EC. AECs are VO1T and VO1AB. VO1AB has a new mobile and held a transmitter hunt in April. VO1AM and VO1AN are on 'phone. VO2CM is building a new all-band rig. VO2AC is QRL with mobile gear. VO2AW is going linear. W4SIY-VE1 is operating from Shelburne using a Viking Ranger. IC is going north for the summer as operator on the CGS *Cornwallis*. VO6U plans to go on 50.44 Mc. VE1GI is being heard again on 20 and 75 meters. The ARRL Maritime Convention will be held at St. John the last two days of July. UT expects to be mobile shortly. The Maritime 'Phone Net meets every evening on 3750 kc. at 7:00 ADT and will welcome visiting U. S. mobile stations calling in when up in the VE1 area. This net ties in with the CGP and can QSP any messages back home. LJ/1 is heard on 75 meters operating from Camp Gagetown, N. B. Traffic: VE1FQ 180, DW 175, VO6AH 109, VE1OC 70, VO6U 62, VE1QM 60, VO1T 48, VE1AV 46, OM 29, VO1D 26, VE1UT 21, ME 18, BL 12, GA 10, WK 7.

ONTARIO—SCM, G. Eric Farquhar, VE3IA—The Nortown Club of Toronto was host to Lee Aurick, W1RDY, Assistant Secretary of ARRL, who addressed the meeting on the legislation of ham radio and showed the film "Ionosphere and Effect on Radio Waves." NG shares a new transmitter with the XYL, DZA, AVS, DTO, and DAR now are mobile. RU has returned from Mexico. DTO and DIL now are Class A. BUR keeps early morning skeds with the help of a new receiver. PH mobiles to the Maritimes. AUU enjoyed the Oshawa Hamfest. AGE and AWQ attended the Dayton Hamvention. AWQ was the happy winner of a Collins transmitter. The fingers of BSW lost out with the garage door in an accident. The Ottawa Club

(Continued on page 114)

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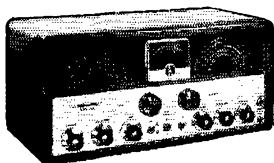


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Collins KWS-1.....	1995.00	Central 10B.....	129.50	Hallcrafters S38D	49.95
Collins 32V3.....	775.00	Central 20A.....	199.50	Hallcrafters S85	119.95
Ranger Kit.....	214.50	Central 600L.....	349.50	Hallcrafters SX99	149.95
Ranger wired.....	295.00	Elmac PMR 6 or 12	134.50	Hallcrafters SX96	249.95
Viking II kit.....	279.50	Elmac AF-67.....	177.00	National SW54....	49.95
Viking II wired.....	337.00	Morrow 5BR1.....	73.45	National NC88....	119.95
VFO kit.....	45.50	Morrow 5BRF.....	66.39	National NC98....	149.95
VFO wired.....	62.50	Morrow FTR.....	125.83	National NC125..	199.95
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KW amplifier.....	1595.00	Gonset Communi-		H-W R-9.....	149.50
RMDDB-23.....	49.50	cator.....	229.50	H-W T-9.....	179.50
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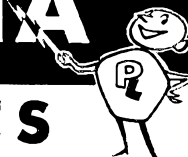
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Current (max) 150 ma.
Diss. (max) 75 w.



PL-4D21

Beam Tetrode

Filament

Voltage 5.0 v.
Current 6.5 a.

Screen Grid Rating

Voltage (max) 600 v.
Diss. (max) 20 w.

Plate Rating

Voltage (max) 3000 v.
Current (max) 225 ma.
Diss. (max) 125 w.



PL-6569

Triode

Grounded-Grid Type

Filament

Voltage 5.0 v.
Current 14.5 a.

Plate Rating

Voltage (max) 4000 v.
Current (max) 300 ma.
Diss. (max) 250 w.



PL-5D22

Beam Tetrode

Filament

Voltage 5.0 v.
Current 14.5 a.

Screen Grid Rating

Voltage (max) 600 v.
Diss. (max) 35 w.

Plate Rating

Voltage (max) 4000 v.
Current (max) 350 ma.
Diss. (max) 250 w.



Technical data sheets giving ratings and typical operating conditions are available. Ask for data file 701.



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held a banquet and auction night. Cayman Island Night was held at the Hamilton ARC when CJ took the gang on a travel to that paradise of the West Indies and told about his third trip. He operated under the call VP5BP to give many a new country. As one who heard Noel, I extend thanks for such an evening. Traffic: VE3BUR 191, AJR 163, NG 93, VZ 93, DPO 60, AUI 30, KMI 27, NO 24, AOB 10, AVS 7, VD 6, PH 5, IO 5.

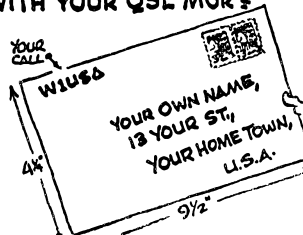
ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAAL: OD, RM: XG, WC says he is getting FVI troubles licked. AL is operating phone on 3.8 Mc. PC has qualified for phone operation. OC is back on the air from the new Edmonton QTH. ZR is QRL with new mobile installation. NX and MJ both are chasing the elusive 1X. EP is building a new receiver. VE is QRL with plans for his daughter's marriage. The code practice sessions heard on 3768 kc. during the past months will be suspended during the summer months but will be resumed in the fall. JF is working on an oscilloscope for modulation purposes. Traffic: VE6HAM 88, AL 21, WC 12, MJ 4.

BRITISH COLUMBIA — SCM, Peter M. McIntyre, VE7JT — SEC: DFH. Summer being well on the way everybody will be doing all the usual summer antenna repairs, and dodging the ever-present household chores. Barring the few traffic reports this month there is not much to report. The mobile activity is picking up now that the good weather is here with hidden transmitter hunts and mobile pi-ni's in the oling. The last hidden transmitter hunt of May 1st was taped and should have been heard on the CBC Roving Reporter series on the local Vancouver CBC station, CBU. Last month's column, I hope, will bring some things to report next month. Keep your ears open for 7JB, whose aim has been to start a swap and shop gimmick for the amateurs at a convenient location. It should prove very beneficial for the amateurs to trade or swap for the stuff they need with what they have that someone else wants. Also every Wed. night on the AREC Net on 3755 kc. is the swap column night. There is a list of phonetics printed in the Handbook. It would save a lot of the net's time if the stations would use phonetics, especially when making relays. Give it a try! Traffic: VE7QC 208, ASR 105, AQW 44, AUF 32, AIO 16, ZV 14, ZF 9.

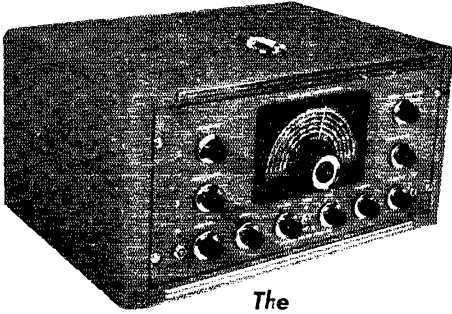
MANITOBA — SCM, John Polmark, VE4IL — OO: RB, LO, now tractor mobile, hasn't quite licked the noise yet. EF finally has gotten his 20-meter beam working. KG is going to have a try at mobile. The AREC is off to a fine start. How about some more applications? GV has his rig working again. Glad to see you back, Jimmy. VE3DVF/M4, ex-4AX, was back for a short visit with his FB mobile. AY is back after having transmitter troubles. Congratulations to XW on getting his commercial flying ticket. NW finally is getting moved to the lake. How about a few activity reports? Traffic: VE4AI 23, KL 12, HL 10, YR 10, KG 9, EF 7, FF 6, XP 4, GB 2, OB 2.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — This report is being made up at the hospital, my QTH for the past two months. I would like to say thanks to all the gang for the kind wishes that have been received, both via 75 meters and by card. Through the courtesy of TH I have an S-38 and it has given me many pleasant hours listening in on the bands. BD is on 2M-Mc. mobile phone. BZ is going to 14 Mc. for the summer. FG is QSY Moose Jaw. When two local public schools held Hobby Shows, BG and HR set their stations up. A number of contacts were made and the display was well received by the public as well as the school children. JO has been promoted with the Power Corporation and is now located at Regina Beach. We regret to record the passing of SD on Apr. 13th. He will be greatly missed by the Prince Albert Club. DR made BPL with his traffic handled during the big blow. 5AJ and 6AL were instrumental in locating an overdue aircraft en route to Saskatoon during the big storm. Traffic: VE5DR 177, YF 33, RE 26.

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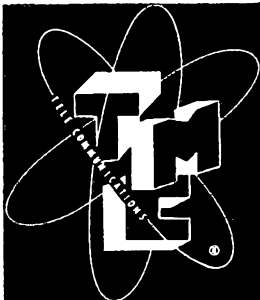
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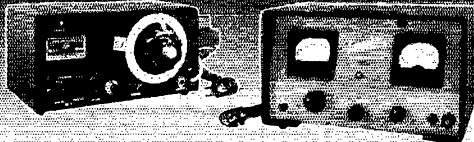
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S.S.B. VFO

(Continued from page 12)

hold the loop thus formed. The tap should be tinned before the coil is mounted, to facilitate connecting the lead from C_4 . L_5 is wound in a straightforward manner, terminating on the split-ring terminals provided with the LS-3 coil form. C_{10} is connected across the coil to these same rings. After winding, both coils should be coated with coil "dope." L_2 , L_3 , and L_4 are pre-wound coils and can be adjusted to resonate to the required frequencies with tube and circuit capacitances.

Most wiring can be completed point to point, except the B-plus, which is terminated on tie points. In the Central Electronics exciter the 6.3-volt filament supply has its center tap grounded, necessitating a two-wire filament circuit. The wiring to the oscillator section was run in the fold of the chassis and didn't have to go through the shield since there was sufficient room for these leads between the shield and the chassis. However, the wires could be fed through a $\frac{1}{4}$ -inch rubber grommet if necessary.

The interconnecting cable is made up of 3 ordinary leads and a piece of coax for the r.f. The plugs on each end, and their connections, will be determined by the type of socket on the exciter (octal on the 10-A) and J_1 . The cable was taped with Scotch electrical tape for neatness.

Adjustment

First, check all wiring and determine that no errors exist. Then connect the cable between the exciter and the VFO. Turn on the exciter and determine that both tube filaments light. Do this with the VR tube out of its socket as the jumper in the tube will open the B-plus to the tubes. Remove both tubes from their sockets, replace the 0B2 and adjust the dropping resistor for 23 to 25 ma. of current through the VR tube. Next, insert the oscillator tube, V_1 , and listen around 5 Mc. in the receiver for the oscillation. It would be wise to connect a low-range milliammeter between the cathode choke and ground. It should indicate approximately 10 ma. Peak the signal with the slug in L_2 .

Now comes the important part, to determine the range of the oscillator from maximum to minimum capacity. It will be more than the required 500 kc. Set the 5-Mc. point at 5 on the logging scale, by adjusting the slug in L_1 . Now carefully remove one plate at a time from C_1 , readjusting L_1 as necessary. As each plate is removed, record the new range of the oscillator on a piece of paper. As you progress, a pattern will emerge of the ratio of change as each plate is removed. When the 500-kc. range occupies almost all of the scale, the pattern will warn you that to take off one plate more will be one too many. This procedure determines the bandspread of the VFO. The writer's VFO covers the 500 kc. needed between 5 and 93 on the logging scale of the MCN dial.

Next, plug in the buffer/multiplier tube, set

(Continued on page 118)

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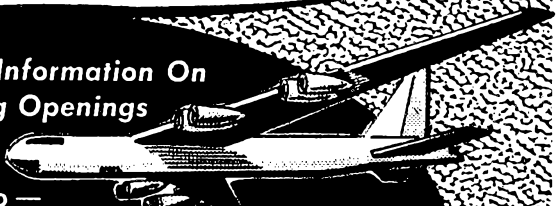
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Eimac air-system sockets are custom designed to provide adequate cooling with the most economical blower requirements for several Eimac radial-beam power tetrodes.

4-400A, 4000 air-system socket is employed with Eimac tube type 4-400A. Air enters through the bottom of the socket and is guided by a pyrex glass chimney, assuring efficient cooling of the various seals. If desired, this socket may also be used with Eimac 4-125A and 4-250A.

4-1000A, 4000 air-system socket is designed for use with Eimac tube type 4-1000A. Air entering the bottom of the socket is guided by a pyrex glass chimney toward the plate seal, assuring correct cooling even during maximum rating operation of the tube.

4X150A, 4000 air-system socket provides adequate air cooling and high frequency circuit arrangement for Eimac 4X150A and 4X150D. Air enters the socket through the bottom and is guided by a ceramic chimney.

4X150A, 4010 socket is identical to the 4X150A, 4000 except that this socket is complete with grounded cathode connecting tabs. Eimac air-system sockets and chimneys are also available as separate units.

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the bandswitch in the S0-20 position, and with the dial near midscale peak the slug in L_4 . There should be some increase in signal strength in the receiver as the gain of the buffer stage is added. Next, set the bandswitch to the 160-meter position and listen for the signal around 10.9 Mc. Peak L_3 for maximum signal. The VFO dial will have to be moved toward the 5.5-Mc. end. Next, set the dial near the 5.4-Mc. point and the bandswitch to the 40-meter position, and look for the signal around 16.2 Mc. on the receiver. Now peak L_5 . For accurate placement of the 5.0-Mc. point (about 5 on the logging scale) zero-beat the oscillator with the 5-Mc. signal of WWV and adjust the slug in L_1 . This completes the adjustment, but after attaching the cover (bottom plate) with sheet metal screws, recheck all the above adjustments, touching up the slugs where needed.

The oscillator adjustment procedure can also be used to adjust the bandset dial on two-dial receivers. With the 10-A in "Cal," set the bandspread dial on the receiver to 4.0 Mc., then carefully tune the bandset dial until the signal is heard zero beat. The receiver is then calibrated for the 75-meter band at 4.0 Mc. (provided the 9-Mc. crystal in the exciter actually is on exactly 9 Mc.).

Your VFO is now ready to give you s.s.b. operation on four bands.

Receiver Modifications

(Continued from page 27)

Appendix II

Revision of 75A-3 to use 6DC6 or 6BZ6 as r.f. amplifier. All resistor tolerances ± 10 per cent unless otherwise marked.

For sets serial number 1299 and under using the 455B series of mechanical filter:

- 1) Replace 6CB6 with 6DC6 (V_1).
- 2) Remove R_{66} (120 ohms) and C_{106} (cathode by-pass), tie Pins 2 and 7 of r.f. amplifier to chassis.
- 3) Remove R_{68} (1.5 megohm). (Some sets may use 1 megohm.)
- 4) Change R_7 (V_2 cathode) from 68 ohms $\frac{1}{2}$ watt to 180 ohms $\frac{1}{2}$ watt.
- 5) Check to see that Pins 2 and 7 of V_{18} are connected to chassis. If not, connect them. (This modification has been made on sets with serial numbers higher than 950.)
- 6) Remove a.v.c. from Pin 3 of mechanical filter box assembly. Connect Pin 3 of filter box to junction of R_{67} , R_{68} (r.f. gain control and minimum bias resistor).
- 7) Add R_{84} (100 ohms, $\frac{1}{2}$ watt) between R_{50} and Pin 7 of V_7 . Move junction of R_{67} and negative side of meter to opposite side of R_{50} .
- 8) Change R_{67} (meter shunt) to 220 ohms, $\frac{1}{2}$ watt ± 5 per cent.
- 9) Change R_{47} to 220 ohms, $\frac{1}{2}$ watt ± 5 per cent.
- 10) Change R_{50} to 56 ohms, $\frac{1}{2}$ watt ± 10 per cent.

For sets serial number 1300 and over using 455C filter:

- 1) Replace 6CB6 with 6DC6 (V_1).
- 2) Remove R_{66} (120 ohms) and C_{106} (cathode by-pass), tie Pins 2 and 7 of r.f. amplifier to chassis.
- 3) Remove R_{68} (1.5 megohms).
- 4) Change R_7 (V_2 cathode) from 68 ohms $\frac{1}{2}$ watt to 180 ohms, $\frac{1}{2}$ watt.

(Continued on page 120)

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Multiphase Exciter... Model 20A
20 watts peak envelope output on AM, PM, CW and SSB. Single switch for sideband selection. VOX on AM, PM and SSB, plus break-in on CW. Bandswitching: 160 thru 10-meters. Has magic eye indicator for carrier null and peak modulation. Choice of table or rack model.

Wired..... **\$249.50** Kit..... **\$1995.00**



Model
600L

Broad-Band Linear RF Amplifier

No tuning controls except single knob band selector covering 160 thru 10-meters. Requires only 2 watts effective or 4 watts peak envelope drive power for 500 watts DC input. 60 to 65% linear efficiency. Single 813 operates AB₂. Meter reads input power in watts, grid current, output in RF amperes, and shows reflected power with mismatched load. Has input level calibrations for AM, PM and CW. Self-powered with regulated bias and screen voltages. RF is shielded and by-passed for effective TVI suppression. Choice of table or rack model.

Complete with tubes..... **\$3495.00**

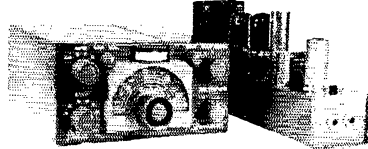
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Wired..... **\$49.95** Kit..... **\$399.50**

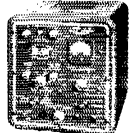
B & W SSB EQUIPMENT



Model
5100S
TRANSMITTER

Bandswitching on 80 thru 10-meter bands. Operates VFO or crystal on CW or phone. input power: 135 watts phone and 150 watts CW. Features Pi-network output, built-in low-pass filter and TVI suppression. Has accurate, stable VFO. Provides 75 watts audio output at 500 ohms. Self-powered.

