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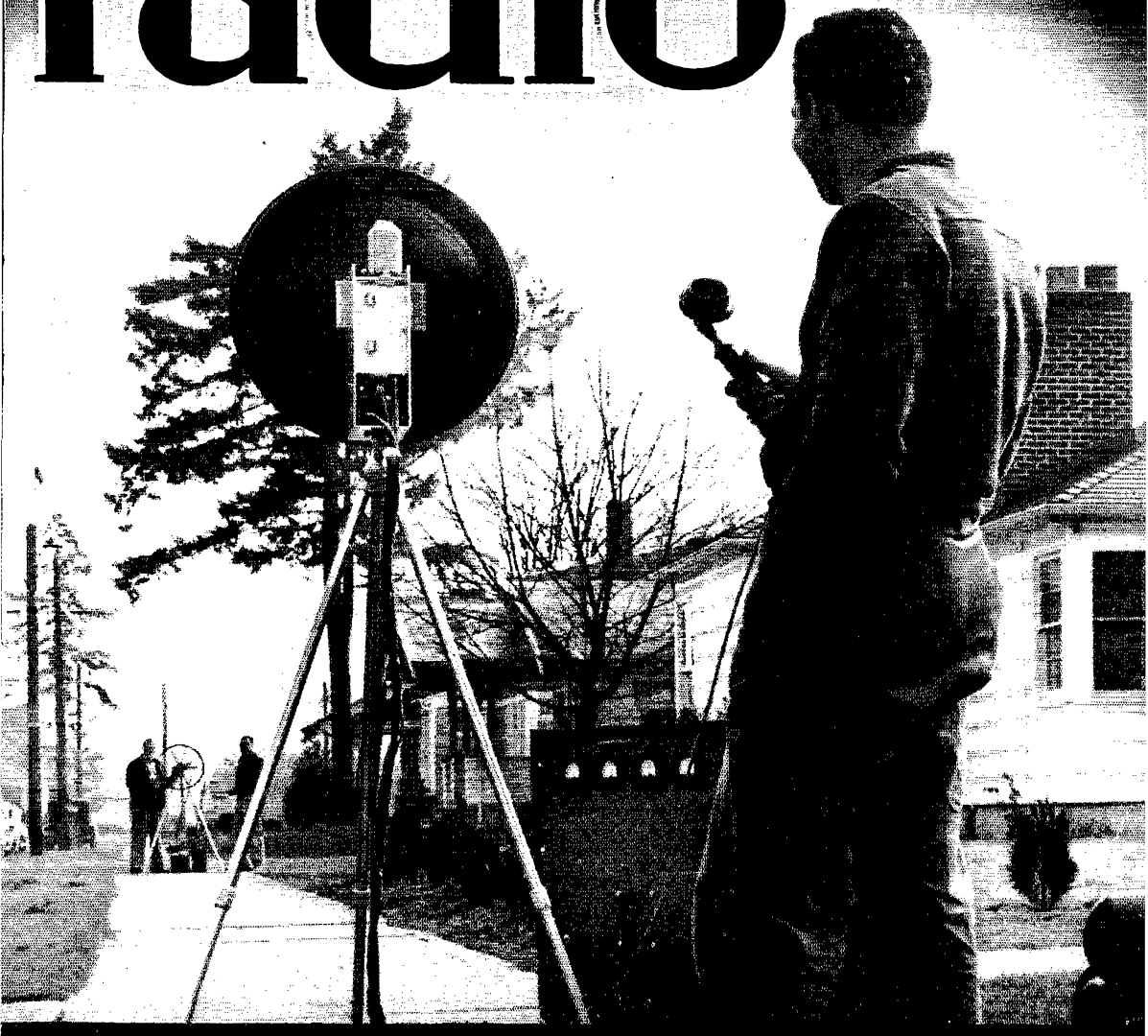
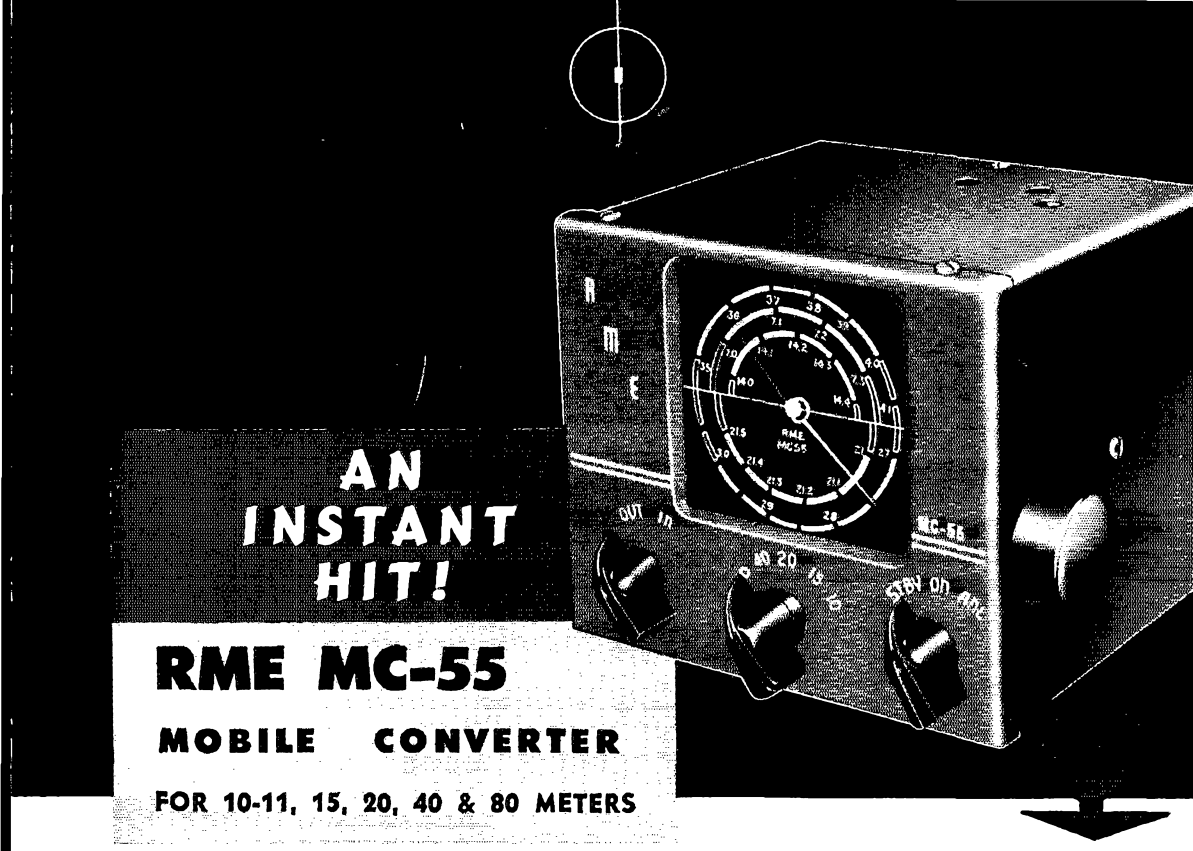




AN INSTANT HIT!

RME MC-55

MOBILE CONVERTER

FOR 10-11, 15, 20, 40 & 80 METERS

FOR 6 AND 12 VOLT OPERATION

In bringing out the new MC-55, RME anticipated the needs of the amateur by providing for both 6 and 12 volt operation, the latter voltage becoming increasingly popular on new car models. In addition, you're all set for fone operation on 15 and 40 meters since the MC-55 covers all ham bands, 10 thru 80 meters! As a pioneer in the construction and design of converters, RME has built into its new models rock-like stability, so that they can "take it" in the hard-riding old jallopy or the smooth new Cad. Many of the features found in the VHF-152A and the HF10-20 are incorporated in the new mobile converters.