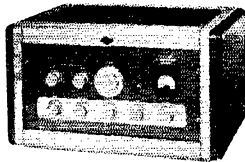
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\$467.50



Model 51SB
SSB GENERATOR

Designed for use with 5100S transmitter. Bandswitching on all ham bands, 80 thru 10-meters. VFO or crystal control on AM, CW and SSB. Features VOX on SSB and speaker deactivating circuit. Self-powered.

Complete with tubes..... **\$2795.00**



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Single knob bandswitching covers 80 thru 10-meters with provision for 160. Pi-network output circuit matches 50 to 300 ohm loads. Four 807's operate class AB₂ and provide substantial power output with low grid drive. Circuit is completely stable and free from parasitics and self-oscillation. Complete metering of individual 807 cathodes, grids and relative RF output. Overload relay and warning light protect screens. Self-powered.

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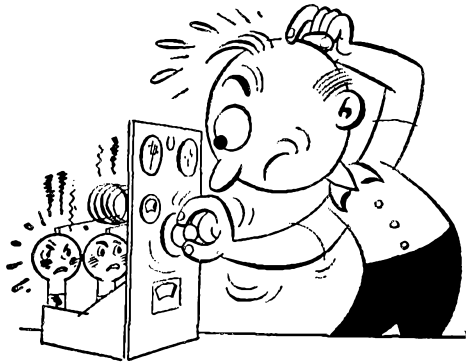
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**GPR
90**

TECHNICAL MATERIEL CORPORATION
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120

- 5) Change R_{81} from 4700 ohms, $\frac{1}{2}$ watt to 10,000 ohms, $\frac{1}{2}$ watt.
- 6) Change R_{67} to 150 ohms, $\frac{1}{2}$ watt (S-meter shunt).
- 7) Remove a.v.c. from Pin 3 of mechanical filter box assembly. Connect Pin 3 of filter box to junction of R_{57} , R_{55} (r.f. gain control and minimum bias resistor).

Appendix III

Conversion of 75A-2 to replace 6BE6 mixers with 6BA7s.

- 1) Carefully unsolder pin connections of V_2 and V_4 .
- 2) Remove 7-pin tube sockets and ream out holes to $\frac{3}{4}$ inch for clearance of 9-pin sockets. Be sure that all loose chips are removed from set, especially around bandswitches.
- 3) Mount new tube sockets. Orient V_2 socket so that Pin 7 is closest to r.f. amplifier. Orient V_4 socket so that Pin 2 is closest to crystal oscillator tube, V_3 .
- 4) Wire sockets per schematics in Fig. 4, being sure that all grid and plate leads are as short as possible and that all chassis connections are returned to the same point they were made to in the original set-up.

Appendix IV

Revision to improve shape of i.f. selectivity curve.

- 1) Remove C_{10} (top coupling for T_6 — not present in all models).
- 2) Add 82,000-ohm $\frac{1}{2}$ -watt resistor across terminals A and C of T_6 (R_{82}).
- 3) Realign 455-ke. i.f. using the following procedure:
 - a) Connect v.t.v.m. d.c. lead to diode load (junction of R_{39} and R_{42}).
 - b) Connect signal generator output to receiver antenna terminals. Set signal generator to some frequency in the 80-meter band. Do not move signal generator frequency during the rest of the 455-ke. i.f. alignment procedure.
 - c) Tune receiver to signal frequency.
 - d) Adjust signal generator output control for an 8-meter reading of $S_9 + 20$ db.
 - e) Tune receiver to the S_9 point on the high-frequency side of the signal. Record the dial reading.
 - f) Tune receiver to the S_9 point on the low-frequency side of the dial. Record the reading.
 - g) Set the dial halfway between the readings determined in steps (e) and (f).
 - h) Set the fiducial (zero set) accurately to some dial division. During the following adjustments, attenuate the signal generator output to keep the v.t.v.m. readings below 5 volts.
 - i) Tune dial 3 kc. lower than the center frequency (determined in step (g)). Adjust T_6 (both top and bottom slugs) for maximum v.t.v.m. readings.
 - j) Tune the dial 3 kc. above center frequency. Adjust T_6 and top and bottom slugs of T_7 for maximum v.t.v.m. reading.
 - k) Retune to center frequency determined in step (g) and tune C_{32} (plate of V_{18}) for maximum readings.

Appendix V

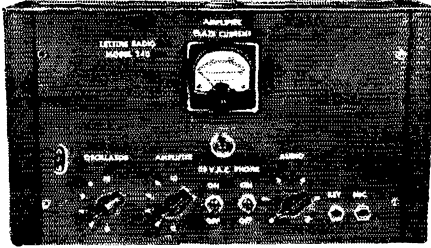
Revision to improve a.v.c. noise immunity.

- 1) Replace C_{82} with .05- μ fd. 300-volt capacitor (grid-plate coupling at V_9).
- 2) Replace R_{35} with 0.33-megohm + 10 percent, $\frac{1}{2}$ -watt resistor (grid-plate coupling at V_9).
- 3) Replace C_{81} with 0.2- μ fd. 200-volt capacitor (grid shunt at V_9).
- 4) Add 180- μ fd. mica or ceramic capacitor from Pin 2 of V_9 to chassis.
- 5) Remove C_{83} (on a a.v.c. line).

Strays

W3LUD is curious as to when ARRL will get around to issuing a WASEN award -- WAS except Nevada, that is!

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This outstanding transmitter has been acclaimed a great performer throughout the world. Air wound plug-in coils used for high efficiency. Takes any freq. from 1.6 to 30 mc. Ideal for General Class, Novice, CAP, C13, Industrial. Sold direct from our factory, ready to operate, 40 to 50 watts input. Phone-CW. Complete with 8 x 14 x 8 cabinet, 40 meter coils, xtal. tubes; 6V6 osc., 807 final, 514G rect., 6S17 xtal mike amp., 6N7 phase inv., 2-61.6's PP mod. Wt. 30 lbs. \$79.95. 80, 20, 10 meter coils \$2.91 per band. 160 meter coils \$3.60.

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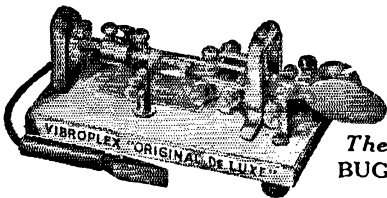
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Break-In Keying

(Continued from page 28)

If the action just described is not obtained, you probably have the rectifiers connected backwards, and they should be reversed. It should be apparent, of course, that the same principle can be applied to a transmitter currently using grid-block keying, since the pertinent parts of the keyed circuit are similar. A vacuum tube diode can be used in place of the selenium rectifier, but it must be shunted by a high resistance to simulate the back resistance.

I have been using this system for two years and have no reason to ask for more. The keying is clean because the characters are being formed in the next to the last stage of the transmitter, and no back wave is heard with the key open and the receiver set at above normal gain.

Six Meters

(Continued from page 32)

Such a coupler or balun can be connected anywhere: at the transmitter, at any convenient point between the rig and antenna, or at the antenna itself.

An antenna system that is designed for 300-ohm Twin-Lead feed, such as the 4-element array described in all the *Handbooks*, can be fed with coax and either of the coupling devices shown in Fig. 2. The coupling circuit of Fig. 2A can be used with either 50- or 75-ohm coax, and the line can be any balanced transmission line presently available. The components of the coupler can be similar to those used in the plate and output-coupling circuits of the final stage.

Adjustment of the coupler and the antenna system can be done positively only if a standing-wave indicator of some sort is inserted in the coaxial line. Adjustments should be made for minimum standing-wave ratio first, and then the coupling at the transmitter should be set for the desired loading. A low s.w.r. is particularly important if coaxial line is used all the way to the antenna system. The design and use of s.w.r. bridges are covered in all recent *Handbooks*.

Strays

Bob Barry of Santa Barbara, a rabid Democrat and an Adlai Stevenson tub-thumper, got his come-uppance from FCC when they issued him his ticket: **KN6IKE!—K6ATX**

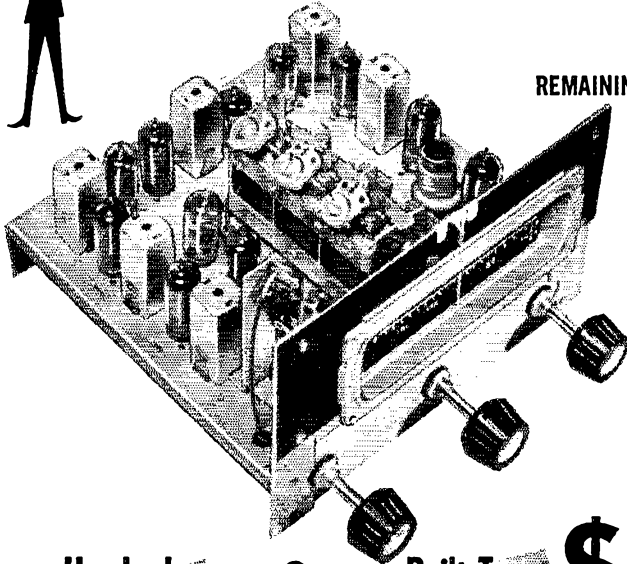
If you have trouble getting the Global (Carborundum Co., not GE) type CX resistor called for in "The Z-Match Antenna Coupler" which appeared in *QST* for May, 1955, you can get one for \$4.90 prepaid from Harvey-Wells Electronics, Inc., Southbridge, Mass.

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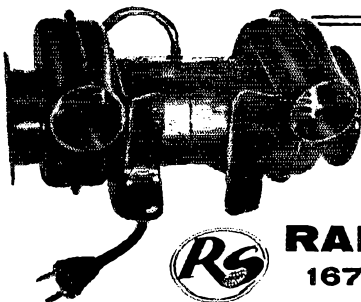


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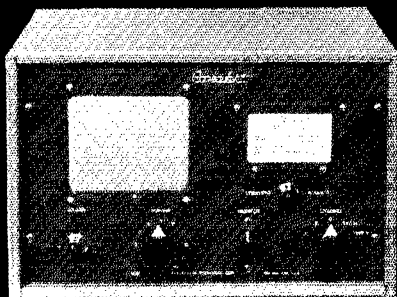
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What's the Answer?

(Continued from page 35)

frequency, expressed in kilocycles or megacycles. In the early days of radio, amateur bands were listed by meters. In the interest of accuracy, the "powers-that-be" switched to frequency designations for the radio spectrum. However, habits die hard, and although the change was made in the late '20s, it is still common practice to use meters as band designations.

If one wishes to convert frequency-in-kilocycles into wavelength-in-meters, and incidentally, this is a question sometimes asked in the Novice exam, the following formula is used:

$$\lambda = \frac{300,000}{f}$$

where λ = Wavelength in meters
 f = Frequency in kilocycles

Example: The wavelength corresponding to a frequency of 3500 kilocycles is

$$\lambda = \frac{300,000}{3500} = 85.7 \text{ meters.}$$

Lightning Protection

(Continued from page 37)

antenna was cut to center on this frequency. Operation is not confined to this frequency, however, as many contacts are made even at the high end of the band without any retuning or adjustment of either the driver or final-stage tuning circuits.

The antenna is 125 feet long and the quarter-wave Zepp feeders are $62\frac{1}{2}$ feet long, spaced 6 inches apart. The feeders are tied together at the lower end and grounded. A metal rod 6 inches long is used as the lowest spacer. RG-11/U (72-ohm) coax is used to feed the Zepp feeders. The shield of the coax is attached to the feeder which goes to the antenna and the center conductor goes to the other feeder which dead ends at the antenna. The point of attachment is about 24 inches from the shorting bar. The coax is tied to the feeder to which the shield is connected and follows it back to the shorting bar and then follows the ground lead to the ground stake and from there runs underground to the house.

By now you are wondering why the shield is connected to the feeder which goes to the antenna instead of being attached to the feeder which dead ends. Actually, it makes no difference which way you do it, except that if you use a bridge to check the standing-wave ratio, you will have more trouble with induced voltages from local broadcast stations if you reverse the connection, since the feeder plus antenna picks up much more of this broadcast field voltage than the dead-ended feeder alone will pick up.

Another benefit from this antenna which was entirely unexpected is the reduction in harmonics reaching the antenna. At the desired frequency, the 4 feet of wire between the ends of the coax and the shorting bar serve as a transformer to

(Continued on page 126)

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Approximate Dimensions & Weight : Megaphone 20" long, diameter 13 1/2".

Amplifier dimensions—in 2-piece Portable Metal Case, housing 6 volt storage battery—13 3/4" H, 12 3/4" W, 9 3/4" deep.

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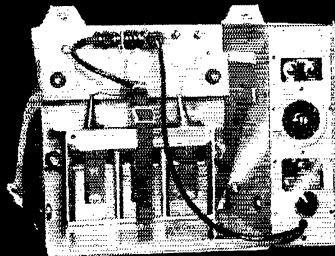
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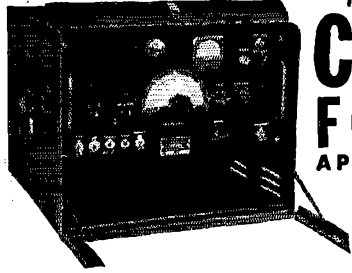
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match the impedance of the coax to the impedance of the open-wire feeders. At other frequencies, however, this is not the case, and the higher-order harmonics are effectively suppressed. No other filter is used at W4ZG for this purpose and there is no observable interference on a television receiver connected to an antenna just 15 feet away from the Zepp feeders.

Should you wish to use this antenna on other bands, you may do so by reducing the dimensions in accordance with standard antenna formulas. The point of connection of the coax to the Zepp feeders is not critical and may vary somewhat under different surrounding conditions. It can best be done by measuring the s.w.r. at the transmitter end of the coax at several different test positions, but if no bridge is available, the connection of the coax to the Zepp feeders may be made 24 inches from the shorting bar for 80 meters, 12 inches for 40 meters, 6 inches for 20 meters, and 3 inches for 10 meters.¹ It is desirable that the feeder spacing be reduced at the higher frequencies as the length of the shorting bar is a factor in the impedance match.

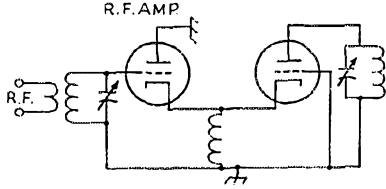
¹ For antenna systems in which the antenna and feeder lengths are the same as above in terms of wavelength. — En.

Technical Correspondence

(Continued from page 48)

minimizing the noise figure of the second stage. To calculate the noise figure of this combination we need to calculate the noise contributions of the two tubes, and if for simplicity we assume the two noise figures are identical, the noise figure of the combination can be shown to differ little from that of the first circuit.¹

If the tap on the interstage coupling coil is left out this circuit becomes the so-called "cathode-coupled amplifier" shown below:



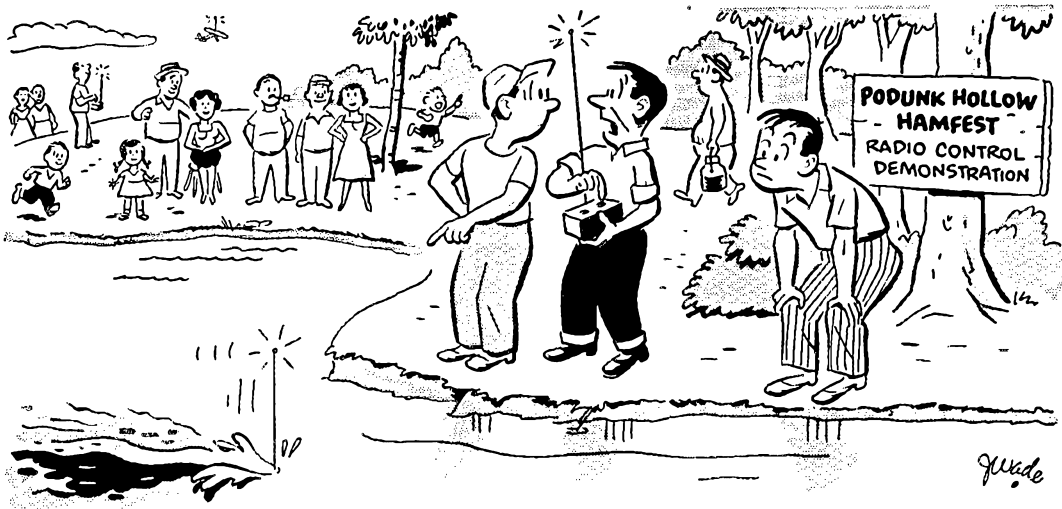
The noise figure of this combination is slightly poorer. Since the two triodes here are directly connected through their common cathodes, a valve often used in this circuit is a Type 6J6 (whose equivalent noise resistance is 470 ohms for each triode section). This circuit is identical to that used by Longerich and Smith, except that a.c. coupling is employed rather than direct coupling and the series-resonated coil in the cathode is replaced by a resistor. The noise figure of the cathode-coupled amplifier is in general somewhat better than the grounded-cathode pentode amplifier. This circuit is, however, inferior to the grounded-cathode grounded-grid triode circuit in both noise figure and stability (i.e., the so-called Wallman circuit² or cascode r.f. amplifier³). Also, the lower available power gain of the grounded-plate triode means that contributions of third-stage noise are correspondingly greater.

— Jack Belrose, ex-VE7QH-VE3BLW

¹ Valley and Wallman, *Vacuum Tube Amplifiers*, p. 664 (McGraw Hill M.I.T. Radiation Laboratory Series).