SMOOTH FREQUENCY CONTROL

Knob driven 25 to 1 worm gear provides smooth frequency control that stays put. Experienced operators welcome this feature since it enables careful, accurate tuning while the car is in motion. Other brand new features found only in the MC models, make these small, compact converters outstanding performers. Compare the design and workmanship, then decide!

Write for Illustrated Specification Sheet.

Address

RADIO MFG. ENGINEERS • Peoria 6, Illinois

MC-53

Also ask to see the new MC-53, the only converter for 2, 6 and 10-11 Meter Operation.

RME

DIVISION OF Electro-Voice

HIGH GAIN — Adds average gain of 25 db to any receiver.

BUILT-IN NOISE CLIPPER — Highly efficient automatic noise limiter all ready to connect into your car radio. Handy In-Out Switch.

STAND-BY SWITCH for muting converter while transmitting.

LOW POWER REQUIREMENTS — All miniature low-drain tubes. Requires only 18 ma at 150-180 volts.

TUBE LINE-UP — 6BJ6 rf amp 12AT7 osc and det, 6BJ6 if amp 6AL5 noise limiter.

LARGE DIAL — Large, attractive edge-lighted dial calibrated for 26.4-30 mc, 21-21.5 mc, 14-14.3 mc, 7-7.3 mc and 3.5-4 mc.

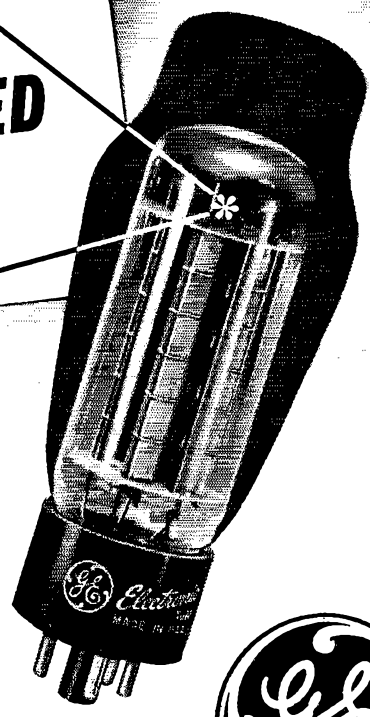
MOUNTING BRACKET SUPPLIED.

ATTRACTIVE CABINET, complete with tubes, connecting cables and instruction sheet.

AMATEUR NET $69.50

More compact*. . . . . Tougher, shock-resistant

. . . G.E.'s NEW SERVICE-DESIGNED 5U4-GA!



*20% shorter, 30% less diameter

NEW DESIGN throughout makes the 5U4-GA a superior rectifier tube for your low-power rig. Trim in contour, saving of space, this new tube also will stand up under hard usage. As one of a pioneering series specially developed for TV-radio repairwork, the 5U4-GA is a tube you can count on for a full-time, long-time job.

● Ratings are good. Make this cross-check with another compact rectifier type, the popular 5Y3-G:

	RMS SUPPLY VOLTAGE PER PLATE	MAX D-C OUTPUT CURRENT	MAX PEAK INVERSE VOLTAGE
5U4-GA	**450 v**	**225 ma**	**1,550 v**
5Y3-G	**350 v**	**125 ma**	**1,400 v**

● Plenty of output! In dependability and long life, you get more for your money than ever.

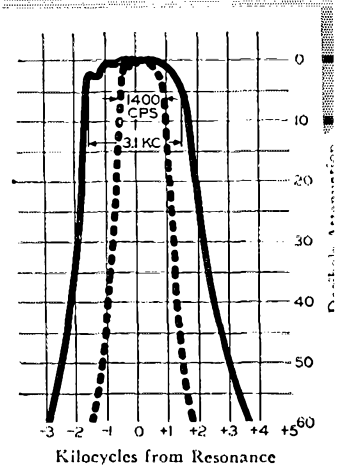
● See the 5U4-GA at your local G-E tube distributor's! Keep in touch with him for other SERVICE-DESIGNED Tubes as they appear! All perform better, last longer, than the types they replace. *Tube Department, General Electric Company, Schenectady 5, New York.*

● **IN THREE WAYS** General Electric's new SERVICE-DESIGNED 5U4-GA is a better, sturdier rectifier tube than its prototype 5U4-G. **(1)** The straight-side bulb is smaller, trimmer, and stronger than the former bulb shown in shadow. **(2)** Mica supports brace the tube structure both top and bottom, instead of at top only. **(3)** Base is new button-stem type, with leads well separated, individually sealed off. They are no longer pinched together into a single pressed-stem seal that takes up extra space inside the envelope.

GENERAL ELECTRIC

166-183

Sooner or later you'll want A COLLINS RECEIVER



Collins 75A-3 Receiver with Mechanical Filter

The Collins 75A-3 double conversion superheterodyne receiver, with its crystal-controlled front-end and highly stable low frequency VFO, is like a high frequency crystal-controlled converter working into a very stable low frequency receiver. The high stability and 3.1 kc bandwidth of the 75A-3 make it ideal for AM or single sideband — and an 800 cycle mechanical filter is available as an optional accessory for CW.

All coils are permeability tuned and have a straight-line frequency characteristic allowing linear dial calibration. Only the band in use is visible on the slide rule dial. On the vernier dial each division represents one kc except on the 10 and 11 meter bands, where each dial division represents two kc. This accurate calibration is made possible by the highly stable oscillators in the 75A-3.

The 75A-3 covers the 160, 80, 40, 20, 15, 11, and 10 meter amateur bands. Sensitivity on all bands is 2.5 mv or better for a 10 db signal-to-noise ratio. Image rejection is at least 50 db. AVC is applied to RF as well as IF stages. Separate noise limiters for phone and CW. The S-meter is calibrated from 1 to 9 in steps of approximately 6 db, and for 20, 40 and 60 db over S9. S9 corresponds to a signal input of 100 microvolts. Antenna input impedance is 50 to 150 ohms, balanced or unbalanced. A phone jack and 4 ohm and 500 ohm audio output terminals are provided. Sockets and front-panel controls are included for the 8R-1 100 kc crystal calibrator and 148C-1 NBFM adapter which are available as optional accessories. The following controls are on the 75A-3 front panel: tuning, zero set, bandswitch, RF gain, audio gain, BFO pitch, CW limiter, antenna trimmer, crystal selectivity, crystal phasing, mechanical filter selector, CW-AM-FM switch, noise-limiter calibrate switch, on-off-standby switch. The 75A-3 operates from a 115 volt 50/60 cycle ac power source. Cabinet dimensions are: 21⅛" wide, 12¼" high, and 13$\frac{1}{16}$" deep. The 19" panel fits a standard relay rack. The 75A-3 weighs approximately 50 pounds.

Net domestic prices:

75A-3 receiver complete with F455B-31 3 kc mechanical filter: $530.00
10-inch speaker in matching cabinet: $20.00
8R-1 crystal calibrator: $25.00
148C-1 NBFM adaptor: $22.50
F455B-08 ... 800 cycle mechanical filter: $55.00
F455B-60 ... 6.0 kc mechanical filter: $55.00

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COLLINS

QST

MAY 1954

VOLUME XXXVIII • NUMBER 5

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.: OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

OFFICES

38 La Salle Road
West Hartford 7, Connecticut

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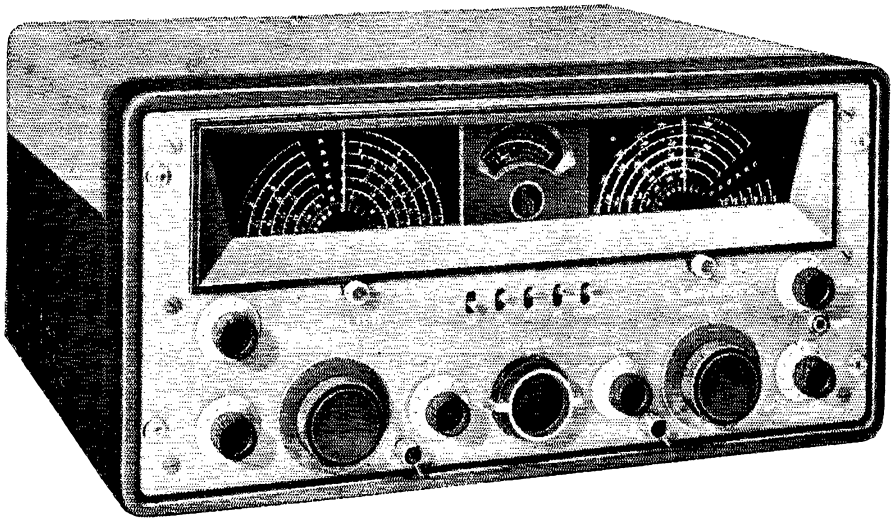

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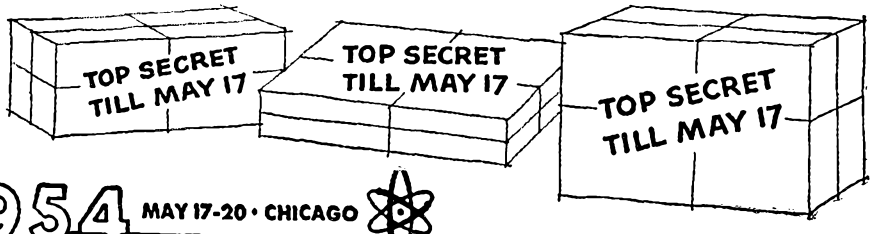

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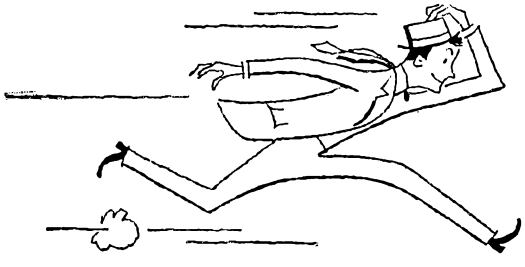

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CHICAGO

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **All ARRL Field Organization appointments** are now available to qualified League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist, SCMs desire applications for SEC, EC, RM and PAM. In addition to station and leadership appointments for Members, *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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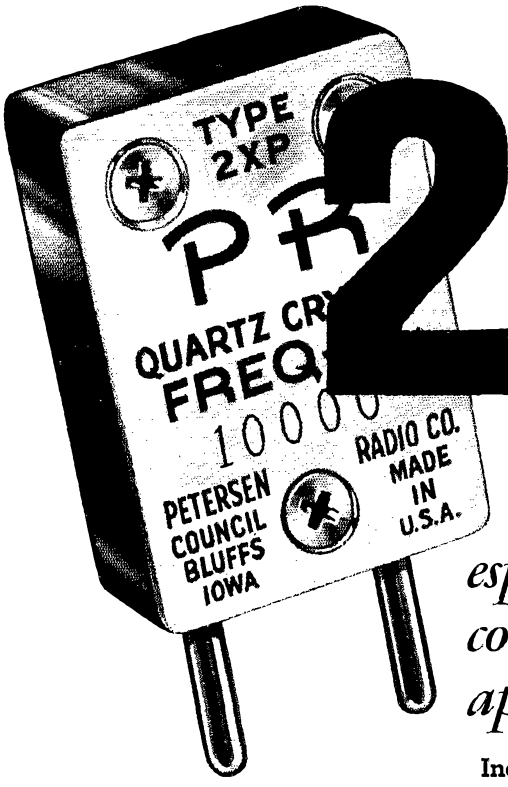

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the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

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

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

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

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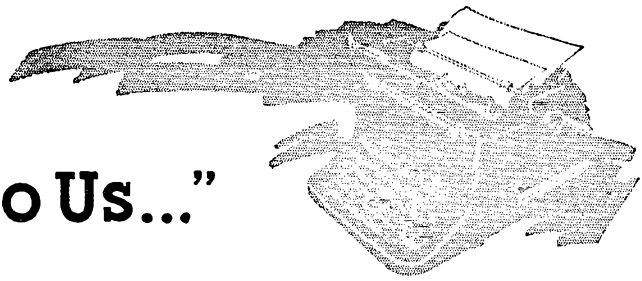


"It Seems to Us..."

ARRL's 40th ANNIVERSARY

• The late Secretary Kenneth B. Warner, W1EH, commemorated the League's 25th anniversary with an editorial in the May, 1939, issue of *QST* recounting our beginnings in 1914. Rereading it as initial research on a similar commemoration for this 40th anniversary issue, we were struck with the thought that, after all, the history of the League's founding has not changed, and our poor words could not any better tell the story of how the ARRL came into being and its early struggle for existence. We therefore reprint KBW's editorial in its entirety, having changed only the figures necessary to make it accurate as of today. Read on, all — old-timer to recapture the nostalgia of the early days, neophyte to appreciate how important to our welfare today are the solid foundations erected by our founding fathers.

It is the American Radio Relay League's Fortieth Anniversary! Forty years ago this month there was born in the city of Hartford, Connecticut, the lusty infant which has since grown into the great League we love so much — forty years of as thrilling progress as has ever marked any of man's arts and a period of useful service doubtless greater than the total years of most of you, our readers!

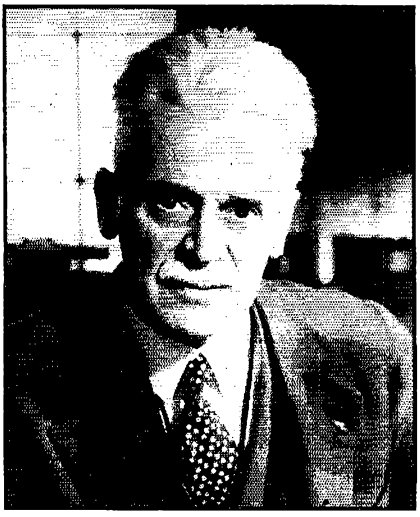
Let us set the stage. It is the beginning of the year 1914. There are about 5000 amateurs in the nation, all operating on spark. The audion detector has begun to replace the crystal detector, the fixed gap is rapidly giving way to the rotary. Spark-coil transmitters have a range of about ten miles, an occasional transformer set does a hundred miles or better. In January the Radio Club of Hartford has its first meeting, one of many amateur clubs springing up around the nation. Two of its active members are Hiram Percy Maxim, famous as a pioneer automobile engineer and the inventor of the Maxim silencer, and Clarence D. Tuska, a college youth. Interested in their club, they conceived, between them, the project of a vast national organization of amateurs based on the idea of relaying communications from station to station to overcome the handicap of short range. Each could relay for the others; thus united, any amateur could get his communications anywhere. In April they took their idea to their club and sold it. A relay committee was set up, the name American Radio Relay League was agreed upon, Maxim became its president and Tuska its secretary, and the club furnished funds to prosecute the work. By middle May application blanks were ready and letters were being written to every known amateur, inviting his membership. This was the real beginning of ARRL, the date from which we count our years.

The idea took hold of amateur imagination and spread like wildfire. Applications rolled in. In June of 1914 the League actually relayed a message all the way from Hartford to Buffalo and a Boston-Denver route was being organized. In September the League published a U. S. map showing the location of its 237 member-stations in 32 states, and the following month it brought out a list showing the particulars of 400 stations that by then belonged to ARRL. In January of 1915 the League and the Radio Club of Hartford decided to go their separate ways, the club being local in scope and the League obviously destined to national proportions. That month ARRL was incorporated as a Connecticut non-stock non-profit association. *QST* did not yet exist; it was not until December of 1915 that it first appeared, as a "relay bulletin" of the ARRL. Privately published by Tuska and Maxim, and owned by Tuska, it was devoted exclusively to the activities of the League; its subscription price was $1 a year. That first issue is now a collector's piece.