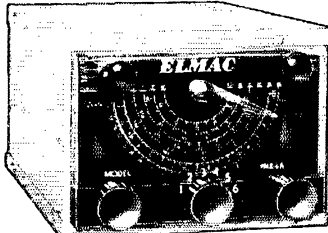
² Shimizu, "Modified Wallman Circuit with Voltage Feedback," *Electronics for Communication Engineers*, p. 28 (McGraw Hill, 1952).

³ *The Radio Amateur's Handbook*, p. 366 (1954).

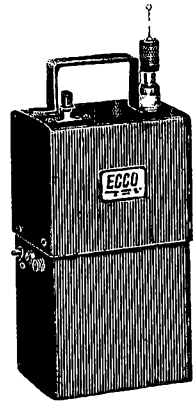


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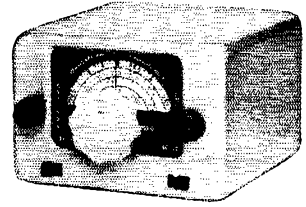


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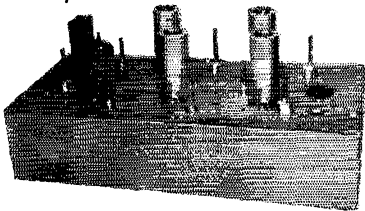
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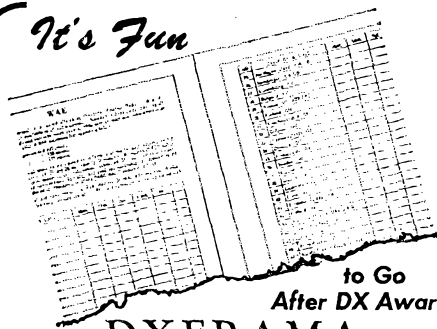
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Happenings

(Continued from page 44)

64) On motion of Mr. Gowan, 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 Novices and beginning amateurs. The Committee is requested to consider, among other things, the feasibility of the establishment of a "Student Grade" membership and the publication of a Novice Handbook.

65) At this point, the President announced the following are appointed to the Membership & Publications Committee for the following year: Mr. Maer, Chairman, Mr. Gowan and Mr. Steed.

66) At this point, without formal action, the Board and its General Counsel, at the request of Mr. Cornell, engaged in an extensive discussion of Article 12 of the Articles of Association.

67) On motion of Mr. Roberts, the following resolution was unanimously ADOPTED:

WHEREAS, Karl W. Weingarten, W7BG, had for nearly twenty years served The American Radio Relay League and amateur radio as Director and Vice Director of the Northwestern Division, and

WHEREAS, the institution of amateur radio is deeply grieved by his passing on December 2, 1954

Now, therefore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League, meeting at Hartford, Connecticut on May 14, 1955, on behalf of amateur radio hereby expresses its deep sense of loss at his passing.

68) On motion of Mr. Maer (on behalf of Mr. Cornell), unanimously VOTED that the Board of Directors of the League authorizes a National Convention to be held in the Pacific Division of the League during the year 1956, under terms as may be approved by the Executive Committee upon receipt of a satisfactory request from a responsible group to sponsor such a convention.

69) On motion of Mr. Maer, unanimously VOTED, that the General Manager is hereby authorized to pay expenses for the operation of the Membership & Publications Committee during the year 1955 in an amount not to exceed \$1000.

70) Whereupon, on motion of Mr. Schmidt, the Board adjourned *sine die* at 10:46 A.M.

71) (Time in session as a Board, 9 hours, 54 minutes; total authorizations \$28,150.)

A. L. BUDLONG
Q. B. SMITH
Secretaries

Hints & Snarls

(Continued from page 45)

ingly working right below. Once I almost had the best beam of anybody in the graveyard.

4) Lay the ladder down gently, Stupid. Don't bounce it off your big toe as I always do.

5) Don't service an antenna, accompanied by 8000 angry bees, without wearing the baby's crib netting over your head. *Caution:* Tuck it in. *Second caution:* If you have a big nose forget the whole beezness.

Measurements

1) The arc off the final "test." A certain Long Island W2, who should have known better, popped a pretty good bottle that way. Now he's QRP.

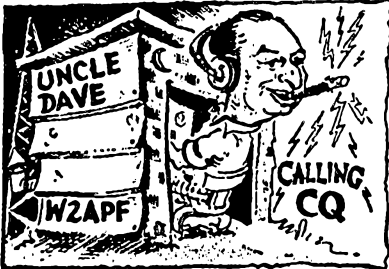
2) The "voltage measurement test," also known as the "grabbed it" test. Not accurate, but rather shocking. Use your own calibration system.

3) The "wonder if it's turned on" test. You too?

4) The "whoops, shorted it" test.

5) The "burned finger" test. Quite handy in finding out which tube is cold. It's always the last one.

(Continued on page 150)



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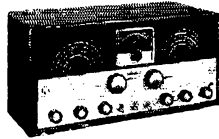
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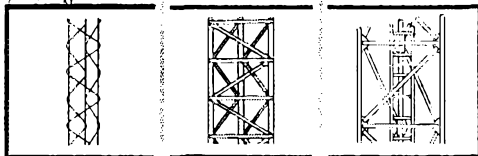
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Frustration in General

- 1) Never live on the East Coast. You get all the blackouts and magnetic storms. When it gets so bad back East that you can't even give your neighbor his accustomed TVI, the West Coast goes merrily on it's happy DXing way. (Known as East Coast ulcers.)
- 2) Even though the postman is the ham's best friend, the inflated foreign postal rates will really get you. It's no longer "Will you send me a card?" but "Can you afford it?". Just one more hazard on top of "Sorry you ain't in my log," wrong call on QSL card, essential contact info missing, etc.
- 3) Incidentally, once the other guy gets your call wrong, you can do a jig, stand on your head, etc., while he says "solid copy R R wrong call R R." Why not a Q signal for "Listen carefully, dumbbell, my call is _____"? Do you go off talking to yourself, too?
- 4) Never, never, never put up a brand-new 3-element beam just ahead of those three witches—Carol, Edna and Hazel. We ain't had a hurricane around here for nigh onto 10 years. So GVZ beatedly goes modern again. (This is one case where outdoor plumbing is best.) And what happens? Bam, zowie, whee—Hellion Hazel turned my hair black again, what with watching what looked like my beam's death agonies. My hair even stood up on end, quite a trick considering that the baldies wore it all off years ago. Just when I was mentally framing an epitaph which said "Born in June, died in October," Hazel went away and bothered someone else. A big apple tree fell on the house, we had no power for three days, the food in the freezer went defunct, but who cared? The beam survived undamaged!

Guess I don't need that new book after all. For once I must have done it right!!!

Strays

W4EUV wonders if there is any paint or coating that would keep woodpeckers from slowly disintegrating his beam pole!

K6BF, B. J. Kroger of Santa Barbara, Calif., who has kept a 100 per cent log for over thirty years, recently had his 20,000th QSO on 2 meters with K6HEC, Oxnard. Kroger has had 11 calls in four U. S. districts, Nicaragua and Mexico.

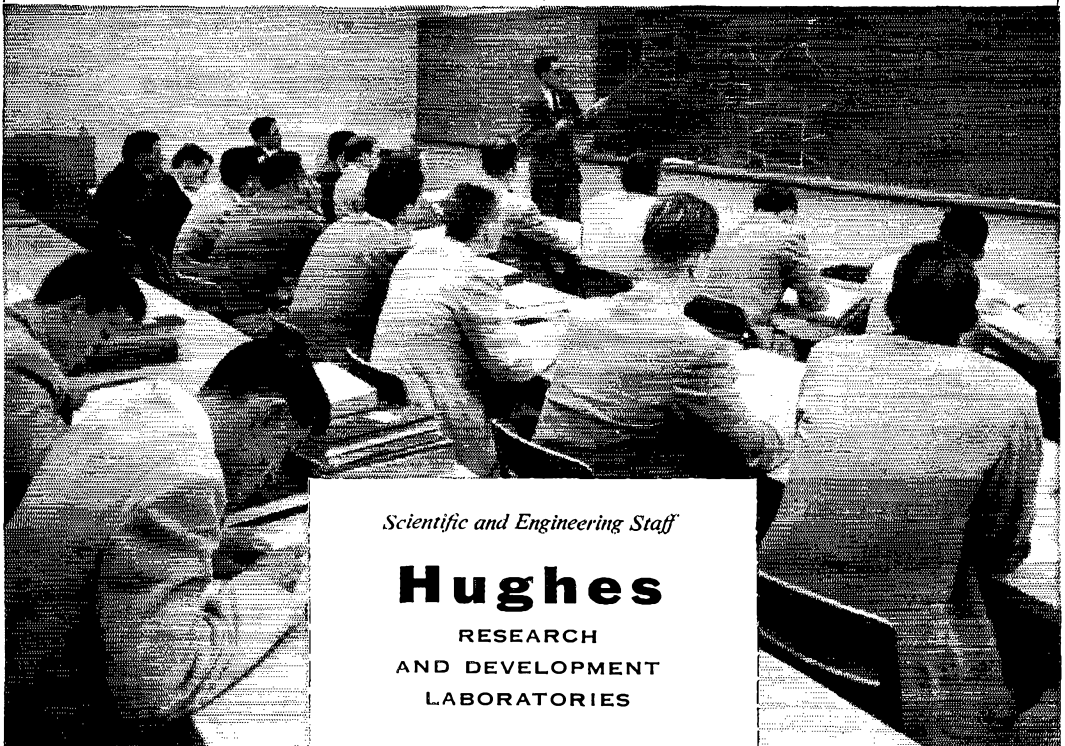
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TVI is sealed in with
METEX Electronic Weatherstrip**

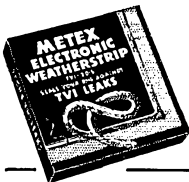


Viking Ranger

This inexpensive product will do the same for your own rigs. Follow the lead of Johnson and other high placed manufacturers.

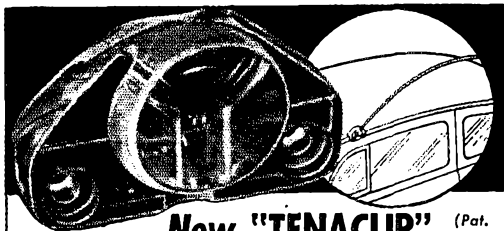
For sealing your own rigs or any consumer, industrial or military equipment against RF leakage METEX Electronic Weatherstrip is highly effective and is a simple operation. It's made of highly resilient compressed knitted wire which comes in several forms to meet all normal requirements even where closure is of an uneven nature. Type TVI 20-S is

easily applied to most rigs in the home workshop. METEX Electronic Weatherstrip is the simplest and most inexpensive method for sealing in RF leakage yet devised. Try it. Results are amazing. Ham and industrial inquiries invited.



METAL TEXTILE CORPORATION

KNITTERS OF WIRE MESH FOR MORE THAN A QUARTER CENTURY
Roselle, New Jersey



New "TENACLIP" (Pat. Pend.)

attaches to car... stops antenna whipping

Clear plastic clip quickly fastens to rain molding... holds right or left antennas. Prevents damage to antenna from low hanging limbs or driving into garage. See your dealer or order direct. No C.O.D.'s please.

\$1.98

PLASTICLES, 4207 GRAND RIVER, DETROIT 8, MICH. *postpaid*

GPR 90

TECHNICAL MATERIEL CORPORATION
Mamaroneck, N. Y.

World Above 50 Mc.

(Continued from page 87)

open end, with coupling loops for injection and input. The line is tapped for a crystal-diode mixer. Item 4 is a wave-meter tuning from 300 to 1300 Mc., by W6RJS. Near it is a 1296-Mc. tripler (5) similar to one soon to appear in QST. It was built by W6DQJ, and it uses a 2C39A tube, which may be seen on the floor in front of it.

A converter for 1215 Mc. shown at (6) uses the r.f. assembly from an AN/TRC-5. It has two resonant circuits preceding the crystal mixer. Its local oscillator uses a 2C40. One stage of 30-Mc. i.f. amplification is included. It is the property of W6DQJ. The APS-13 (7) is useful as an i.f. system for u.h.f. or microwave work. W6DQJ uses its 30-Mc. i.f. with the converter described above.

In his other hand Don holds a complete transmitter and receiver for 1215 Mc. A local oscillator from a TPS-1 serves as a transmitter, its type 446A tube delivering about 1/2 watt. The receiver section has another 446 local oscillator feeding a crystal mixer. A cascade i.f. stage on 30 Mc. is link coupled to a TV i.f. strip modified for 6AK5 tubes. A single audio section is used for both receiver output and Heising modulator. The power supply for this station is shown between items (3) and (5).

At the right of the photograph is an APT-5, property of W6RJS. This jammer, a common item in the heyday of low-priced surplus gear, has a relatively high-powered oscillator tuning from about 300 to above 1200 Mc.

Demonstration of the gear included two-way communication by W6CFL and W6MNU. And considerable interest was generated that should provide company for W6CFL, W6DQJ, and W6NLZ, u.h.f. pioneers of the Los Angeles area.

OES Notes

K2GAN, Murray Hill, N. J. — Constructed chassis with 5 different overtone oscillator circuits, to permit comparisons that will determine their respective merits for use in 2-meter transmitters and converters. Also experimenting with crystal grinding.

K2DYC, Phelps, N. Y. — 50-Mc. transmitter similar to October, 1954, QST, about completed.

W2ORA, Collingswood, N. J. — Activity on 50 Mc. picking up steadily in the Philadelphia-to-Washington area, but little heard from the north. Will cooperate with interested 50-Mc. operators in early-morning schedules, beginning at 6:30 EDST. Should be attractive to those who are kept from operating in evening hours because of the threat of Channel 2 TVI.

Recently put in 50-Mc. crystal. This may be TVI solution for some who think Channel 2 TVI is impossible to correct. Much trouble may come from unwanted harmonics of 6- or 8-Mc. crystals falling in Channel 2, rather than from blocking by the 50-Mc. fundamental.

W2UXP, Webster, N. Y. — Several new stations expected soon on 50 and 220 Mc.

W3PMG, Chinchilla, Pa. — Small transmitter-receiver set-ups for 50, 144, 220 and 420 Mc. under construction for use by W3KK3 in V.H.F. Party and Field Day.

W3UQJ, York, Pa. — New 2E26 rig running on 50.3 Mc. with 3-element array. Will soon have 829-B final. Skeds being run with W3OTC, Silver Spring, Md., on 6. Activity growing on 50 Mc., new stations including W3s OWW OCI ALN AXC and SST.

W4HHK, Collierville, Tenn. — Monitoring 50.1 Mc. daily with fix-tuned receiver. Six-meter rig with p.p. 6146s under construction. Also planning 220-Mc. exciter for 4X150 220-420 final already on hand. Double conversion with single crystal planned for 432-Mc. reception. Crystal on 42.5 Mc. is to be multiplied 9 times for injection at 382.5 Mc., converting the 432-436-Mc. range to 39.5 to 53.5 Mc. The 42.5-Mc. signal also beats with the latter range in a second mixer to produce an i.f. of 7 to 11 Mc. to be tuned on the HRO.

W4KKK, Rome, Ga. — Experimenting with 50-Mc. phase modulation, in attempt to reduce TVI in fringe-area reception of Channel 2 from Atlanta. Most of the TVI was of an audio nature with the a.m. rig, picture being unaffected except in immediate vicinity. Working W4AKX. Gadsden, Ala., on Six, 55 miles.

W4UIW, Miami, Fla. — Active stations on 144 Mc. include W4s RNV KQG UIW FLH and JZB, with more activity coming. [See report of reception of Miami area

(Continued on page 134)

Just released...

and they're waiting for you at Burghardt's

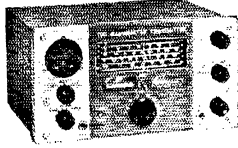
Terrific Trade-Ins—As liberal as anyone in the country ... and yours may be worth more at Burghardt's. Trade-ins usually cover down payment on your new gear.

10% Down—Easy Terms—10% down lets you "take it away." Up to 18 months to pay on balances over \$200. Burghardt's financing saves you money—adjusts terms to your budget. All time payments based on local bank rates. Full payment within 90 days cancels interest.

Speedy Delivery—Personal Attention—No order too large or small for personal attention. All inquiries acknowledged and orders processed day received.



Satisfaction Guaranteed
or your money refunded
after 10 day trial.

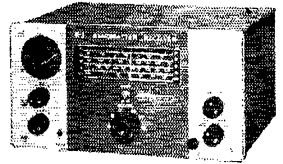


HARVEY WELLS T-90 SUPER BANDMASTER—Here, in one small package (only 12¾" x 10½" x 6¾") is a complete 90 watt, band-switching transmitter for fixed or mobile operation • TVI suppressed • complete break-in keying or keying of just exciter stages • push-to-talk and receiver muting • antenna changeover relay • 90 watts CW • 75 watts phone. Factory assembled and tested, complete with tubes. **ONLY \$17.95 DOWN**
\$9.78 per month for 18 months.

AC POWER SUPPLY FOR THE T-90—Designed specifically for use with the T-90 for fixed station operation. Operates with nominal line voltage input of 115 AC, 60 cycle, single phase. May be used as a separate supply for other equipment. Filament and relay voltages may be dropped to 6.3 volts with external resistors. **ONLY \$7.95 DOWN**
\$6.32 per month for 12 months.

6/12 VOLT DC POWER SUPPLY FOR THE T-90—Vibrator power supply. May be used with either 6 or 12 volts DC by changing jumpers. Complete with 10 ft. shielded output cable and connectors. **ONLY \$8.95 DOWN**
\$7.11 per month for 12 months.

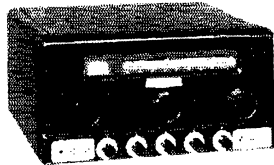
HARVEY WELLS R-9 RECEIVER—The perfect companion unit to the T-90, this highly stable, all-band receiver has a number of features never offered in such a compact rig before. Double conversion on all bands • all coils slug tuned, providing high "Q" circuits • separate oscillator coils for each band. Complete with tubes and built-in AC power supply. **ONLY \$14.95 DOWN**
\$8.14 per month for 18 months.



VIBRATOR POWER SUPPLY FOR THE R-9—Designed to power the R-9 receiver for mobile operation, the VPS-R9 will operate with either 6 or 12 volts DC. Complete with shielded cable and connector. **ONLY \$28.50 COMPLETE**

ONLY \$28.50 COMPLETE

BANDMASTER SPEAKERS—High quality. Fixed station models **\$10.50**—6" mobile speaker, only **\$7.50**.



HAMMARLUND PRO-310 RECEIVER—New from top to bottom, the Pro-310 features outstanding advancements in circuitry and mechanical design. Covers 550 kc to 35.52 mc • exceptional stability • high image rejection on all 6 bands • double conversion on top 4 • exalted BFO and sharp selectivity built-in for SSB operation. Bands spread continuously calibrated over the entire range. **ONLY \$59.50 DOWN**
\$24.99 per month for 24 months.
Matching speaker available soon

HAMMARLUND HQ-140-X RECEIVER—A top quality communications receiver for the commercial or amateur radio operator, as well as the SWL. Frequency coverage is continuously tunable from 540 kc to 31 mc. • patented crystal filter provides extreme selectivity to attenuate closely adjacent interfering signals • Unusually stable BFO • large, comfortable and conveniently positioned controls. **ONLY \$26.45 DOWN**
\$14.41 per month for 18 months. Matching speaker—\$14.50

TOP TRADE-INS!

Write for our latest bulletin. We have hundreds of standard brand pieces of equipment in our trade-in department—used equipment made by Johnson, National, Collins, Hallcrafters, Gonset, Elmac, Harvey-Wells, Morrow, Central Electronics, and other leading names.

Our prices on trade-ins are realistic and down to earth. In addition where purchase is for cash with no trade-in, an additional 10% discount is allowed. Burghardt's financing plan tailored to your budget can be used for the purchase of new as well as used equipment.

73,

Stan Burghardt WØBJV

"Your confidence is our most valuable asset!"

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IMPOSSIBLE? NO!

A Single ROBOT Antenna for ALL BANDS, 80 thru 10, with Automatic Impedance-matching on ALL BANDS — NO SWITCHING — NO COILS — with MAXIMUM OPERATING EFFICIENCY.

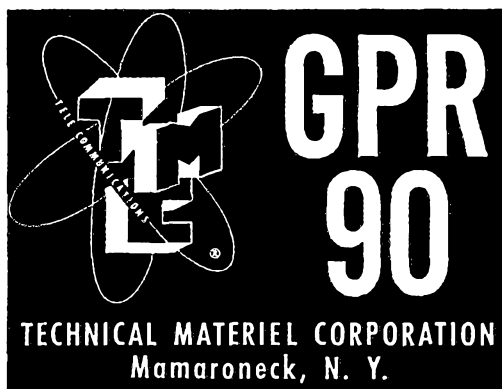
Erectable in small space — EVEN ON A ROOFTOP! It's the famous V-37 Electro-magnetic decoupled vertical from the laboratories and factory of the ANTENNA ENGINEERING CO. The price? V-37 deluxe, \$299.00 with TERMS AVAILABLE. The AEC also produces the V-72 at \$199 and the V-70 at \$99 covering ALL BANDS with the AEC SB-75A unit at extra cost.

We make antennae for MILITARY, COMMERCIAL and MARINE uses and our Laboratory is available for ANY Antenna Research, Testing and DEVELOPMENT. Write us for details and how we can help you.

See our Ad in QST for March '55 or The Radio Amateur's Handbook!

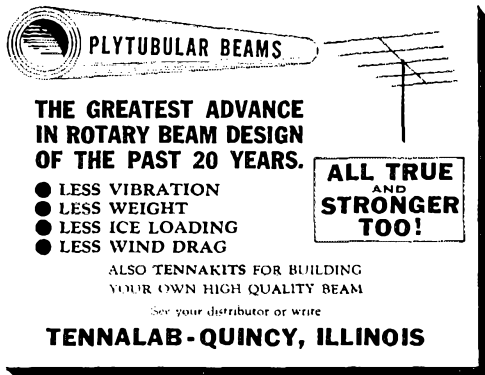
ANTENNA ENGINEERING CO.

5021 W. Exposition Blvd. Los Angeles 16, Calif.



GPR 90

TECHNICAL MATERIEL CORPORATION
Mamaroneck, N. Y.



PLYTUBULAR BEAMS

THE GREATEST ADVANCE IN ROTARY BEAM DESIGN OF THE PAST 20 YEARS.

- LESS VIBRATION
- LESS WEIGHT
- LESS ICE LOADING
- LESS WIND DRAG

ALL TRUE AND STRONGER TOO!

ALSO TENNAKITS FOR BUILDING YOUR OWN HIGH QUALITY BEAM

See your distributor or write

TENNALAB-QUINCY, ILLINOIS

stations in North Carolina elsewhere in this month's copy — E. P. T.J. W4LXZ ready to go on 420; W4UW getting set.

W5FPB, Albuquerque, N. Mex. — Albuquerque V.H.F. Club organized officially, with 23 members present at first meeting, April 22nd. W5FAG now has high-powered c.w. rig on 144 Mc. and is looking for DX skeds. Several West Coast stations, W7VMP or Phoenix, Ariz., and W7s FCG and UPF of Tucson, are already cooperating. Frequencies: W7VMP — 144.0165; W7FGG and W7UPF — 144.126 Mc.

W5SCX, Ardmore, Okla. — AF MARS net meets each Sunday morning at 0700 on 143.99 Mc. for propagation check. W5AXY, Austin, Texas, NCS, was \$9-plus over 300-mile path, May 1st.

W6ORS, Alhambra, Cal. — New club, San Bernardino Microwave Society, meets at home of W6VIX, Ontario. All interested in "a.c. bands" are invited.

W7TMU, Snohomish, Wash. — New activity developing on 50 Mc. since appearance of Technicians, April 12th. Now have 11 stations using the band locally, with more to come. Activity on 144 Mc. dropped, it is hoped temporarily, as a result of polarization controversy.

W7UKI, Marysville, Wash. — Experimenting with 1N34 crystal mixer, heard W7TMU, 15 miles away, while using only indoor folded dipole. Believe it would make a satisfactory converter if used with good r.f. amplifier and crystal-controlled injection.

W7YJE, Seattle, Wash. — First good 50-Mc. opening of the season, May 14th. W7s PRW UFE and DYD worked around 10 stations each in Southern California. Local 6-meter gang check band nightly at 1900 PST.

W8HCD, Dayton, Ohio — Six-meter band used locally principally for contests. Activity otherwise is low because of Channel 2 trouble. Have been able to put out up to 10 watts without TVI, using either c.w. or f.m. Amplitude modulation increases TVI potential greatly.

New 32-element 144-Mc. array at 50 feet above ground outperforming old 5-over-5 (at 40 feet) beyond description.

Use of 420-Mc. band picking up to point where contacts can be made occasionally without prior arrangement on another band. Working on flying-spot scanner, having experienced trouble getting 5527 to work. Would like to hear from TV enthusiasts regarding results with 5527.

W9LBE, Westboro, Wisc. — Skeds with W9LVJ, Waukesha, 175 miles, 0730 and 1900 CST, 144.18 Mc., and W0BBN, Grand Marais, Minn., 190 miles, 0745, 144.13 Mc., now running close to 100 per cent successful since coming of warmer weather.

W9UDD, Ft. Wayne, Ind. — Local gang busy modifying former police and fire receivers for 2190 and 1634 kc. for use with 50-Mc. converters in local mobile net formerly on 29.62 Mc. Converter to have 6BQ7 g.g. r.f. stage and mixer with 6J6 oscillator-doubler. Aiming for simplest possible construction.

W0QMF, Perryville, Mo. — New 12-element long Yagi erected for 144 Mc., to compare results with former 5-over-5.

W0RSP, Marvin, S. Dak. — Skeds on 144 Mc. with W0HXY, St. Cloud, Minn., 170 miles, highly successful. W9LBE and W9DSP, 400 miles, worked occasionally.

YL News & Views

(Continued from page 55)

— another multiplier — I couldn't give up W9CXY. An hour later the burning odor persisted. Not my transmitter, I happily thought. Then — oh no — our dinner! Must save it and our once happy home. Wonder if I can keep the rig when our divorce is final? Our dinner looked and tasted like a prehistoric man dug from the peat bogs. There was no conversation.

But I wouldn't have missed it — not even for a kilowatt with a charmed maintenance life and proper voltages on the oscillator. Take it from a seven year 'phone gal, c.w. is here to stay and contests are a very pleasant form of mayhem.

The finishing touch to Merle's first c.w. contest.

(Continued on page 136)

new SELF-SUPPORTING LAY-OVER TOWER

ONE MAN INSTALLATION
USE NO CONCRETE

Tele-Vue

TOWERS, INC.
701-707 49th St., So.
St. Petersburg, Florida

Change beam from ground level. Telescope to 20 ft. with ratchet reel then crank over with second reel. Tower is re-inforced $\frac{3}{4}$ in. aircraft tubular steel—husky but light. Base post heavy 3 in. steel pipe with fins. $\frac{1}{8}$ in. — 1200 lb. test aircraft cable on layover reel. Tower finished 2 coats plus asphalt protective coating supplied for base section.

These two towers not interchangeable



\$85.50 F.O.B. St. Petersburg
PACKED IN STRONG SHIPPING CARTON

OUR REGULAR TELESCOPING TOWER USED BY HUNDREDS OF HAMS

Stop it any height 20 to 40 ft. Lower for storms. Hinged bottom. Install it yourself. SPRING LOADED RATCHET WINCH CAN BE PADLOCKED. Good looking, husky yet light. $\frac{3}{4}$ in. aircraft steel. Hoist cable tested for 920 lbs.

\$53.50 F.O.B. St. Petersburg
PACKED IN STRONG SHIPPING CARTON

TAMPED
EARTH

5 FT

PREMAX

**"CA" BUMPER MOUNTING
FITS ANY CAR**

Mount Your Mobile Antenna without Drilling or Marring!

Even the massive bumpers of new 1955 cars can be outfitted with Premax's newly improved "CA" mobile antenna mounting, without spoiling chrome finish. Mounting includes extra chain links and braided copper wire ground lead. Ask your dealer for the "CA", or write,

Division
Chisholm-Ryder Co., Inc.

PREMAX PRODUCTS

5582 Highland Avenue, Niagara Falls, New York



Here's Why!

There's no drilling or damage to Bumper or splash-pan necessary. "CA" Bumper Mounting is fully adjustable with 9 links of chain. Add or remove links as needed!

VALPEY

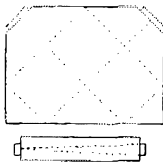
Quartz Crystals

symbol of craftsmanship
for over 23 years

Valpey measures each crystal for surface flatness using a Precision Optical Flat with monochromatic light in a Valpey-designed Interferometer. Parallelism and surface flatness are measured to millionths of an inch — another step in the Valpey quality control process.



Manufacturers of ultrasonic transducers and delay lines are assured the ultimate in equipment performance when they specify Valpey. For experimental labs or production runs, Valpey is equipped to provide crystals to 60 Mc., meeting the most rigid specifications.



VALPEY Crystal CORPORATION

1444 Highland Street
Holliston, Mass.

Craftsmanship in Crystals since 1931

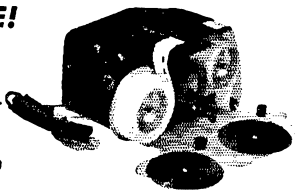
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SPEED UP Your
RECEIVING
with G-C

Automatic Sender

Type S

\$28.00 Postpaid in
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Housed in Aluminum Case Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle A.C.

Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

GARDINER & COMPANY

STRATFORD

NEW JERSEY

GPR 90

TECHNICAL MATERIEL CORPORATION
Mamaroneck, N. Y.

attempt was notification by the YLRL that she had placed second highest in the OM c.w. portion of the contest! Her rightful conclusion: Merle is a name common to both sexes and contest checkers tossed her log on the OMs' pile.

Keeping Up with the Girls

Congratulations to W1ZJE, Lillian Salter, who completed her 25th year with the ARRL Communications Department on May 12th. . . . W2JZX has resigned as PAM, OPS, and OBS and will be off the air while she moves from Long Island to New York City. K2IWO, Hilda, will take over for Vi as Second District Chairman for the YLRL until the end of her current term, July 1st. . . . W8s LGY, HPP, HUX, and KL7BHE/W8 attended the Doghouse Net picnic in May at Columbus, Ohio. . . . W4BLR, Kay, made BPL for April. . . . W8NNH's contacts with EA8BF, Canary Islands and GD3IBL, Isle of Man, have spurred her on to more DX hunting. . . . KZ5DG has 100 countries confirmed on 'phone on 15 meters. Grace became the first station in the western hemisphere to contact Gambia on 15 meters when she worked ZD3BFC in March (only station in that country on that band). When PM7WN put Martinique on the 15-meter band in April, Grace was his first contact. . . . WN0AYQ, of Ladue, Mo., can be numbered among the younger YLs — Bonnie is 8 years old. . . . On April 23rd, the Chicago unit of the YLRL celebrated its second anniversary with an open house at its club rooms. One hundred fifty guests heard speeches by OMs W9s LLLX, LZ, HPG, YIX and representatives of nearby radio companies. . . . Mrs. Lillian Root, Chairman of Women's Activities for the Dayton Hamvention reported 146 YLs and XYLs in attendance at the popular Ohio affair. . . . While newspaper men visited VE6MP, Maude demonstrated ham radio by making a 5/9 contact with W1MCW, Lou.

YLs You May Have Worked

Mary G. Livingston, "Marian," W5EYE, was chosen "Operator of the Month" (December, 1954) of the Fourth Army Area. She received an Army MARS certificate in recognition of her outstanding assistance



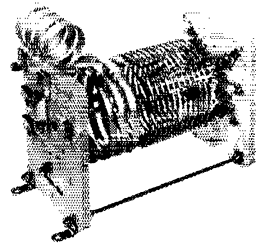
to the MARS program. Marian averages 65 hours per month on scheduled MARS nets and handles an average of 80 messages during that period. Her favorite bands are 75 and 40 c.w. She is particularly interested in antenna experimentation. Her OM is W5KXJ, and there are four jr. ops at their Sheldon, Texas, QTH.

Strays

Have you heard the swinging choke song —
Dance with Me Henry? — W8DBF

1 KW PI-NETWORK TANK COIL With Full Bandswitching ALL IN ONE COMPACT UNIT

Here's an integral high-power bandswitching pi-network tank coil for maximum efficiency operation from 80 through 10 meters. Designed for class "C" or linear operation using triodes or tetrodes in conventional or grounded grid circuits, Model 850 lets you easily select the desired operating band through its positive-acting, high-current, r-f switch. Stepped sectional coil windings, of extra heavy conductor at the higher frequencies, provide ample current carrying capacity and a minimum "Q" of 300 over the entire operating range. Quality construction throughout assures long life and an extra margin of safety. See this bandswitching inductor at your nearest B&W distributor. Or, write for Bulletin 850.



MODEL 850

Output Impedance: 50 to 75 ohms.

Input: 1 kw with plate voltages from 2500 to 3000 volts d-c.

Price: \$35.00 Amateur Net.

B&W

BARKER & WILLIAMSON, INC.

237 Fairfield Ave.

Upper Darby, Pa.

MAKE PRINTED CIRCUITS

Give your work a neat, professional look with compact, printed circuitry! New, **CONTROL CIRCUITS** "Kit No. 1" contains all materials needed to make several commercial-size printed circuits. Easy to follow instructions and circuitry design pamphlet included. Money back guarantee.

"Kit No. 1" ONLY \$3.95 postpaid

CONTROL CIRCUITS

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Rockfall, Conn.

GET INTO ELECTRONICS

You can enter this uncrowded, interesting field. Defense expansion, new developments demand trained specialists. Study all phases radio & electronics theory and practice: TV; FM; broadcasting; servicing; aviation, marine, police radio; 18-month course. Graduates in demand by major companies. H.S. or equivalent required. Begin Jan., March, June, Sept. Campus life. Write for Catalog.

VALPARAISO TECHNICAL INSTITUTE

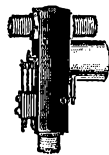
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EXPLAIN DOW LEADERSHIP

Model DKC



Special connector protects your receiver from R.F. during transmission (Optional).

Silent AC magnet prevents hum modulation of carrier — AC types guaranteed as quiet as DC.

Transmit contact-pressure over 75 grams, making the 1000 w. rating very conservative. Causes negligible change in SWR up to 100 Mc.

1000 WATTS
Length 4 1/2",
width 3 7/8"

DKF2 rigid adapter for external chassis mounting, \$1.85



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)

THE DOW-KEY CO., INC.
WARREN, MINNESOTA

Evans RADIO

• "YOUR FRIENDLY SUPPLIER"

- ▶ Service to hams by hams.
- ▶ Nationally accepted brands of parts, tubes and equipment.
- ▶ Trade-ins and time payments.