By this time much real work was being accomplished. January, 1916, saw the formation of the first trunklines, three east-west routes and three north-south. It was a full year later, though, before the first transcontinental relay succeeded, the route being Los Angeles to Denver to Jefferson City to Albany to Hartford. Ranges had increased too! Following month, February of 1917, a real record was set up when a transcon message went across and back in an hour

and twenty minutes. *QST* boldly predicted eventual coast-to-coast communication in twenty minutes.

All this time the League had functioned solely under the guidance of Maxim and Tuska. They decided that the time had come to better their organization and in February, 1917, a meeting was held in New York with prominent local amateurs present, where the first formal constitution was adopted and the first Board of Directors elected. Maxim was destined to remain president until his death in '36; Arthur Hebert became vice-president and general manager in charge of the operating department, as the Communications Department was called in those days, with his office in New York; and Tuska carried on the secretarial and editorial work at Hartford. Except for Tuska's income from his *QST*, all of which he promptly poured back into the magazine, none of these men got a cent for their efforts on behalf of amateur radio. There were no salaries, no formal headquarters, no staff. It was of course but shortly after perfecting this organization that war came — in April. *QST* drifted along until September, doing noble recruiting work but running heavily into debt as the League members went into war service, and finally folded up "for the duration." Early in 1919, the war over, the Board commenced the reorganization of the League. Membership was almost nonexistent, the treasurer reported but $33 in the kitty, all amateur transmission was still prohibited by wartime restrictions. Nonetheless, the work was started. Capital was needed and it was decided to borrow it from amateur enthusiasts. There wasn't ven money enough to finance an appeal for loans. The hat was passed and $90 raised in the Board meeting. That was enough to start the ball rolling. Several thousand dollars were borrowed from League members on ARRL bonds, which were paid off in two years. *QST* was purchased from Tuska in May, 1919; in April the League opened its postwar headquarters in Hartford, and in June the first postwar issue of *QST* appeared — 32 pages it had, too, by cracky! The wartime ban was still on transmission, and to the removal of this the League addressed all its efforts. At last the effort succeeded, and on Oct. 1, 1919, postwar amateur radio got started on its glorious career.



Hiram Percy Maxim, W1AW, cofounder, guiding genius and, until his death in 1936, president of ARRL.

There followed such a period of progress and development as has scarcely ever been seen in any art. We're going to tell you a few of the important dates. The average amateur of today has probably been in the game six or seven years; he found modern high-frequency technique and world-wide DX waiting for him. But it was not always so. Those things came by painful development: we crawled before we walked before we ran before we flew. Many of our readers of today probably have little idea of our early history, of our rich background, of the step-by-step development that

(*Left*): Kenneth B. Warner, W1EH, from 1919 until his death in 1948 the secretary of ARRL and editor of *QST*.

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(*Right*): Clarence D. Tuska, ex-1ST, now an RCA patent attorney, cofounder and first secretary of the League; with Mr. Maxim he also formed the *QST* Publishing Company and became the magazine's first editor.

Practically broke after World War I, the League issued bonds which were heartily subscribed to by ardent amateurs of the day, and paid off, with interest, in two years. Typical of the certificates, issued in amounts from $1 to $200, was this one redeemed from the late Arthur A. Hebert, W1ES, prewar vice-president and general manager of ARRL and later its treasurer.

made amateur radio what it now is. We started out, after the war, with our same old prewar spark gear, the same old restricted ranges. Now watch the story unfold:

January, 1921: After months of planning, transcontinental relays were held through selected stations while all the rest of amateur radio piped down and listened. From Hartford to Chicago to Roswell, N. M., to Los Angeles and back, a message went from coast to coast and the answer was returned by relaying in a total elapsed time of 6½ minutes. Try it today by relay!

March, 1921: Vacuum tubes made their first appearance on the amateur market; a 5-watter cost $8, such a tube as you can buy today for a buck; 50-watters cost $30! Despite the cost, the trend to c.w., which a few hardy pioneers had been pushing ever since 1919 with wartime bootleg tubes, got new impetus — although it was to be many years before spark was finally outlawed.

August, 1921: ARRL held its first national convention at Chicago, with 1200 present from 36 states, with every call area represented for the first time at any ham gathering.

December, 1921: Believing that our signals could be heard well across the ocean, ARRL sent Paul Godley, America's most expert receiving experimenter, to Scotland to listen during transatlantic tests, on special superhet gear of his own devising. He heard 18 c.w. stations, 9 sparks, and European amateurs heard a few more; 30 hams got across the pond on 200 meters.

In late 1921 broadcasting came to metropolitan centers.

April, 1922: First QSO between California and Hawaii.

September, 1922: 1CCZ on Cape Cod worked every U. S. district in one night — first time it ever happened.

November, 1922: Record-breaking relay, 1AW to 9AWM to 6ZAC in Hawaii and return to Hartford in elapsed time of 4 mins. 18 secs.

December, 1922: More transatlantic tests. 316 American amateurs got over the ocean on 200 meters, from all districts. ARRL's cable bill for reporting the results was $1900. More important, 20 U. S. hams heard three British and French amateurs for the first time.

June, 1923: The first expedition using amateur radio sailed; MacMillan's "Bowdoin," WNP, with 1TS as operator, set out for the Arctic, ARRL paying 1TS's salary to demonstrate what amateur communication could do.

September, 1923: VK2CM works ZL4AA, 1500 miles away, on 0.004-watt c.w.

November, 1923: First transatlantic two-way communication occurred when 1MO and 1XAM in Connecticut worked F8AB in France, on about 2560 kc.

December, 1923: First QSO between America and England occurred, with Yours Truly on the American end. Italy and Holland quickly followed.

December, 1923: ARRL adopts new constitution providing for directors elected by the members of divisions, and the old Board of Directors votes itself out of office to give League members self-government.

May, 1924: More continents united when New Zealand and Argentina work for the first time, with a new DX record of 6400 miles. Same month saw North and South America united for first time.

July, 1924: With all previous "short-wave" work only on experimental licenses or by special temporary authority, the government after months of ground-work by ARRL came across with short waves for amateurs; 3500–4000 kc. and some higher

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The future of amateur radio in 1918 looked dark and grim; the wartime ban was still on and a bill introduced in Congress would have spelled our death blow. On behalf of the fledgling League, Mr. Maxim took up the cudgels in Washington, and after a year-long battle amateur radio operation was again authorized, resulting in the famous "ban-off" supplement to October, 1919, *QST*.

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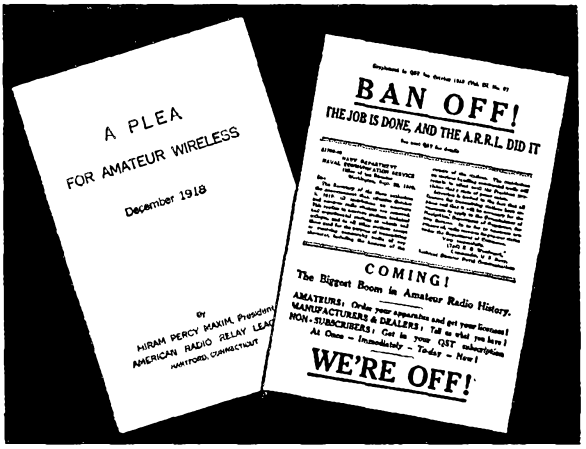


frequency bands assigned for first time to all amateurs.