Write W1BFT

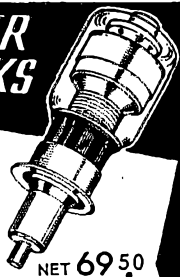
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CONCORD, N. H.

for **HIGH POWER
PI NETWORKS**

**VACUUM VARIABLES
10 KV . . . 10-400 MMF**

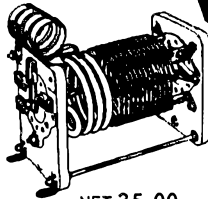
A beautiful, brand new, Jennings Vacuum Variable offered at half price as a result of a fortunate contract cancellation procurement. This is an ELMAR exclusive. See our QST ad for November 1954, page 143.



NET 69.50

**B-W'S BRAND NEW
MULTI-BAND INDUCTOR**

an all-band inductor with KW rating for pi networks. Built around a real heavy-duty switch. Lowest losses, (minimum Q of 300 for all bands) fastest band change. Size, including switch, no larger than older style roller coils . . .
... EFFECTIVE . . . EFFICIENT.



NET 35.00

Immediate attention to mail orders for the above or any other nationally advertised electronic parts and equipment. ELMAR can supply, from STOCK, almost anything you may require.

**ELMAR
ELECTRONICS**

140 11th Street, Oakland 7, Calif.

ELVIN W6TT
MARIO W6DUB

**HIGH EFFICIENCY
BASE LOADING FOR
MOBILE WHIPS!**

The "Whipload 6" provides high efficiency base loading for mobile whips with instant bandswitch selection of six amateur bands: 75, 40, 20, 15, 11 and 10 meters. On 75 meters a special capacitor with dial scale permits tuning entire band. Covers other bands without tuning. Air-wound coil provides extremely high "Q". Fibre glass housing protects assembly. Mounts on standard mobile whip.

Cat. No. 250-26 \$19.50 Amateur Net

E. F. JOHNSON COMPANY

WASECA, MINNESOTA



**GPR
90**

TECHNICAL MATERIEL CORPORATION
Mamaroneck, N. Y.

(b) *Broadcasting:*

Melba (famous opera and concert star) sang over the Marconi radiophone station in Chelmsford, England.³⁸

The De Forest Company began sending out nightly news-service, on 1,650 meters, with a 1-kw. radiophone located on top of the World's Tower Building, New York City.³⁹

The Naval Communications Service broadcast a concert given by Mme. Tetrazzini. This originated in her apartment at the McAlpin Hotel (in New York City), and was sent, via Bell Telephone, to the Naval Communication Service's station at 44 Whitehall St.⁴⁰

In "Strays," the following appeared, on page 47 of the February, 1921, issue: "Wondering who KDKA is" Westinghouse Elec. & Mfg. Co., East Pittsburgh, 375 meters."⁴¹

Later, in 1921, a church in Pittsburgh made a practice of picking up KDKA's church service broadcast each Sunday and delivering it to the parishioners via a loudspeaker installed in the pulpit.⁴¹

(c) *Ship-to-shore radiotelephone:*

Green Harbor, Massachusetts (IXD) began experiments with the "KQ" Boats.⁴²

A.T.&T. "bought into" the R.C.A.⁴³

Near Jacksonville, Florida, the Lybeck Ocean Harvester Co. installed a radiophone on one of its fishing craft, and began experimental contacts with shore on 350 meters.⁴⁴

(d) *"Firsts" or "Near-Firsts":*

The QSL card for use in reporting amateur signals over distances of 500 miles was first suggested.⁴⁵

A radiotelephone mounted in an automobile, was exhibited (by 8DR) at the annual outing of the Radio Engineering Society of Pittsburgh, held on July 18, 1920.⁴⁶

At station 4BQ (Rome, Georgia), an arrangement whereby a telephone line could be connected to a radio receiver was in operation. It was used to distribute distant radio concerts to friends.⁴⁷

The May, 1921, issue of QST contained the first intimation that the League would like to publish a "Handbook" of its own: ". . . One of the things we want to do is to publish a real textbook on radio; a book different from any other

(Continued on page 140)

³⁸ 41, August 1920.

³⁹ 48, January 1921.

⁴⁰ 41, February 1921 (item re Radio Traffic Ass'n, Brooklyn).

⁴¹ See: "The Invisible Minister," 26 June 1921.

⁴² 28, November 1920 (Entwistle's Report). This was on 395 meters. The Independent Wireless Telegraph Co. cooperated.

⁴³ 48, December 1920.

⁴⁴ 37, July 1921 (Merritt's Report).

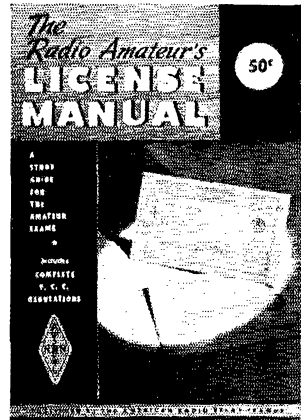
⁴⁵ 41, August 1920.

⁴⁶ 26 to 27, September 1920 (Service's Report).

⁴⁷ 39, May 1921.

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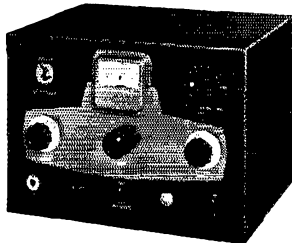
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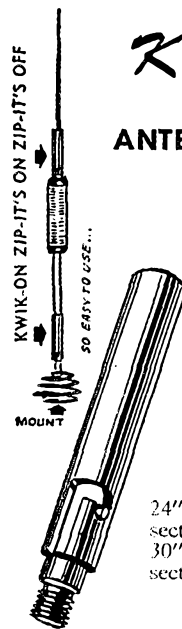
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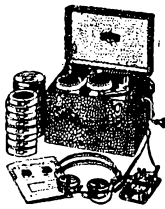
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one now in existence, dealing with the basic theory of amateur radio in a way that will give every amateur operator a clear theoretical understanding of how his apparatus functions so that he may experiment intelligently and not haphazardly; and a book that will likewise serve as a text for the non-technically trained individuals who in increasing numbers are taking up the study of Citizen Wireless."⁴⁸

(e) "Curiosities":

The editor of *QST* announced that he had on hand enough "Calls Heard" lists submitted by amateurs to fill several thousand pages of the magazine.⁴⁹

Station 9ZN covered the Moran-Leonard fight, at East Chicago (20 miles from the "windy city") with a De Forest radiophone and a portable ¼-kw. radiotelegraph spark transmitter. This was done for the Chicago "Herald Examiner".⁵⁰

Arthur W. S. Davis (1LD, of Lowell, Massachusetts), an elderly amateur, had his radio station moved into his sick room, during his last illness; and he "worked it" almost up to the last minute of his life.⁵¹

Radio 8ZW purchased 550-Volt D.C., for his e.w. set from the trolley company for 50¢ per month.⁵²

At radio 6WN (San Diego, California), a 5-step amplifier allowed the signals of 6MZ (Del Mar, California) to be read by sense of touch.⁵³

In this "Foreword" I have been able to mention only the "high-spots" of this remarkably-interesting Volume of the magazine. An examination of the Index itself will "fill in the details." "All-in-all," Volume IV merits plenty of attention.

—S.B.Y., W0CO

Rural Route 3, Box 94,
Wayzata, Minnesota,
July 12, 1953.

Part II of W0CO's index to Volume IV of *QST* will appear in a subsequent issue. — Ed.

⁴⁸ 28, May 1921. ("Our Bonds").

⁴⁹ 54, August 1920.

⁵⁰ 48, December 1920.

⁵¹ 49, March 1921.

⁵² 44, April 1921.

⁵³ 51, May 1921.

Strays

Articles published in *QST* invariably bring the authors considerable mail from readers desiring clarification or amplification on certain points. While such interest is always welcomed, authors are often hard put to handle such correspondence in volume. To expedite replies, readers should: 1) enclose stamped self-addressed envelopes; 2) when using club stationery include the secretary's address; 3) sign correspondence with full names and mailing addresses in addition to call signs; and 4) stress legibility when handwriting.

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Model 606-6V Kit

500V DC 225 M.; no battery drain on standby; instant start, stop—no waiting; communications type Vibrator; size 6 x 7 x 6 $\frac{3}{4}$, mtg. plate, 6 x 9. Small and rugged.

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Model 612-12V Kit. \$33.50
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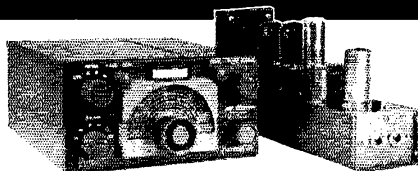
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Complete power supply; 6 Volt input; output power selector sw.—Pos.#1, 500 V 225 Ma.—Pos.#2, 400 V 170 Ma.; built-in relay for remote control; On-Off sw for local control; 700 Volt filter condensers; extra heavy duty Vibrator. . . \$39.50

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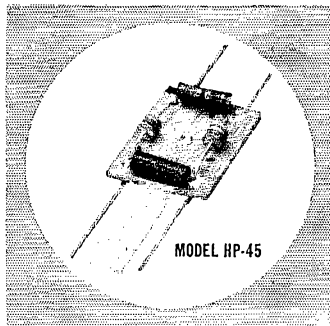
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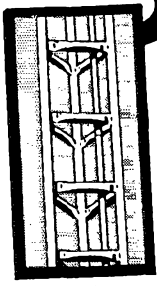
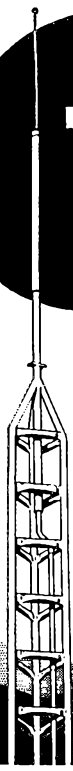
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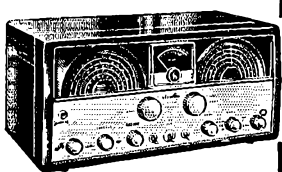
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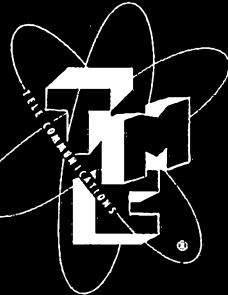


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Phone
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GPR 90

TECHNICAL MATERIEL CORPORATION
Mamaroneck, N. Y.

Correspondence

(Continued from page 49)

were saying they would have found that they were mostly foreign commercials. . . .

— C. J. Haas, WQBLI

IDENTIFIED

9835 Calumet Ave.
Chicago 28, Ill.

Editor, QST:

I'll bet you a wooden nickel I can identify the "unlicensed" station "DA" mentioned on page 50 of March QST. That has been so long ago I won't have to take refuge under the Fifth Amendment.

I believe this was a rig using 4 Navy VTIs and using B batteries for plate voltage.

To my personal knowledge this transmitter was used at Seagate — old WST-NAH7 — with regular station antenna, but I believe it was also used at several other locations around Brooklyn and New York City. . . .

— Levin J. Peck, W9FAW

LISTENER REPORTS

RCAF Station Gander
Gander, Nfld.

Editor, QST:

. . . Financially, SWL QSLs are embarrassing. If I had replied to all the QSLs and letters that I've received from SWLs since going high power (for Canada at any rate) I'd have had to spend 4¢ per card as well as 4¢ for mailing that card, and for the SWL cards that I've received without the International Reply Coupons alone, it would have cost me \$38.04. Now I ask you — is that fair?

— A. Velleman, VO2AW

U. S. Naval Air Station
Box 12, c/o FPO
San Francisco, Calif.

Editor, QST:

. . . Being a KG6 SWL I spend a good part of my time listening in on 20 meters out here in Guam.

After spending a few hours drawing up a card with the help of a local ham, and a few more photographing and printing the cards up, I was in business. After listening to so many stations saying they QSL 100 per cent I thought that I would do pretty good, so started mailing out the cards. All the cards go airmail and it must not be local stuff as most of them cost me twenty five cents airmail. Also enclosed are the proper amount of International Reply Coupons. I have a few hundred dollars worth of radio to SWL with and don't have too much trouble hearing stations all over the world.

What I would like to know is the secret to get some QSL cards in return. After a few months of trying I have received one from a W6 and one from a PY2. Haven't given up trying as I sent out 15 more this morning.

— Robert H. Davis, HMI, USN

NOR THIS WAY

3804 Resmere Rd.
Baltimore 18, Md.

Editor, QST:

. . . I wonder if Mr. Proetz (May QST, p. 54) can give me an answer for the following? On May 6, 1952, at 6:25 p.m. EST, I worked VQ2DT, Dave R. Taylor of Kitwe, Northern Rhodesia. I sent a QSL to him that same day followed at decent intervals by others, then a letter. No answer to any of them. Then on March 6, 1953, I sent another letter containing five International Reply Coupons. I still have not received his QSL. On January 6, 1952, at 3:25 p.m. EST, contacted VQ3CP, J. A. Doxsey of Mwanza, Tanganyika. QSL card sent that day and subsequent ones, also a letter, but no reply. March 6, 1953, I sent him an airmail letter containing five International Reply Coupons, but to date I have no QSL from him. The same situation prevailed with VQHRR of Nairobi, Kenya.

Doesn't Mr. Proetz realize that QSL cards are required by ARRL and other organizations for purposes of verification when certain certificates are applied for? And may I

(Continued on page 144)

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370 KC-538 KC

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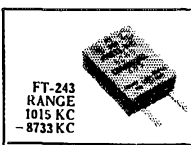
PACKAGE DEAL No. 3

HAM BAND CRYSTALS — FT-243

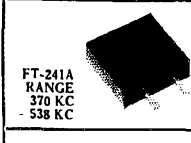
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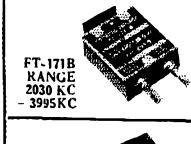
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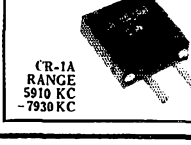
FT-243
RANGE
1015 KC
- 8733 KC



FT-241A
RANGE
370 KC
- 538 KC



FT-171B
RANGE
2030 KC
- 3995 KC



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374	395	416	485	508	531	441	462	4345	5675	6206	6800	7650	7950	4445	5675	6206	6825	7660	7975
376	396	418	487	509	533	442	463	4450	5707	6240	6850	7673	8240	4455	5706	6273	6900	7700	8273
377	397	419	488	511	534	443	464	4490	5760	6250	6875	7675	8250	4495	5706	6273	6900	7700	8273
379	401	422	491	513	537	446	466	4535	5740	6325	6925	7706	8200	4495	5706	6273	6900	7700	8273
380	402	423	492	514	538	447	468	4695	5750	6300	6950	7710	8300	4535	5740	6325	6925	7706	8200
381	403	424	493	515		448	469	4830	5780	6350	7475	7750	8316	4830	5780	6350	7475	7750	8316
383	404	425	494	516		450	470	4950	5806	6375	7500	7773	8325	4950	5806	6375	7500	7773	8325
384	405	426	495	518		451	471	5030	5840	6375	7506	7775	8630	5030	5840	6375	7506	7775	8630
385	406	427	496	519		452	473	5205	5850	6400	7520	7800	8683	5205	5850	6400	7520	7800	8683
386	407	431	497	520		453	474	5295	5852	6406	7525	7806	8690	5295	5852	6406	7525	7806	8690
387	408	433	498	522		454	475	5305	5873	6425	7540	7825		5305	5873	6425	7540	7825	
388	409	435	501	523		455	476	5327	5875	6673	7550	7840		5327	5875	6673	7550	7840	
390	411	436	502	525		457	479	5360	5880	6675	7573	7841		5360	5880	6675	7573	7841	
392	413	481	504	527		458	480												

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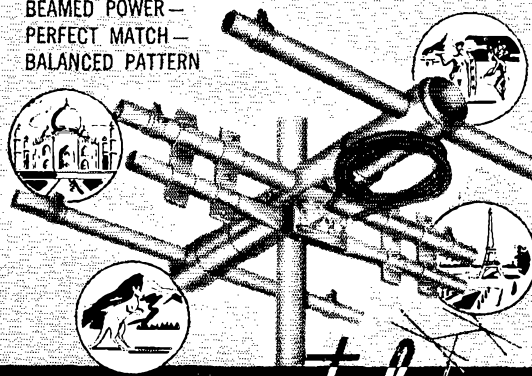
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remind him to look on page 76 of the April 1955 QST and he'll see listed in the DXCC Honor Roll the call of VQ4ERR with 226 countries. How did he get it? By receiving QSL cards so he could send them to ARRL for verification, that's how! . . .

— Arthur W. Plummer W3EQK

PHENOMENON

Jefferson City
 Missouri

Editor, QST:

. . . On an average of one night every three or four months during the period of the new moon at about midnight there is an echo on signals in the 2800-ke. region. A number of us on the Missouri State Highway Patrol c.w. net on this band have noticed the effect and no two agree on the cause. Our c.w. receivers are wired for full break-in, and on the nights in question, the operator can hear his own transmitted signal with a strength of about S8 and a delay of up to about 2 seconds.

The only details I can supply are these: The effect is usually first noticed about midnight at the station at St. Joseph, and here in Jefferson City anywhere from 30 minutes to 2 hours later. It seems to move in a south-easterly direction, usually observed at Poplar Bluff a half hour later than here. Some nights only one or two stations will notice the effect, but once, about three years ago, all of the Missouri stations heard it. The echo is never heard by any but the transmitting station. The duration of the effect varies from about 5 minutes to an hour.

Normally, on something like this, the cause might be attributed to too much "cough medicine," but with old-timers like W0BNQ, W5BBI, W0KQ, W0RTG, W0ZAO, and a few others to vouch for me, I feel that someone else has probably noticed it too. Anyone want to volunteer a good explanation?

— Davis A. Helton, W0PME

WHY SINES?

5704 Ben Alder
 Whittier, Calif.

Editor, QST:

Just finished reading "YB's" letter in the April issue of QST (page 52) and would like to add my two-bits to his. Having worked as railroad telegrapher and train dispatcher for 27 years I agree with "YB" that we should receipt for messages with our "sine," but it is nice, when just rag-chewing, to know the other fellow's name.

— J. E. Muncey, W6HUJ

1178 High Street
 Central Falls, R. I.

Editor, QST:

. . . Well, "YB," I tried your system on c.w., but I must say it doesn't fare too well! I used "PB" instead of "Paul" for a sine, and 7 out of 10 replied, without fail, ". . . NAME OM? PSE RPT NAME OM" or better still, "CFM NAME PB IMI IMI." I got sick of this and went back to my old stand-by, P-A-U-L, and nobody ventured a query. When one comes right down to it, if W7OE ever gave me "YB" for his name, I'd query quite a bit also. So, Howard, we are not all telegraph office operators and I'm afraid legible names will have to be used if we want to save gray hairs! The initial "sine" system has some value, though — don't throw it out yet! Of most practical use would be on NTS — our ARRL c.w. traffic nets, where the use of names is totally unnecessary. But then, the call is sufficient so why bother with sines at all?

— Paul B. Bovin, Jr., W1ZXA

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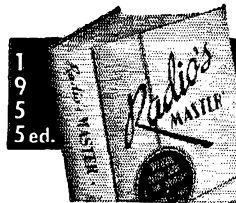
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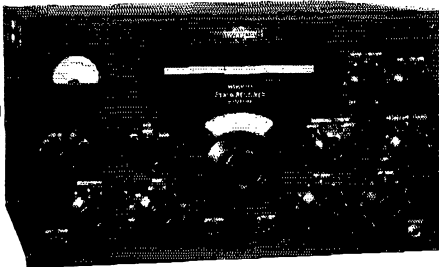
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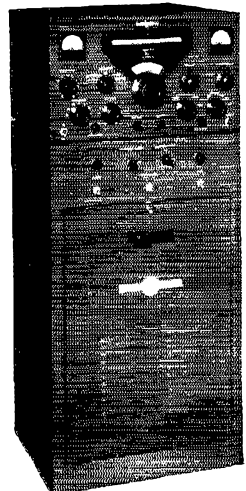
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HAM-ADS

(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.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (4) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature, and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and sold by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply. To expedite handling of your copy please state whether you are a member of ARRL.

(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 communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 2R/42 Mc. W0VIV, Troy, Ill.

WANTED: Early wireless gear, books, magazines and catalogs. Send description and prices. W6GH, 1010 Monte Drive, Saita Barbara, Calif.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

SUBSCRIPTIONS. Radio publications. Latest Call Books, \$4.00. Mrs. Earl Mead, Huntley, Montana.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

OUTSTANDING ham list offers. Our prices on trade-ins of all amateur brands are rewritten down to earth. We feature Johnson National, Collins, Hallcrafters, Sunset, Elmac, Harvey, Wells, Morrow, Central Electronics and other leaders. We trade easy and offer our own time-payment plan tailored to fit you. All leading brands of new equipment always in stock. Write today for latest bulletin, Stan Burghardt, W9BJV, Burghardt Radio Supply, Inc., Box 41, Watertown, S. Dak.

DON'T Fail! Check yourself with an up-to-date, time-tested "Sure-check Test." Notice \$1.50; General, \$1.75; Amateur Extra, \$2.00. Amateur Radio, 1013 Seventh Ave., Worthington, Minn.

ANTENNA for bandswitching transmitters up to 300 watts input, approx. 120 feet long, centered with 75-ohm line, 70 feet included, low SWR, tunes 80-40-20-10 meter bands. U. S. Patent 2,535,298. Each one tested for resonance on all bands. Send stamp for details. \$18.95 each, Latin Radio Laboratories, 1431 Sweeney St., Owensboro, Ky.

CALL SIGNS—Three color, reletterized (glass-beaded), aluminum 4" x 12", \$10 postpaid, including mounting frame for car, rig or shack, Lackner, W0WFT, 3029 Bradley, Chicago 18, Ill.

MICHIGAN HAMSI Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, W8RF, Future Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. 8-8696, No. 8-8262.

2-METER aluminum Brownie beams, \$22 and up. Write to H. W. Snyder, W3LMC, 4330 Glenmore Ave., Baltimore 6, Md.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARCI, R5/ARN7, BC10UE, BC221 mounts and parts wanted. Fairest prices possible paid. Dames, W2KUU, 308 Hickory St., Arlington, N. J.

\$26 Worth of valuable radio parts for only \$6! Here are a few of the usable parts you'll find in this Army Surplus power supply unit: 1 Ninety second time delay switch; 1 adj. pilot lamp socket assembly; 1 interlock switch, 125 V. A., 12 amp; 1 filter cond., 1 µfd, 200 VDC; 1 liter choke, 2 1/2 Hy. 2000 VDC; 6 rectifier tubes, #536, 5000 V 25 ADC; 1 aluminum case, black crackle finish, 8" x 5" x 19"; 2 tube sockets, P STD ceramic; 2 plate caps, ceramic fit #36, etc.; 2 terminal strips, 3 term. #6 each; 2 for \$10. Cash with order or C.o.d. Army Surplus Outlet, 91 N. Second St., Memphis 3, Tenn.

ATLANTIC City vacation! Commodore Hotel, Kilowatt accommodations at low power prices. Luxury rooms with bath and radio. Budget special rooms with running water. Write for information and reservations. Ben Robin, W2BIG, Manager, Commodore Hotel, 715 Pacific Ave., Atlantic City, N. J.

QSLs? State-map? Rainbow-map? Cartoon? Mobile? Largest variety samples 25¢ (refunded). "Rus" Sakkera, W8DED, P.O. Box 218, Holland, Mich.

QSLs! Modern, better quality designs. Samples 10¢. Tooker Press, Lakelurst, N. J.

QSLs. Samples, dime. Printer, Corwith, Iowa.

QSLs-SWLS. Samples free. Backus, 5318 Walker Ave., Richmond, Va.

QSLs: Neat, reasonable, samples free. W3EHA, Cyrus F. Jones, 840 Terrace No., Hagerstown, Md.

QSLs—The kind you want. Samples 10¢. Graphic Crafts, Rt. 12, Ft. Wayne, Ind.

DELUXE QSLs—Pretty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

100 Free QSL cards with order. Samples 10¢. World Printing, 106 Barkley, Clifton, N. J.

QSLs-SWLS. Meade W0KX1, 1507 Central Avenue, Kansas City, Kans.

QSLs-SWLS. Samples free. Bartinoski, W1YHD, Williamstown, N. J.

QSLs-SWLS. Cartoons, Rainbow, others. Reasonable. Samples 10¢ (refunded). Joe Hains, 225 Maple Ave., North Plainfield, N. J.

QSLs of distinction! Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Box 96, Lynn, Penna.

QSLs, SWLS. America's Finest!!! Samples 10¢. C. Fritz, 1213 Briar-gate, Joliet, Ill.

QSLs. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

QSLs! Two colors, \$2.00 hundred. Samples for stamp, Rosedale Press, Box 104, Asher Station, Little Rock, Ark.

QSLs—"Brownie" W3CJ1, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSLs! Taprint, Union, Mississippi.

QSL-SWL cards. Sensational offer, Bristol stock 500 1 color \$3.95, 2 color \$4.95, 3 color \$5.95. Super gloss \$1.25 extra. Rainbow cards. Samples 10¢. QSL Press, Box 71, Passaic, N. J.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSLs. Postcard brings samples. Fred Leyden, WINZJ, 454 Proctor Ave., Revere 31, Mass.

QSLs-SWLS. Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

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QSLs-SWLS. Varicolored, specialist, 10¢ samples. Snyder, W9HIU, 113 Harrison, Jeffersonville 1nd.

UNUSUAL! Vivacious! Illustrated QSLs, typolithographed. Free samples. WAT, Box 128, Breckville, Ohio.

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QSLs. Something new—Different—All printed in 3 colors or more on a glossy stock, \$1.85 per 100. Preference when ordering such humorous, plain or modern. Be surprised. Satisfaction guaranteed. 2-day service. Constantine Press, Bladenburg, Md.

WANTED and for sale: Want to buy 10 to 20 2-meter mobile installations, particularly commercial units like those from taxicabs, police, etc. Give complete details and best cash price. For sale: BC-221 frequency meter, Meissner signal shifter, SX-24 receiver, 750 volt 300 Ma. AC power supply. Brington, W4NJE, Box 246, Lewisburg, Tenn.

LEECE-NEVILLE 6 volt system. 100 amp alternator, regulator & rectifier, \$60.00. Also Leece-Neville 6-Volt system. 100 amp alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

WANT: Policarman M-S1; low or hi-freq. handie-talkies; Edico EE-2. Ed Howell, W4SOD, P.O. Box 126, Lumberton, N. C.

TECHNICIANS: Get on six meters fast with Tecraft xtal control mini-converter, 3 tubes. Only \$24.95. Mail for details. N.R.M. Wholesale Radio, Inc. 286 Teaneck Rd., Ridgeland Park, N. J.

NEW and used Motorola, Link, RCA, G-E, etc., FM commercial communications equipment bought & sold. Allan M. Klein, W2FOU, 95-33 25th St., Bellerose, L. I., N. Y. Phone FL 4-3394.

WILL Pay \$150 for good clean AN/ARC-1 20-channel preferred. Also RT-610E, BC-614E, BC-939, BC-729, BC-221, TCS and others. Cash for our unadvertised Navy, Air Force stock catalogs; maint. instr. TM's for war surplus equipment. Amber Co., 393 Greenwich St., N. Y. 13, N. Y.

PITTSBURGH Hamfest: Sunday, August 7, 1955, at Totem Pole Lodge in South Park. Save 25% by registering in advance. Send check for \$1.50 to William E. Guthrie, 4949 Roberta Drive, Pittsburgh 36, Pennsylvania. Tickets are \$2.00 after July 22nd. This is the 17th Annual Hamfest of the South Hills Brass Founders and Musicians.

NATIONAL receivers SW-54, NC-88, NC-98, NC-125, NC-183, HRO-60 in stock. Attractive swaps or trades for used ham receivers and surplus equipment. Dynamotors—6 VDC/420 VDC 280 Ma., good used, \$12.95; 12 VDC/400 VDC 500 Ma. including luter base, starting contactor, excellent, \$16.95; surplus RG-8/H cable, 100 ft., \$5.95; 250 ft., \$13.25, 500 ft., \$25.00. Free Bargain Bulletin. Visit Stop for our unadvertised bargains. Lectronic Research, 719 Arch St., Philadelphia 6, Penna.

PRINTED circuits made from your drawings. Etched circuit supplies. Rowe Engravers, 492 East 39th St., Paterson, N. J.

WE will be looking for you at the ARRL Central Division Convention at South Bend, Indiana, October 15-16 are the dates. This will be the Big One for 1955! Advance registration \$3.50. Write to Box 551. Make checks payable to Central Division Convention. Do it now!

RECENTLY factory overhauled 75A-2, \$325.00; 32V-3, \$550.00. Right (8) Raycon 3/4 ft. horns, \$50. George Sperry, 108 Oak Hill, Portsmouth, Va.

20-15-10 DX bands coming back. The VS baby mobile antenna, beauty of high gain, is a DX natural. Weatherproof High Q plug-in loading coils, with chromite fittings available 75 thru 10. Trim appearance. Changes bands instantly. Adjustable to exact frequency. Perfect for 50-watt bandswitching transmitters. Effective on all bands. Replaces cowl or fender whip. Simple installation. Antenna with one coil and mounting hardware, \$12.95. Specify band. Additional plug-in coils, \$2.75 each. DX 3 coils, special, \$17.45. W6VS, Bill Davis, 225 Cambridge Ave., Berkeley, Calif.

WFO data compiled. W5CA.

S36A Hallicrafters receiver, \$100; NC183D, \$300. All equipment in perfect condition. Clement Gouveia, 3310 63rd St., Sacramento, Calif.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallicrafters, Hammarlund, Johnson, Lyco, Master Mobile, Morrow, National and other ham gear H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill. WANT: Good used receiver under \$100. Silvert, 44 Seaview, Marblehead, Mass.

REMEMBER Blossomland Amateur Radio Association's Hamfest picnic, July 31st at Warren Dunes State Park, 15 miles south of St. Joseph, Michigan, on U. S. 12. 10-meter transmitter hunt. Bring gear for swap and shop. Registration fee \$1.00 in advance or \$1.25 at the park. Advance registration through R. T. Hatch, W8JFW, 3225 Cleveland, St. Joseph, Michigan.

SELL HRO-50, used 4 hours; Viking 1 TVI-suppressed, 4D32, \$175; Amertran 6300 V.A.C. C.T. 700 mila, \$60.00. Kasr 40-watt mobile, 10 meters, complete, \$30.00. Write for list. S. Macy, W4KZT, 2346 Dundee Rd., Louisville, Ky.

FL8 audio filters, 2 for \$2.00 prepaid in USA. FT 154 shock mounts for BC348, \$2.00 each; BC614 speech amplifier, PCA-2T-200 Panadaptor, BC638A frequency metr 100-156 Mc.; will sell or trade for audio equipment or tape recorder. M. D. Haines, W5QCB, 1316 S.W. Military Dr., San Antonio 4, Texas.

10A; SSB exciter, factory-wired, late model; Q11 circuit and 80-40-20 meter coils, in exc. cond., \$55.00. F.o.b. Hamden, Conn. R. H. Zeek, 1633 Whitney Ave., Hamden, Conn.

SELL: Lyco Model 600s 35-watt TVI suppressed transmitter, \$120.00; WFLC 600w motor, \$40.00. Stan Echler, W8JVS, 827 Turner Ave., Toledo 7, Ohio.

FOR Sale: Complete station: 75A2-32V2 1V1 suppressed; 700 watt 813 p.p. final, custom-built. Used 10 hours. 40 ft. VDX tower; Johnson 10-20 M. beam; prop pitch rotator. Price: \$1300. (Will take offers on units to be sold separately). Saper, W2RLX, 3881 Cambridge Rd., Woodmere, N. Y.

QUARTZ Crystals. Full stock of marine frequencies. Heavy duty transmitting, \$2.95, receiving, \$2.50. C-W Crystals, Box 2065, El Monte, Calif.

FOR Sale: Globe King B. \$325.00; BC455s, \$5.00; Browning pre-selector, \$10 power plate and mod. transformers, coils, condensers and many other units, 60 coils. Vettesse, W2011, Box 4, Pomona, N. J.

SELL: Hallicrafters S-76 in exc. condx. with Nov. '54 QST ant. trimmer, \$139.00. Also Hallicrafters HT-18, all band VFO in FB condx; \$59. Bob Martinez, K2DGT, 45-10 Kissena Blvd., Flushing, L. I., N. Y.

SELL: Terrific Bargain! Viking II, \$220; Collins 32V3, \$575.00; 75A3, \$450; HT-18, \$40. All equipment like new, not a scratch, perfect in every way. W3LAT, Mars Theatre, Mars, Penna.

SELL: Gonset communicator #2, in gud condx, \$165. Bullion, 439 Ave. P., Brooklynn, N. Y.

FOR Sale: Telvar T-60-2, 60 watt fone/c.w., \$70. J. Klarnann, P.O. Box 531, Farmingdale, L. I., N. Y. Phone: Farmingdale 2-1669J after 6 P.M.

WVOMING Hamfest July 23-24. Excellent program. Tourist mobiles welcome. See Hamfest Calendar this issue.

RECEIVERS — Transmitters, repaired and aligned by competent engineers, using factory standard instruments. Collins, Hallicrafters, Hammarlund, National. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Avenue, Boston 19, Mass.

SELL or Trade: Par-Metal Grey ER-227 relay rack with steel panels including 5' meter panel, \$45. National SW-52 receiver, perfect, \$30. D. Webster wire recorder, \$35. All above F.o.b. Belvidere, Ill.

WANT tape recorder complete or mechanism, Johnson Ranger or similar transmitter, KMT-85 or similar communications receiver, Larry Kleber, Belvidere, Ill.

FOR Sale: CREI correspondence course. Section One (Introduction to Radio Engineering) and Section Two (Advanced Practical Radio Engineering). Late course. Complete with graded examinations. Perfect condition. Cost \$200. Will take \$50, prepaid to you. Also a Pickett & Eckel model 500 Log Ortho-Phase slide rule with leather case. Perfect condition: \$10. Postpaid. W. Cook, W5LFB, 1614 Morson Rd., Jackson 9, Miss.

WANTED: Short wave communications receiver. Mr. W. Ellis, 1240 Burke Ave., Bronx 69, N. Y.

BC-107A xmtr, 115V. AC, 150-200, 11 tubes 6SN7, 655, 807, 2-504R, 879, 9002, 2-9006, 2-826s, surplus, new, a bargain at \$25.00 F.o.b. W3CZE, 418 10th St., N.W., Washington 4, D. C.

BC610-E xmtr and BC-614E speech amp. Must sell for lack of space. Best offer cash & carry. H. C. Weidner, 1205 Ave. "C", Reading, Penna.

HANDIE-Talkies: Sale or trade, HT-144 (144-148 Mc.). Not surplus. New condx. with orig. schematic, 3 1/2" x 1 1/2" x 1 1/2" gray crackle, whip antenna. Ready to go on air. \$20.00 for pair F.F. Trade for new 4D32 tube, S-38 rcvr or what have you. W3CLP, 707 Edge Moor Rd., Wilmington, Del.