July, 1924: First article on crystal control appears in *QST*.

September, 1924: First authenticated transpacific work occurs, between California and New Zealand.

October, 1924: New DX record of 9000 miles when Connecticut works New Zealand. Quickly outshadowed the same month by the first linking of the Antipodes when England and New Zealand tied up, followed in November by the first England-Australian contact.

December, 1924: Amateur signals first heard across the continent in daylight when John Reinartz in Connecticut, using the new 20-meter band, is intercepted by Frank Jones in California.

April, 1925: First published theory of shortwave propagation appears, Reinartz' article in *QST*.

April, 1925: Following a missionary trip by Hiram Percy Maxim at the instance of the ARRL Board, the International Amateur Radio Union is formed in Paris, Maxim elected president, Warner secretary.

1925 also saw the formation of the NCR and the AARS, the development of strong alliances between ARRL and the Services.

April, 1925: Getting leave of absence from his job as ARRL Communications Manager, Fred Schnell takes "NRRL" with the U. S. Fleet to Australia, sells short waves to the Navy.

May, 1925: Australia and England unite the Antipodes in the first daylight QSO, on 14 Mc.

April, 1926: WAC started, with 8 initial members. (Present number, over 11,000!)

May, 1927: ARRL's first annual DX contest held.

March, 1928: The 10-meter band is opened.

Hiram Percy Maxim is authority for the statement that The Radio Club of Hartford, Conn., of which he is chairman, has organized a committee whose object is to develop a system of relay stations throughout as much of the country as seems possible. At the present time messages are being forwarded by relay from Hartford, Conn., to Buffalo, N. Y., via Northampton, Mass., and one of several intermediate stations. This plan has worked so well that there seems no reason why it should not be improved still further in detail and also extended to cover a wider range.

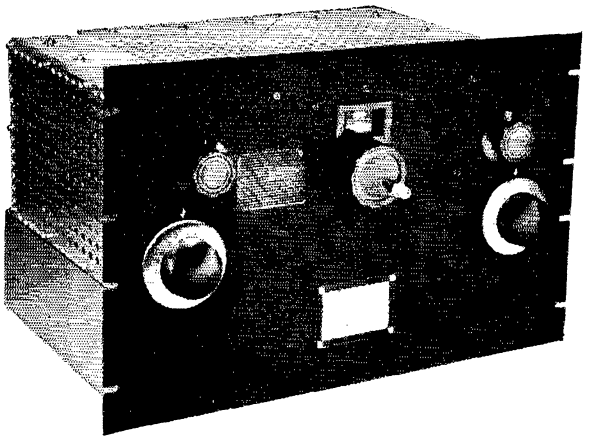
The club believes that the number of good amateur stations in the country is great enough to make it possible for an amateur to reach the far West and possibly the Mexican border, if the stations were organized. The only thing needed is to secure the names and addresses of the owners of stations able to transmit fifty to one hundred miles. If amateurs will write to Mr. Clarence D. Tuska, Secretary, Radio Club of Hartford, No. 136 Oakland Terrace, Hartford, Conn., blank forms will be supplied which when filled out will be used as a basis for appointing official relay stations.

This plan seems to be about the only one by which the amateur can reach distant points by wireless and without getting into difficulties with the United States Government. It is expected that messages will be received and transmitted by courtesy entirely and that no money will be involved in any way, the effort being to keep the plan strictly amateur in every sense.

The June, 1914, issue of *Wireless Age* carried this announcement of the formation of the League.

And so on and on and on. We could fill pages and pages with the entrancing tale, as Clint deSoto in fact has done in his fascinating history of amateur radio, *Two Hundred Meters and Down*. Our little thumbnail sketch above highlights only the operating accomplishments of amateurs, says nothing about our innumerable legislative fights for existence and our invariable success, our gradual transition from a lawless unorganized mob into a closely coordinated institution of recognized national value. It makes no mention of our tremendous record of public service in emergencies, our conquest of the ultra-highs, our constant sallying forth to attack new problems.

Today we have 115,000 licensed amateurs in the country, several thousand more in Canada. Our magazine is read by almost every active amateur in the world, our headquarters has a staff of 55 persons rendering membership service of every description, we possess a great communications system and a fine headquarters station, our society is the pattern for the other amateur organizations of the world. We are public-service conscious as never before, appreciated and valued by the public as never before. On such an occasion as this it should be pardonable to look over our progress with a little pride. It seems to us that ARRL has flourished because it was founded on sound principles. It is of, by and for the amateur. Since the beginning, private profit has been kept out of our affairs. We are indissolubly bound to the principles of deciding our problems in terms of the greatest good to the greatest number, and of making all our decisions on the highest possible standards of integrity, democracy and fraternalism. Our forty years of mutual service and progress can scarcely better be summed up than in the language we have used for many a year on the directory page of each issue of *QST*, where we say that our League has a history of glorious achievement as the standard-bearer in amateur affairs. True words they are, and we should be proud that we can say them today!



Panel layout of the amplifier. Lower left and lower right are the National type AM vernier dials controlling the MB-40SL grid tuner and the plate-loading capacitor, respectively. Upper left is the grid circuit link and upper right is the bandswitch. Center is the vacuum capacitor tuning control using a Johnson rotary counter-dial.

High-Power Pi-Network Amplifier with Parallel Tetrodes

A Compact Bandswitching Kilowatt with 4-250As

BY WILLARD BRIDGES,* W1NWO

THE practical advantages of the pi-network tank circuit, with particular reference to TVI reduction, were pointed out by George Grammer in January, 1952, *QST*, and high-power single tube finals based on this text have been well developed in later articles by Grammer and A. A. Farrar.[1] This design is the basis of the writer's lazy kilowatt final using parallel 4-250As. Since we don't enjoy building power supplies it was decided to operate the unit from a single high-voltage source if this could be accomplished without loss of efficiency. A basic requirement was that the amplifier must run full power on all bands from ten through eighty meters when plate modulated, without tendency toward regeneration or parasitics. Furthermore, it must be easily constructed with ordinary workshop tools and the very limited skill of a non-technical DX-hound.

The first final constructed used the basic circuitry of the amplifiers previously illustrated in *QST*, except that the two 4-250As were mounted in the chassis and the grid circuit was underneath. This was a tragic mistake. There followed some weeks of daily modification in an effort to tame this amplifier, but on the higher frequency bands it would take off when plate voltage reached 1000. This arrangement of parts obviously did not present sufficient isolation of the grid circuit, and the whole unit was dismantled. By this time we began to realize that the very ease with which these tubes can be driven is also the source of their greatest handicap to the amateur builder. The grids are so "tender" that every care must be taken to quiet them, and this must be anticipated in the design. After further research it developed that the principal cure for

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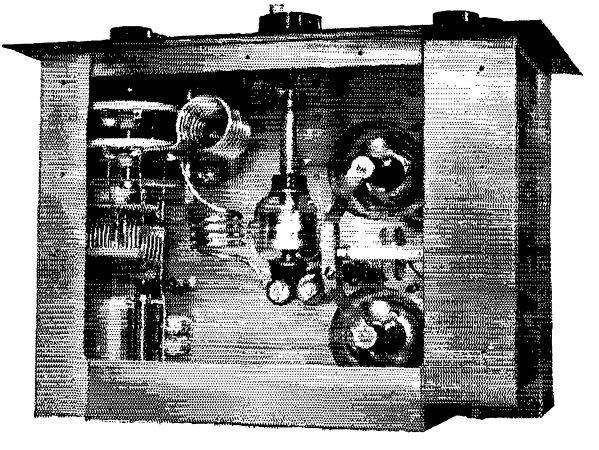
[1] Grammer, "Pi-Network Tank Circuits for High Power," *QST*, October, 1952; Farrar, "A Wide-Range High-Power Pi-Network Final," *QST*, October, 1953.



Top view with cover removed, showing how the shielding is constructed from standard chassis. Components are fully explained in text. The ACTS-200 variable vacuum capacitor is held in place by two fuse clips and is made fast at the high-voltage end with a Hi-clamp fuse clip No. FC1 made by Holub Industries, Inc., Sycamore, Illinois, and available through Jennings.

regeneration is shielding, and careful isolation of the grid circuit. This was accomplished by adopting the general layout of the previous amplifiers. The grid circuit is mounted in a shielded compartment above the main chassis, and the tube sockets are also mounted above the chassis where the terminals can be by-passed to ground with the shortest possible leads.

The question of parasitics is a little different. Apparently, the usual cure for them is to wait until they develop and then construct traps or detuning devices. However, this process leads to some frightening moments when high r.f. voltages pile up where they have no right to be, and there is danger to the tubes and even to the operator. It was decided to anticipate the risk of parasitics in selection of the constants for the amplifier and thus avoid, if possible, the problem of correcting them after the unit was completed. This was accomplished successfully through the following direct steps:

1) A plate voltage of 2500 volts, and consequently current of 400 ma., was adopted as the operating plate value for the two 4-250As, thus avoiding the encouragement of parasitics through extremely high plate voltages.

2) Screen voltage is deliberately lowered to a maximum of 400 volts to reduce the over-all sensitivity of the tubes and to discourage tendency of the screens to act as plates in the key-up position. Through this change the grid drive requirement of the tubes is theoretically increased very slightly, but in all other respects operation remains normal.

3) The variable vacuum capacitor offers great advantages as a low impedance path to ground for v.h.f. and contributes substantially to the stability of the amplifier.

The Circuit

The grid tank circuit is built around the new National MB-40SL which is used without modification, and bridge neutralization is employed as in the earlier amplifiers. The question of screen voltage source in large tetrodes is always a problem. In previous amplifiers at W1NWO

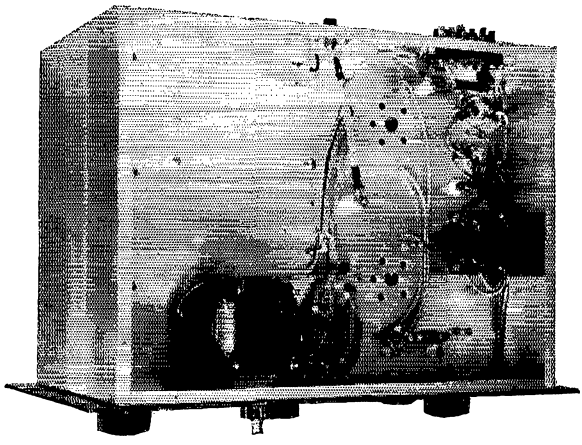
• Those who like their kilowatts conservative should find much to interest them in this article. W1NWO's amplifier is approximately the same size as the single-tube jobs after which it is generally patterned, but uses two tubes that loaf along at a kilowatt input. Good circuit and construction ideas, too — and, of course, all the necessary precautions against harmonic TVI.

it has been obtained from the plate voltage through a heavy dropping resistor and controlled with a clamp-tube circuit. Recent articles have pointed out the risk of this circuit, and of course there is the possibility that if the clamp tube filament burns out full plate voltage may appear on the screens of the tetrodes. After considering this hazard it was decided that the many advantages of the circuit outweigh its risk, and consequently, it was installed in the new amplifier.

To arrive at a working screen potential of 400 volts, the 2500-volt main power supply is dropped through a 40,000-ohm 200-watt resistor, and this voltage is applied to the plates and screens of two 6Y6s in parallel acting as clamp tubes. If either 6Y6 fails, the other tube will easily carry the screen current to ground in the key-up position. When excitation is applied to the amplifier they are biased to cut-off, thus effectively removing them from the circuit. Proof of the satisfactory action of the circuit, even under irregular operating conditions, can well be seen from the following chart:

	Plate Voltage	*Plate Current*	*Screen Voltage*	*Screen Current*
1 kw. fully loaded	2500 v.	400 ma.	400 v.	40 ma.
Full voltage, lightly loaded	2500 v.	250 ma.	280 v.	42 ma.
Reduced voltage, normal loading	2000 v.	300 ma.	340 v.	32 ma.
100 watts input	1000 v.	100 ma.	100 v.	20 ma.

Normal grid current requirement for two 4-250As is 20 ma. through the 11,000-ohm bias



Below-chassis wiring. Ventilation holes for forced-air cooling of the 4-250A tetrodes are drilled under corresponding holes in the sockets. The cooling fan is external.

resistor. Even when the grid drive is reduced to 8 ma. the tubes operate normally and screen values remain approximately the same.

The plate components are similar to those used in previous articles. The new National R175A choke, which has been reconstructed to cover all amateur bands from 3.5 Mc. through 50 Mc., has been employed without modification. In the selection of the plate tank capacitor it was necessary to allow for a somewhat larger maximum than in previous applications because of the low ratio of plate voltage to plate current, and the ACTS-200 by Jennings was selected. At eighty meters about 160 $\mu\mu$f. of the 200 $\mu\mu$f. available is used.

For simplicity it was decided to employ band-switching instead of the rotary inductor of previous designs, though either method is perfectly satisfactory. The two-section Model 88 switch manufactured by Communication Products Co., Inc. of Marlboro, New Jersey, is suggested. It is rated at 13,000 volts and 30 amperes. The gang to the rear shorts out unused sections of the coil while the gang near the panel is used to add capacitance to the variable loading capacitor at the lower frequencies. The high-frequency coils are easily wound of soft $\frac{3}{16}$-inch copper tubing regularly sold by refrigeration repair shops, while the forty- and eighty-meter coils are added to the circuit from a tapped section of B & W Inductor No. 3905. As the frequency is lowered by the bandswitch a new section of coil is added to the circuit by each step until eventually at eighty meters all of the coils are in the circuit in series.

For the output or loading capacitor a long search was conducted in the hope of finding a variable condenser of high capacitance and small physical dimensions. For a while, we experimented with the Hammarlund MC series. This is a small condenser less than three inches long and said to be of 1000-volt rating. Nevertheless, at 1-kw. input fully modulated the peak r.f. output voltage across a 52-ohm line is less than 600 volts, so there is ample safety factor in this choice. Since we couldn't make the condenser arc over and have never had any trouble with it, we decided that if one was good, then three of them would be better. The shaft of the capacitor extends through the back, so it is a simple matter to couple three of them in a row and operate them in parallel for a total maximum capacitance of 960 $\mu\mu$f. The minimum capacitance with this arrangement is 40 $\mu\mu$f., and since the lowest minimum required at 28 Mc. is higher than 250 $\mu\mu$f., two ceramic capacitors of 100 $\mu\mu$f. each are fastened directly from the output coax fitting to ground, partly to raise the minimum of the loading capacitor and thus include the 7-Mc. band without adding fixed capacitors on that fre-