FOR Sale: Motorola FM TU30D FM mobile transmitter 150 Mc., complete with tubes and dynamo, \$25. Ralph Villers, P.O. Box 1, Steubenville, Ohio.

GONSET SuperSix, \$37; Dynamometer, 6 in. 300 at .125 out, dynamo 12 inp 400 at 180 out, \$5 each; 813s, new, \$7.50. K6JBI, 4261-63rd St., Apt. 2, Sacto, Calif.

AMATEUR Paradise vacation spot. Livingstone Lodge and log cabins, Mascosia Lake, Enfield, N. H. Swim, fish, boats, sports, 100 acres, eleven buildings, churches, recreation building, main dining lodge; 75 and 40 meter rig in lobby, family groups, 20th year, low rates. Booklet. Al Livingstone, W2QPN, 12-01 Ellis Ave., Fair Lawn, N. J.

FOR Sale: NC-125, new, with speaker, in original cartons. Price \$175.00. C. W. Ehlers, 319 Union St., Jersey City 4, N. J.

BC610-E, BC614-E speech amplifier and HT-18 VFO. Coils 10 through 160 and antenna coupler, \$495.00. Lyco 600S, modulated and TVI-suppressed, like new, \$95.00. E. P. MacKenzie, W8NGO, 430 University Place, Grosse Pointe 30, Mich.

LYSCO 600, like new, \$80. W8OZL, 338 Walnut, Ashland, Ohio.

HAVE lots of ham gear to swap. My list for yours. William McDonald, 15 Joslin, Providence, R.

SELL: All-band KW transmitter; PP 813s; 807 buffer, Sonar VFX680; final power supply 3.5 KW Amertran, Variac controlled with triple filter section. Separate screen and bias supplies both electronically regulated. Fully metered. Best components used. Enclosed in deluxe Par-Metal cabinet. Spares, coils and manual included. Cost over \$1100; asking \$500 or near offer. W2TAM, 140 Summit Ave., West Trenton, N. J.

WILL trade a nice piece of lake frontage on Long Lake near Iron River, Wisconsin for a good transmitter and receiver (must be in good working condition). Will send pictures and further information upon request. Art Schmidt, Park Falls, Wis.

\$20 of used chemical equipment. Trade for ham gear. Wanted: relay, VFO, surplus equipment or anything. WNSFIO, Roberts, Sweetwater, Texas.

SELL: Model 12 teletype with cover, table, keyboard and AC motors. Also W2BF12 converter. All in excellent condx. W3MKZ, 87 College Ave., Annapolis, Md.

SELL: Triple power supply, 450V at 150 Ma., 750V and 1000V at 250 Ma., \$50. Ameco code course, records through 18 wpm, L. L. Paul, Goldman, K2GKU, 248-54 54 Ave., Douglaston 02, L. I., N. Y.

MUST sell slightly used TBS-50-D in original carton, \$85; filtered PE101-C (\$5.00); Brand new MB40-SL, \$13; 10 Biley A-2 75-mtr xtals, \$1.00 each; new MM all-band loading coil, \$12; MM 8 ft. whip, mount, bumper mount, \$10; Millen 10035 dial, \$4; base type PE103, \$27. K2AKW, 11 Montview Rd., Summit, N. J.

SELL: Receiver, NC-128X, in gud condx, just aligned; \$65; xmtr Parallel 807s, 80-40-20 meter coils, relays, xtal, TVI-suppressed, 100 watts, \$125. K2EYW, 307 No. Thurlow, Margate, N. J.

FOR Sale: Cash and carry, metropolitan area, complete station, not sold separately. Viking Ranger xmtr, factory wired, brand new; NC125 receiver, matching speaker, gud as new. Unit wired push to talk, includes cables, relay stat mike, 20 meter Amphenol antenna, balun coils, new 75 meter loaded in, mounted prop pitch motor transformer; \$375 firm. Sherman Dennis, W2RUH, 414 N. Broad St., Elizabeth 3, N. J.

SEE you at Hamfesters Radio Club 21st. Annual Picnic and Air-mobile Meet at Mance Park near Chicago on Sunday, August 14th. Donations \$1.00 in advance, \$1.25 at the gate. W9ECY, Sec., 8908 So. Constance, Chicago 17, Ill.

TRADE pair 4-250A with special sockets, also have Jones Micro-Match. For Hi-Fi commercial cabinet with 12 in. coax speaker. State type speaker, W1HOL, 4 Halcyon Rd., Newton Center, Mass.

SWAP: Automatic Rolleiflex, case, filters, sunshade, panoramic head, flashgun & film; Strobolon V strobe unit with extension lite and new battery. Both units in excellent condition, one owner. For: Viking transmitter or equivalent, rotator, 20 meter beam, etc. Harry Neumann, W1ZVT, 38 Overhill Rd., Milford, Conn.

SELL: Ameco Novice code course, slightly used, \$4.95. Donald Coughlin, R.R. 2, Paulding, Ohio.

FOR Sale: ATI excellent, no scratches, \$26; Viking I with Viking VFO and spare 4D32 tube, excellent working order and appearance: \$22.00; RME Mc 55 all band converter, new and unused, \$50; new RCA 810, \$5.00, new 304TL, \$5.00, new 100TH, \$4.00; GE 4C 2000 volt condense \$3.00; RCA 100 Kc. standard, \$5.00; RP 1000 Kc standard, \$3.00. W4NWW, 1714 Friendly Rd., Greensboro, N. C.

WANTED: Clean HQ-120X with speaker. Give details. Schultz, W2EY, 1829 Cornelia St., Brooklyn 27, N. Y.

RANGER: For sale, Viking Ranger, factory-wired, new in February 1955, and never used; with tubes. First \$200 takes it. W2GYI, Riverside Ave., Amityville, L. I., N. Y.

WANTED: Tubes, boxed and unboxed; transmitting, receiving and special purpose industrial types such as Klystrons, etc. Also will buy your excess test gear, Hickok tube checkers, Variacs, etc. Will pay cash or swap you for choice equipment and tubes. B. N. Gensler R2L1, 330 West 11th St., New York 14, N. Y.

LAYOUT — Drilling template for Chambers three control six-band 813 transmitter described in January '54 QST and ARRL Handbook. Complete layout, full scale, \$2.50. Adams, W1STX, 719 Great Plain Ave., Needham, Mass.

SIDEBAND 10B exciter with converted BC458 VFO, Viking I with VFO, for sale. Any reasonable offer considered. Dr. William O'Rourke, Weller Bldg., Scottsbluff, Nebr.

VAN SICKLE has the new or used gear. Taylor 866As, \$1.95. Gene, W9KJF, 1320 Calhoun, Ft. Wayne, Indiana.

TRADE: 1955 Contax IIA, case and flash. Want good receiver. Will pay cash difference. H. Fessinger, KN6KID, 141 S. McCarty Dr., Beverly Hills, Calif.

FOR Sale: BC-638, BC639, BC640B, BC610E, BC614E. W5GO/6, 494 Alameda, Redwood City, Calif.

VIKING Ranger, new, push-to-talk and low pass filter, \$175. New 3 element 20 Shortbeam and 10 meter 3 element beam, Mon-Key, handsread NC-100 ASD, W2JRV, Bob Collina, 33 McKinley Ave., Westwood, N. J.

FOR Sale: NC183 rcvr, tilt base and matching spkr. A-1 shape, \$195. Rcvr only, \$180 express paid. Dudney Anderson, 8356 Curzon, Cincinnati 16, Ohio.

SELL: S40A, in perfect condx, \$65. Perry H. Laten, W0RFL, 345 W. 9th St., Fremont, Nebr.

SELL: Surplus VHF-UHF transmitting and receiving gear, tubes, antennas and mobile equipment. Send postcard for list and prices. Leroy May, W5AJG, 9428 Hobart, Dallas 18, Texas.

SELL: Gonset 10 meter converter, 10 and 20 meter beam, 30 foot tower, rotator, indicator, large and small plate and filament transformers, filter condensers, meters, tubes. Send for free list. R. A. Farmer, Cook Drive, Baldwinville, N. Y.

OFFER \$10. Any one copy QST May 1916 or before. W4AA, Wayne Nelson, Concord, N. C.

FOR Sale: One Premax 535 aluminum sectional radiator. With base, \$40.00. G. Yust, Chief Engr., Station KROC, Box 83, Owatonna, Minn.

SELL: SP-600 JX perfect condx; HRO5TA1 with spkr and extra 15 meter coil. Very clean; xmtr with 4-125-A1 final, 300 c.w. 600 W. SSB with 10A and extra power supply. All at reasonable prices. W2WVW, 255 Eastern Parkway, Brooklyn, N. Y. NE 8-5273.

COLLINS 32V-3, \$565; 75A-2, \$300. Both together, \$850. Used few hours only, perfect. Herb Hollister, WØDRD, 709 Baseline, Boulder, Colo.

SALE: Complete 150 phone, 300 c.w. rack mounted station; push-button 357V, T-1L suppressed, separate power supply, VFO, Electro Voice mike, RME-69 receiver, complete set spare tubes for station. Best offer over \$200 takes all. Mike Geller, W3YAS, 68 Tanner Ave., Lexington Park, Md.

FOR Sale: 2500 watts, 110 VAC, gasoline generator Homelite. War surplus in gud cond, \$100. F.o.b. K. W. Covey, Mahanomen, Minn. CLEANING out. Send for list of transmitters, receivers, teletype, testing equipment and parts. W8GWA, 6204 Darramoor, Birmingham, Mich.

HALLICRAFTERS S-40B receiver, includes deluxe illuminated "S" meter, matching case, and antenna coupler; in excellent condition; best offer over \$75. Karl Thurber, 247 Hamilton Rd., Teaneck, N. J.

FOR Sale: NC-101X in excellent cond, \$70; Gonset 10-11 mtr. conv. #10; BC645, \$15; 90 watt final, \$15; want two meter trans. and xtal control group. W2SD, Charles Conn. J West Drive, Port Washington, N. Y. Tel. PO 7-2271.

LIKE new trade-ins: Collins 75A-1, \$275; RME-45, \$95; BC-221, \$99.50; Collins JOK-1, \$95.00; "A" Slicer, never used, \$60; Mallory VP-52, \$19.95; Sky Buddy, \$29.95; Viking II, \$279.95. More! Write for list. Curie Radio Supply, 439 Broad St., Chattanooga, Tenn. 406 McLean, Huntsville, Ala.

MOBILE high current Leco-Neville generator with rectifier harness and brackets, like new, \$80. F.o.b. Andrew Kau, Jr., 316 Carmita Ave., Rutherford, N. J.

SURPLUS items (to me), Viking II with VFO, \$250; three 33 ft. 61ST aluminum verticals with two heavy stand-offs each, \$15.00 each; Telrad 18A frequency standard, \$15.00. Will ship but prefer examination at station and pick-up. W1AXW, Richardson, 17 Whittier St., Dover, N. H.

FOR Sale: Hallcrafters S-76. Good condition, one year old. One hundred dollars (\$100.00). Herbert E. Russell, Suffield, Conn.

SELL: 32V-1, excellent, guaranteed, \$325; also SX-71, in same cond, \$135. C. B. Story, W7TZG 540 Wyoming Ave., Sheridan, Wyoming.

SALE: Viking II, Viking VFO, NC-125 receiver, D-104 mike, Carter Dynamotor 600 V., at 240 Ma., Morrow SBRLN converter, Master Mobile all bander coil, best offer takes all or each. Write Wayne Valentine, W5OAE, 340 E. Capitol St., Jackson, Miss.

FOR Sale: S40B, excellent condition, \$50. K2DZX, Phil Steinberg, 37 Morgan St., Bergenfield, N. J.

TELREX 3-element 20 meter beam, \$90; new 3E29, \$8; 832A, \$4; Guardian K-320 keying relay, \$2. Like new, 10 watt, 10 meter phone, high gain speech. Two power supplies, \$40. 750 volt, 225 milliamper power supply, \$15. Exciter delivering 10 watts on 40 or 20. Has 75 watt amplifier foundation, \$20. New Simpson meters, 0-1 Ma. \$6; 0-25 Ma. \$6; 3 inch 0-2RF amperes; \$8. WØGSV, 798 Sherburne, St. Paul, Minn.

SALE: 32V-1, \$300; 75A-1, \$225, in excellent cond. WØOSX, 1396 West Idaho, St. Paul, Minn.

CLEANING house: Model 25-A teletype, \$30; Simpson 260, \$15.00; S-38 rev, \$25; S-38 mike with model G Stand, \$20; HRO-51 coil, J. H. G. \$25. Equipment guaranteed. F.o.b. W. K. Lindeman, 211 Union St., Michigan City, Ind.

SALE: Radio Magazine 1937 thru 1941. Also some CO, QST, RR. Write to Clifford Storch, 5 Winfield Terrace, Great Neck, L. I., N. Y. WANTED: HRO-7 or 50. Cash. Sell SX-9, \$30. W7GND, Barker, 305 Ash St., Pullman, Wash.

BARGAINS: WITH NEW GUARANTEE: R-9-r \$12.50; SW-54 \$29.95; S-38C \$35.00; S-40R \$79.00; Lytco 600S \$119.00; S-27 \$99.00; SX-43 \$129.00; S-76 \$149.00; SX-71 \$169.00; SX-42 \$169.00; HRO-50 \$275.00; Eldico TR75TV \$39.50; Heath A-T-1 \$24.95; HT-17 \$29.95; Shuford C-39.50; Globe Frotter \$49.50; Harvey Wells Deluxe \$69.00; Viking I, \$79.00; Viking II, \$229.00; SS-55 \$169.00; HT-9 \$139.00; King 400B \$325.00; 32V1 \$375.00; 32V2 \$425.00; 32V3 \$525.00. Free trial. Terms financed by Leo, WØGFO. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

SELL: NC-125 receiver with matching speaker, new condition, \$125. WØVOP, 713 No. Huron Ave., Pierre, So. Dakota.

\$300 worth of surplus and 35 years accumulation of ham gear, hardware, tools, etc. \$300. W2CJZ, 90 Blvd., Bayonne, N. J.

WANTED: Amateur, and surplus electronic equipment; receivers, transmitters, teletype, radar, loan, technical manuals, especially APR-4, AR-6, AK-13, ARC-1, EC-610, BC-614, BC-939, DY-12, BC-221, BC-348, BC-312, BC-342 Collins receivers, transmitters. Cash, or trade for NEW Johnson Viking, Ranger, Central Electronics, Hallcrafters, Hammarlund, National, Elmac, Gonset, Morrow, Harvey-Wells, Telrex, Fisher HiFi, Pentron, Bell, etc. All-tronics, Box 19, Boston 1, Mass. Richmond 2-0048, 2-0916. (Stores: 44 Canal St., Boston, 60 Spring, Newport, R. I.)

CANADIANSI GR 10 receiver with speaker, S meter, xtal, filter, in gud cond. No alterations. One hundred dollars (\$100.00). Howard Walker, VESBN, Rosthern, Sask., Canada, care CNRR.

2 METER beams, 6 element, horizontal or vertical, all seamless aluminum. \$6.95 prepaid. Wholesale Supply Co., Lunenburg, Mass.

FOR Sale: Heathkit 30-watt xmitter. New tubes. In gud cond. Shipped express collect. A steal for \$19.00. Money order to be sent to: Mike Collum, W5FZV, 1158 Blair, Abilene, Texas.

STANDING Wave ratio bridge, SW-500. Hi-power type, leave in line up to 500 watts output, read SWR at all times while transmitting. Perfect for bandswitching rigs, antenna tuners. \$18.00 postpaid. With call letters, \$19.00. Available soon, 6-meter equipment; CV-6 crystal controlled converter, TX-6-75 75-watt transmitter. Write for free information. Send letters, checks or money orders to: Ar-Hive Company, W4FFW/9 Shulman and WØBMR, Box 335, Shullsburg, Wis.

FOR Sale: ARR-1 test oscillator (QST June 1952, 432 Mc. converter), \$5.00; 316As, QST Jan. 1949, 420 Mc. transmitter; 25¢ each; two for \$5.6¢. Pair of Selysna, C-78411, 50 v. 60 cycles, \$5.00. Cecil Baumgartner, Box 343, Milton, Pa.

SELL Viking VFO, new, \$35.00. Want: Johnson Matchbox. Will trade. W2DID, Art Rauch, 85 W. Main St., Smithtown, L. I., N. Y.

WANTED: Adjustable frequency crystal holder for 75 meter xtal. W3EUN, Rogers Ave., Ellcott City, Md.

FOR Sale: 3000V 120 ufd oil-filled condenser, 55# net, 13 x 14 x 5 inches. \$35.00. Tom Beal, W8EYU, Grand Blanc, Michigan.

FOR Sale: Collins 32V3, in exc. cond., F.o.b. \$550.00. Morgan City La. WSEKY, Broussard, Box 272, Morgan City, La.

TRAVELLERS portable television receiver for sale in luggage type carrying case. 22 tubes, new, 7 in. picture tube. Built-in antenna. 1000 watts. 1 hr. 13 No. batteries. Postbox 520, Mar Vista, Calif. WANTED: HQ-120X receiver. Malcolm Burdick, WINOO, Hampton, Conn.

TRADE: Fully equipped Rolleiflex camera. About a year old. Valued at \$500, for gud revr as HRO-60. Collins 75A, etc. Write for details. Lou Desquenne, WLEAS, 753 Mendon Road, Woonsocket, R. I.

SELL: Teletype printers and accessories. HQ-140X, \$195; Dumont #241 scope, \$275; APN-9 with inverter power supply, \$250; HQ-1 crystal calibrator with 200 Kc xtal, \$350; Meissner signal shifter, \$55; Viking Adventurer transmitter, \$39. Tom Howard, W1AFN, 40 Mt. Vernon St., Boston 8, Mass. Phone Richmond 2-0916.