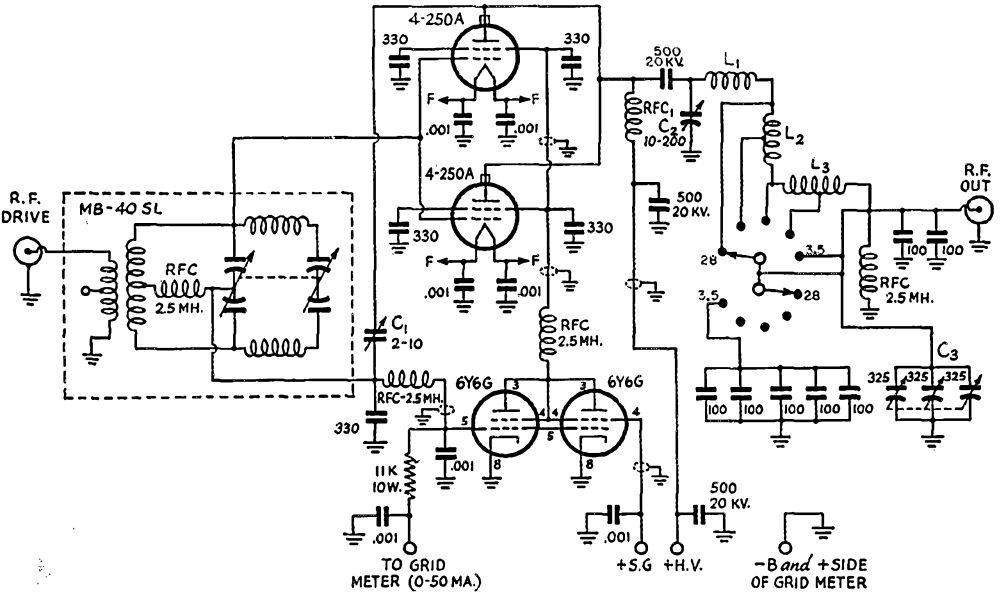


Fig. 1 — Circuit diagram of the parallel 4-250A amplifier.

All 100-$\mu\mu$f. condensers are 5000-volt neg. temp. coeff. (Centralab type 850).

All 330-$\mu\mu$f. condensers are 3000-volt disk ceramic (Erie type 3KV-331).

All 0.001-μf. condensers are 1500-volt disk ceramic (Aerovox HDV15-1000).

All 500-$\mu\mu$f. condensers are 20-kv. ceramic (Centralab TV3-501).

C_1 — Neutralizing condenser, 2-10 $\mu\mu$f. (National NC-800A).

C_2 — 10-200 $\mu\mu$f. variable vacuum condenser (Jennings ACTS-200).

C_3 — Three 325-$\mu\mu$f. variables in parallel (Hammarlund MC-325M).

L_1 — 4 turns $\frac{3}{16}$-inch copper tubing, $1\frac{3}{4}$-inch inside diameter, length 1 inch.

L_2 — 8 turns $\frac{3}{16}$-inch copper tubing, $1\frac{3}{4}$-inch inside diameter, $2\frac{1}{4}$ inches long, tapped at 3rd turn for 21 Mc.

L_3 — 15 turns No. 12, $2\frac{1}{2}$-inch diameter, 6 turns per inch (B & W type 3905), tapped at 6th turn for 7 Mc.

RFC_1 — Plate choke (National R-175A).

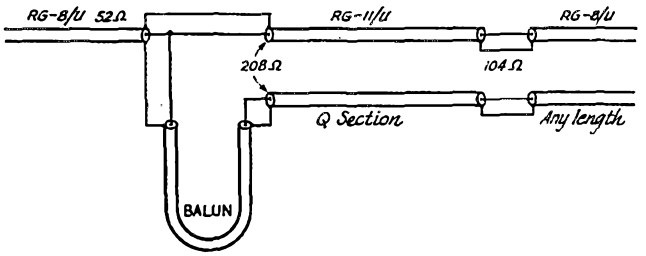


Fig. 2 — Q section and balun for matching coax pair to single coax. Lengths below are in feet, and represent the total length of cable in the case of the balun, and length of *each* Q "bar" in the case of the Q section:

Band	*Balun*	*Q Section*
3.5–4 Mc.	86	43
7 Mc.	45.4	22.7
14 Mc.	22.8	11.4
21 Mc.	15.3	7.7
28 Mc.	11.3	5.7

quency, and partly for TVI reduction.

For these padders the Centralab type 850 was chosen since each capacitor is rated at 6.3 amp. at 10 Mc., far more than is needed for the application. The temperature coefficient of this condenser is also good. A rise of 20 degrees Fahrenheit in temperature results in less than 1 per cent reduction in capacitance, and expressed as a change in loading this can be considered negligible. For the 3.5-Mc. band five of these condensers in parallel are switched into the circuit. Actually, any value between 0.0005 and 0.001 can be used since within this range the air capacitor can compensate to the operating value required in the loading condenser at 3.5 Mc.

The values of the disk ceramic capacitors chosen to by-pass the screens are fairly critical. They must be large enough to act effectively on the lower frequencies but not so large as to reduce the effectiveness of the screens when the amplifier is modulated. A value of 330 $\mu\mu$f. each is about right.

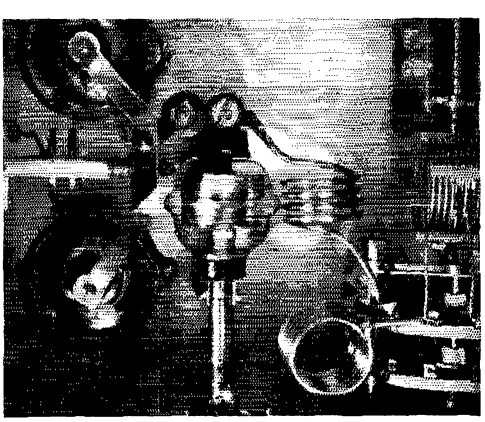
Chassis Arrangement

Since simplicity was one of the prerequisites of the amplifier we had to provide complete shielding and isolation with a minimum of structural effort. The main chassis is 13 by 17 by 4 inches to allow plenty of room for the large filament transformer. This can be reduced to a 3-inch chassis if two of the Thordarson T21F06 transformers are used to supply the filaments of the 4-250As separately. The grid tank circuit and the two 6Y6s are included in a standard 12 × 7 × 3-inch chassis. On the right-hand side of the chassis deck is mounted a 13 × 7 × 2-inch chassis, and the back plate is a 12 × 7 × 2-inch chassis. Unneeded sections of these chassis can be cut away with little difficulty. As a cover, "cane" type aluminum radiator covering is used. The back plate and the cover are fastened with sheet metal screws, which if large enough can be fastened over and over again without damaging the thread in the aluminum chassis. A suitable screw is Type 410 stainless steel No. 8 × 3/8 roundhead Type A made by Industrial Steels, Inc., of Cambridge, Mass.

For complete shielding a discarded section of a chassis is fastened to the front panel in the center area so that the cover can be screwed to this angle for a good electrical contact. The front panel is then fastened to the framework of the lower chassis and the side shielding without the necessity for panel mounting brackets. For the sake of good electrical contact it is desirable to remove the paint from the back of the front panel before mounting. Some panels can be obtained without paint on one side.

Forced air cooling of the 2-450As must be provided in the chassis arrangement and may be obtained by mounting a small Barber-Coleman fan under each of the two tubes or in the side of the chassis. In this particular transmitter an external squirrel-cage fan is employed because of its low noise level, and the air is piped to a flange in the bottom plate of the main chassis. This cooling problem is a nuisance but cooling is absolutely necessary and can be done as described above without adding greatly to the weight of the unit if an external fan is employed. The tube sockets are mounted above the chassis with just enough clearance for the terminals to avoid shorting to the chassis deck. When heat-dissipating plate caps are used on the 4-250As it may be necessary to cut off the top one or two turnings to avoid danger of contact with the protective cover.

The front panel is arranged symmetrically. At the center is the counter-dial to record up to 14 turns of the variable vacuum capacitor. At lower left and lower right are National type AM vernier dials to control the grid tuning and plate loading, respectively. Upper left is the link control, and upper right the bandswitch, of which 5 positions are needed.