NEW YORK area. Sell Gonset "Commander" 1-30", Mallory V1brapaks: 6 to 300V., 200 Ma., 12 to 300V., 100 Ma.; Electronic Labs 6, 115 to 300V., 100 Ma., Shure mikes, 707A crystal, 305C reluctance; Electro-Voice 2105 carbon; 35 watt CW 115v. transmitter; Biley crystal, 6AG7, 6L6 rectifier, VR105-VR150, 80 meter plug-in coils; 10 watt 10 meter phone mobile transmitter; Biley crystal 6AK6, 2E30, 2E30, 10 watt 115v. modulator, speech amplifier; 6S7J-6J5-6J7 rectifier, 35 pounds of parts, most never soldered; 85 tubes of QST, C, Q, 1947-52; 30 x 60 green linoleum topped table. Fixed price for all: \$250. S. Arms, W2SVW, Rye 7-1236.

SELL: Viking II VFO filter, \$285; Elmac A54 \$85; HQ-140X, \$235. Burwell, 9 Fairview Place, Morristown, N. J.

12V Dynamos for late model cars, signal corps PE135AX, input 24-12V, output 500V 400 Ma., size 13 x 12 x 7, original packages, spare parts: \$20 postpaid, refund if not satisfied. Lesterman Co., Barbourville, W. Va.

I want to buy set of coils for National F70 receiver. W7MID, 4511 North 8th St., Phoenix, Ariz.

WANTED: TVT-suppressed transmitter and receiver. W. Ellis, 1240 Burke Ave., Bronx, N. Y. C. KN2MKW.

REST Offer! Hallcrafters SX-71 dual conversation, xtal, etc., revcr & spkr. In excellent cond; Elmac A54H xmttr (10-11-20-40-80) 110 AC supply with matching cabinet; Axtal mike, A 425 volt 200 Ma. 6 volt D. C. V1brapack. Very compact and new! A new model 4A10 Wilcox Gay tap recorder, dual speed, with extras and mike. Only used several hours. Total value \$580 plus. Let's hear your offers, fellows. George Moore, W3PFD, 337 13th Ave., New Brighton, Penna.

BARGAIN! BC348M with S-meter, converted to 110 VAC and Q5'er; both in gud cond; \$75. Guy J. Mallard, Jr., 1433 Belvedere Ave., Jacksonville, Fla.

HICKOK Model 288X crystal controlled signal generator; very gud cond; \$65.00 express collect. N. B. Heidenblad, K2CBR, 55 High Road, Baldwinville, N. Y.

SELL: New and used Gonset mobile equipment, two and six meter communicators, etc., buy, sell and trade mobile gear. Will take gear in trade for new Polaroid cameras and accessories. Graham Co., R. T. Graham, W1KTI, Box 23, Stoneham, Mass. Tel. ST 6-1966. \$59.95 can provide you with 75 watts input on all c.w. bands (160-10) \$14.95 more will put you on phone! Details free! Hart Industries, 407 Park, Birmingham, Mich.

WANTED: "Radiola IV", "Radiola 16", "Radiola 25", "Radiola Grand"; Kolster Decrimeter and Patent SLF condenser. Will pay cash. Donal Eymard, 140-35 58th Road, Flushing, L. I., N. Y.

NATIONAL NC-88 receiver, in gud cond, \$80; BC-459A, excellent cond; \$12.00. K2GLR, Tom Powers, Mt. Kemble Lake, Morris town, N. J. Tel. Bern 8-1293M.

HQ-120X Hammarlund, clean and in excellent cond; \$135; two BC-459A's, one bought new, used as VFO of transmitter, \$7.00 each. Following from estate of W1CS: 1100 power supply with 800a, 60 watt mod. and speech amp. with power supplies in chassis and panel; meter tubes, etc. Station freq. standard 100-1000 Kc. Multivibrator c.w. and modulation. Also meters, transformers, switches, resistors, carbon mikes, etc. W1ASU, Green, 112 Barnard Rd., Worcester, Mass.

FOR Sale: Hallcrafters SX-99, in new cond, \$120. Alan Steger, KN2YV, Box 97, Huntington Station, N. Y.

GONSET Communicator 2, new, never used; \$150. Harvey-Wells Deluxe and power supply, seven months old; \$130. Will ship. Stan Dobrowski, Jr., K2BBX, Atlantic Reserve Fleet, Sub Grp 3 Et Div, Green Cove Springs, Fla.

SELL: National NT300 Class B modulator, less Varimatch transformer, with PP TZ40, \$30; NT120 power supply for same, \$65; Par-Metal enclosed rack, including roller platform, 72" x 19" panel space; \$40. UHX10 transmitter with all coils, xtals, AC power supply, \$40; G. R. Variac 15 A., 2 KVA, \$25; LM4, with modulation, calibration book, \$30. Will ship. W2AFC, 43-12 Douglasson Parkway, Douglasson, L. I., N. Y.

Bargains with new guarantee and completely reconditioned: S38 \$29.00; S40A \$69.00; S40B \$79.00; S 76 \$129.00; SX71 \$169.00; SX62 \$199.00; NC98 \$119.00; HQ140X \$219.00; VHF152A \$49.00; TBS50D \$69.00; Meissner EX \$39.00; Viking Ranger \$199.00; Viking II \$239.00; Viking VFO \$39.00; Viking Mobile \$79.00; HQ129X, SP400X, NC125, NC18D, NC240D, HRO60, AR60B, 75A1, 75A2, 75A3, 32V1, 32V2, 32V3, KW1, PMR6A, AF67, Super 6, Commander, B&W S100; many others cheap. Shipped on approval. Easy terms. Satisfaction guaranteed. List free. Henry Radio, Butler, Mo. \$50 takes T-60 Meck 60W. phone/c.w. 40-80 VFO coils, 80-10 meters. 3 crystals, complete. You pay freight. W8ENX, Harold R. Meldrum, Grand Marais, Mich.

SELL: HT-18, \$50; BC-221 calibration book incl. \$75; Motorola final and power supply (write for details) \$75; MB-150, \$15; meters, Trip-let, 0-500 mil., 0-200 mil., 0-100 mil., 0-1 mil. Westinghouse; 0-2500 volt; 0-1 amp; 0-1.5 amp; 0-1E, 0-500 mil. All for \$25.00. W2DEX, H. A. Sherman, 250 College Ave., Elmira Heights, N. Y.

WANTED: One or two complete sets or single reels for use with TG-10 Tape Puller. Tape must be in good condition. W3ZFM, Zillger, 430 Anthony Rd., Narberth, Pa.

MOBILEERS! Send now for your free copy of Mobile Antenna Design. We cater exclusively to supplying the needs and solving the problems of the mobile ham. Write to Skyline Electronics - Ham Division, 5835 W. Chicago, Chicago 51, Ill.

TELETYPE: Model 12 page printer, receiving distributor, table, cover, box of paper. Will trade with cash for Gonset Communicator, W7OSV, 4826 Memory Lane, Salt Lake City 7, Utah.

2, 6, 10, 15 & 20 meter beams. Aluminum tubing, perforated sheets for shielding. Radcliff's, Fostoria, Ohio.

NEW RTA1B, Ft. 8 audio filters, two for \$2.00 prepaid in U. S. A. FT154 shock mounts for BC348, \$2.00 each; BC614 speech amplifier. PCA-2T-200 Panadaptor, BC638A frequency meter, 100-156 Mc. Will sell or trade for audio equipment or tape recorder. M. D. Haines, W5QCB, 1316 S. W. Military Dr., San Antonio 4, Texas.

POWER supply items, chokes, xfmers, condensers, heavy duty stuff. Many other items. Cash or trade. Stamp for list. Want: audio generator, loop tester, TV rotator, scope. W2NEK, Jaray.

BALUN coils, HKW #3975, chassis mounted and wired \$12.95, plus postage; large inventory used equipment, due liberal trade-in policy, write for latest list with W1BFT; a few examples follow: Bud VFO-21 \$24.95, Central 10A \$99.95, Collins 32V3 \$55.00, Deltronic CD-144 \$99.95, Eldico JN-75TV \$39.95, Elmac A-54H \$110.00, Gonset Tri-Band \$29.95, Hallicrafters HT-18 \$59.95, Hammarlund 4-20 \$44.95, Harvey-Wells TBS-50D \$79.95, Johnson Viking II \$265.00, Lyco 650 \$69.95, Meissner EK \$44.95, Millen 90800 \$19.95, National NC-125 \$125.00, RME VHF-152 \$49.95, Simpson 480 \$299.95, Sonar CFC \$24.95, Telvar T-60-2 \$69.95, Triplett 2413 \$27.95, UTC PA-126 \$10.50. Evans Radio, Concord, N. H.

TRADE or sell: Eico 6 v. eliminator, Heath TC1D; BC453 Navy version; unmodified, new; 2 PE10C modified, new; Delta 11" lathe, all accessories, bench, jack shaft, less motor. Want: DB23, HQ129X, S76 or what have you? M. Marshall, 455 Washington Ave., Dumont, N. J.

FOR Sale: New parts, original packages: UTC S-48, S-61, S-57, S-37; Bud 509, 150 watt coils, tubes, etc. for final. QST: October 1937 through Jun. 1950; radio books. Best offers. Send for list. Robert H. Cushing, 12 Carver St., Plymouth, Mass.

FOR Sale or trade: Eicor 1000 tape recorder, \$75; Cascade disc recorder radio-phonograph; Shure 55-S microphone, \$35; Adler portable mill, \$25; V-M J-speed record-changer, \$20; Sprayberry radio course, \$20; Alliance BB-2 television booster, \$5; T-17 carbon mike, \$2.50. All items guaranteed in excellent condition. Priced F.o.b. V. R. Hein, 418 Gregory St., Rockford, Ill.

SELL: Viking I, TVI-suppressed; HQ-129, Millen R9'er, "Williamson Hi-Fi amplifier, 12 transistor with deluxe supply, mobile body mount, parts, tubes, Peter Rosenbaum, W2GAW, 41-26 73rd St., Jackson Heights 77, N. Y.

BIG Rig for \$200.00. 1 Kw input. 810-S push-pull final, 805-S Class B modulators; Stromberg-Carlson speech amplifier; Millen exciter and oscilloscope; high voltage power supply Variac controlled; 2-66 in. Par-Metal racks. Sell for almost price of tubes. D. W. Keefer, W2MFS, 37 Highridge Rd., Hartsdale, N. Y. Tel. SCarsdale 3-5149.

WILL sacrifice my factory-built Viking II with VFO model 122, in perfect condx, \$250. F. o. b. Monrovia, Calif. Manuals included. W6GMC, Smith, 614 Bradbury Rd., Monrovia, Calif.

NATIONAL NC-183 receiver, NFM-83, speaker, recently factory serviced, \$200; VHF-152 converter, factory-serviced, \$45.00; DB22-A pre-selector, \$55; MB-3 Boomerang cw/phone monitor, \$20; Select-O-ject, power supply, \$20; Collins 310B-1 exciter/VFO, all bands, \$175; Meissner signal shifter, plug-in coils, TVI-suppressed, \$22.50; Navy Command xmitter, 2.1-3.0 megacycles unmodified, \$12.50; Cardwell BC221-Q frequency meter, VR supply, \$65; miscellaneous tubes, meters, filter condensers, parts. Above guaranteed condition, factory manuals furnished, F.o.b. Indianapolis. Trade L. C. Smith No. 5 mill toward Johnson Matchbox or Dixieland Jazz records, tapes. All mail answered. Phone Walnut 4-2184, W9DPL, Howard Severoid, 2431 East Riverside Dr., Indianapolis 23, Ind.

TRADE: Argus C-4, 35 mm camera, 2.8 lens, flashgun, leather carrying case, all new and in original carton and Hallicrafters S20R rev in gud condx for Hammarlund HQ-129X in A-1 condx. K4BGG, Joe S. White, 5802 Lemon Ave., Long Beach, Calif.

FOR Sale: Collins exciter 310B-1, coils, instruction book, \$185; frequency meter BC-221-N, spare tubes, crystal, AC power supply, \$60. All excellent. R. C. Littler, W8JRG, 640 Snowhill Blvd., Springfield, Ohio.

MARINE crystals, new, guaranteed; heavy duty types. All channels in singles or sets. Specify frequencies and socket pin dimensions. Transmitting \$2.95, receiving \$2.50. C-W Crystals, Box 2005, El Monte, Calif.

A Steal! 4-element Q-Master 20-meter shortbeam, also for 11 meters, used 2 weeks. Cost \$120 plus. Sell for \$70. W2LFB, 13 Shepard Pl., Nutley, N. J. NU 2-7552.

NOVICES: TBS-50-D and power supply, in good condition, \$140. Ian Underwood, 265 Grace Church St., Rye, N. Y.

10A SSB exciter modified per November 1953 QST including 20-40-80 meter coils, two crystals, and QT-1. Excellent condition. Best offer F.o.b. New Orleans. Want QSTs before 1930. Wavne Cooper, YN1VZ, 12 Calle 6-21, Guat-mala City, C. A.

VERTICAL antenna for 20-40-80 M. All material and information included. \$59.50. No C.o.d. El Cajon Electronic Engineering, 720 S. Johnson Ave., El Cajon, Calif.

SELL: Receivers HQ-120X, \$75.00; National NSD100, general coverage, \$50; RME VHF-11, \$65; Tri-band converter, \$25.00; transmitters TBS50C, \$65; Subraco MT15X, \$35.00; Elmac A54 speech and modulator modified, \$70. Two Link police car transmitters with dynamotors at \$40.00 each. Want: 75A3 or modified 75A2 with mechanical filter. Anybody able to hatch a deal with any of this? W2ADD, Paul Reveal, 129 Midland Ave., Glen Ridge, N. J.

WANTED: Micro-Match for 72 ohm coax and 75-100 watt Multi-match modulation transformer. Walden Holl, W3JUDW, 538 Luzerne St., Johnstown, Penna.

VIKING I, VFO, TVI-suppressed, S-40B, accessories: \$350. K2DQH, Chris Lane, North St., Harrison, N. Y.

FOR Sale: Complete Motorola T69-20A mobile 10-meter xmitter. Also Motorola fixed frequency receiver with converter. All controls, cables, everything from mike to antenna. \$100. Will consider separating. W9GBS, Schachte, 6020 N. Neva, Chicago 31, Ill.

COLLINS 32V-3 in excellent condition with 4D32 spare: \$450 F.o.b. Bristol, Conn. W1AYR, A. B. Nelson, 350 Fern Hill Rd., Bristol, Conn.

W5AXI/MM correct mailing QTH Arthur E. Hutchins, R/O SS Fullerton Hills, Bernuth Lembecke Co., 420 Lexington Ave., New York 17, N. Y.

DEAR FELLOW AMATEUR:—

"A very serious situation has arisen. Unless all of us amateurs act quickly, a law will be passed in Washington which will wipe Amateur Wireless completely out . . ."

Thus in 1918 a four-year-old ARRL, already the guardian of amateur radio in regulatory matters, wrote each amateur in the United States, trying to prevent the extinction of "amateur wireless."

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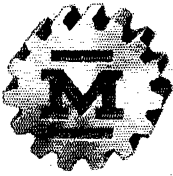
Certainly you would. Today, amateur radio is a strong, stable group, represented by a capable ARRL in battles to preserve amateur privileges. Such representation, backed by a united membership, alone has kept amateur radio on the air, contributing to the public good.

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Application



90801

**The No. 90801
EXCITER-TRANSMITTER**

The No. 90801 Exciter-Transmitter is of the most modern design including features and shielding for TVI reduction, band-switching for the 4-7-14-21 and 28 megacycle bands, circuit metering. Conservatively rated for use either as a transmitter or exciter. 5763 oscillator-buffer-multiplier and 6146 power amplifier. 90 watts input for CW. Can be keyed in the oscillator and/or amplifier or by means of keyed external V.F.O. such as the 90711. 67 watts input phone. Rack mounted 3 1/2" panel height.

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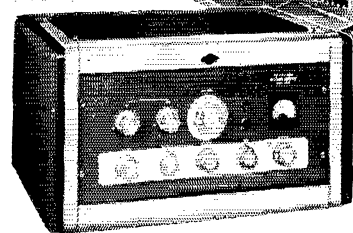


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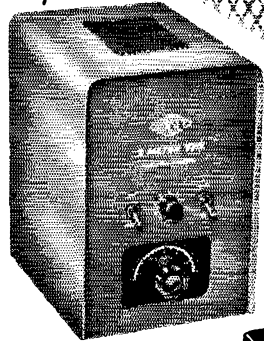
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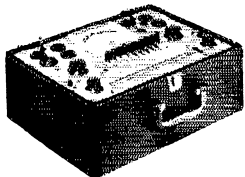
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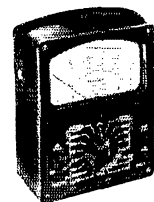
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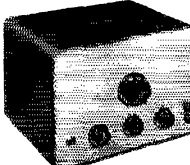
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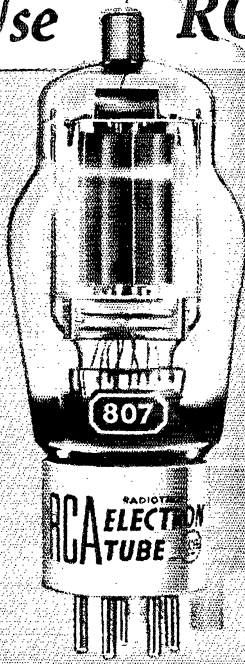
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