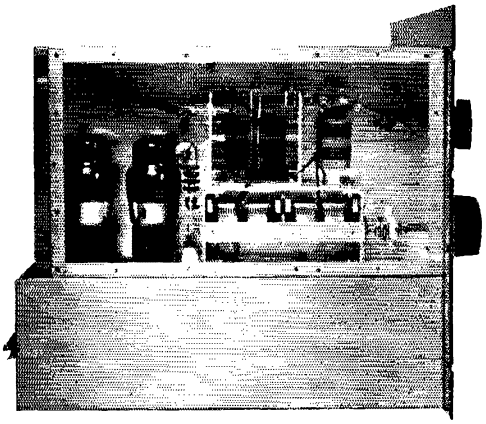
Close-up showing coil construction and mounting of the loading capacitors on the chassis below the switch frame. The harness for the plates is easily cut out of thin sheet copper with metal shears.

Wiring

All subchassis wiring is shielded and by-passed. The filament and screen leads that come through the chassis to the elevated tube sockets are by-passed at the sockets directly to the wire shields, which are grounded above the chassis. This part of the wiring is a little fussy and care should be taken to leave as little as possible of the wire unshielded. The r.f. wiring from half of the grid tank circuit to the two parallel tubes should be passed through small rubber grommets directly at the grid terminals of each tube. If the tube sockets are placed close to the grid tank compartment the section of these leads which lies within the plate tank compartment will be short. This is necessary to avoid regeneration.

Operation

Since the value of the coils has been predetermined, the tuning of this amplifier is almost like



Grid section. The two 6Y6s are included in this compartment. The swinging-link drive shaft is pitched downward with two flexible couplings to make the front panel symmetrical.

that of a conventional single-ended final. If the load into which the amplifier is operating is resistive, the loading capacitor can be varied with very little detuning effect on the tank circuit. In fact, it operates very much like the link on a push-pull final. The following is a set of values which represents approximately a *Q* of 12–15 at 1 kw. input to cover the amateur bands 10 through 80 meters.

	Plate Capacitance in Use	*Loading Capacitance in Use*
28 Mc.	14 μμf.	600 μμf.
21 Mc.	26 μμf.	730 μμf.
14 Mc.	40 μμf.	800 μμf.
7 Mc.	90 μμf.	1125 μμf.
3.5 Mc.	160 μμf.	1400 μμf.

Stray capacitance may be estimated at some 10 μμf.

As in all high-power amplifiers using valuable components, it is almost essential to have variable voltage available from the main power supply. Whenever switching is done from one band to another, even though the values are known pretty well in advance, it is desirable to start by tuning with about 600 volts on the plate. The meters will show very readily when resonance is reached even at this low voltage and there is virtually no risk to the tubes. At full power the plates of the 4-250As will show very slight color and they should drive and load evenly without special provisions for isolation in either the screen or grid circuits.

The amplifier has proven most satisfactory for both 'phone and c.w., though it is usually used on 'phone.

Note on Antenna Coupling

In planning a pi-network amplifier for operation at W1NWO, one deterrent was the fact that we use parallel RG-8/U as feeders for beam antennas on the 28-, 21- and 14-Mc. bands. When the amplifier was first designed we considered changing over the antenna feed to single coax but this was a difficult task involving reconstruction and retuning of the beams. The second thought was the use of balun coils which would have to be carefully switched or retuned from band to band. This seemed unwieldy, and finally the design of a coax balun with *Q* sections included did the trick. By this method the output of the transmitter passes through the low-pass filter and change-over relay, thence through an antenna switch to the individual balun and its associated antenna. The switch can be very simple so long as it is ceramic and can carry some 4 amperes at 400 volts.

As a practical matter, the balun connections can best be made with T-type coax connectors, thus bottling up the r.f. as a protection against TVI.

The balun section at the lower frequencies becomes a little bulky. It can be coiled loosely near the transmitter but should be kept reasonably well isolated from the driver stage either by shielding or by physical separation, as otherwise feed-back may result from the high power in this coil of coax. The Q-sections may, of course, become a part of the feeder line, simply connected to the RG-8/U at their 104-ohm output terminals.

OUR COVER

W7JIP, foreground, and W7OKV with W7OAY as assistant, test 10,000-Mc. gear used in setting American record reported on page 68. Details of equipment in June *QST*.

Late Report: Distance extended to 47.4 miles, a new world record, April 10th. (*Photo by W7PPQ*)

ARE YOU LICENSED?

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

A 40-Watt Amplifier for 220 Mc.

High Efficiency with a New Dual Beam Tetrode

BY EDWARD P. TILTON,* W1HDQ

• **February *QST* carried a description of a simple crystal-controlled transmitter for 220 Mc. good for about 10 watts input. Here is the next step up the 220-Mc. ladder: a 40-watt amplifier that operates at surprising efficiency considering the frequency.**

FOR operation at very low power levels the 220-Mc. enthusiast can get by quite nicely with inexpensive receiving tubes in his transmitter. The dual-triode line-up described in February *QST*[1] is an example of this approach. To run more power, however, he must invest in tubes designed specifically for transmitting applications. Because operation above 200 Mc. or so places some rather special demands on tube design, his choice is quite limited. There are not many tubes available that work well on 220 Mc.

One of the first requirements of a transmitting tube for 220 Mc. is that it be easy to drive. The necessary excitation is not easily developed at this frequency, so an amplifier that will operate with no more than a few watts output from the exciter is a must. The exciter may well use small triodes, as did the rig previously described,[1] but to build up the power level we almost have to go to some of the low-capacitance dual tetrodes. The 832A has been the work horse in this field, particularly in the early postwar years when it was available cheaply on the surplus market. The 829B is usable, but its much higher drive requirements and its relatively poor efficiency above 150 Mc. make it something less than ideal.

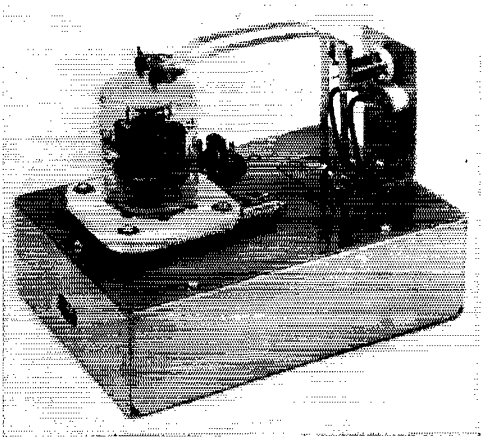
Two newer dual tetrodes designed especially for v.h.f. and u.h.f. amplifier service are the AX-9903 and AX-9910 by Amperex. These tubes are also known by their RETMA numbers, 5894 and 6252, designations that will be used hereafter in this discussion. As the result of refinements in design these tubes handle approximately the same power levels as the 829B and 832A, respectively, but at higher frequencies. For 220- and 420-Mc. amateur work, particularly, they are more effective than their elder brothers in the twin-tetrode family.

The amplifier pictured herewith was designed for the newer and smaller of these tubes, the 6252. An 832A may also be used, at slightly lower input, by shortening the plate lines a half inch or so. If the output from the driver stage is sufficient, the 5894 may also be used effectively, though alteration of both the grid and plate circuits will be required. As shown, the amplifier takes up to 40 watts input safely, and operates at better than 50 per cent efficiency.

Driver Requirements

Consulting the manufacturer's typical operating conditions we find that either the 6252 or the 832A requires less than 0.2 watt of driving power. This figure can be misleading, however; to get the 2 ma. grid current at 50 to 80 volts bias needed for the 6252 may call for a driver output of several watts, plate-circuit and coupling efficiencies being what they are at 220 Mc.

The three 12AT7s in the February *QST* rig will just about do the job, and the first tests were made on the 6252 amplifier using the 12AT7 rig as a driver. To check the effects of having more drive available, a modification was made in the exciter that may be of interest to builders of that rig, even though they may not be constructing the amplifier shown here.



A 40-watt amplifier for 220 Mc. using the new 6252. An 832A may be substituted by shortening the plate line. Plate lines, by-pass capacitor and top plate are made of sheet copper. Note mounting of the tube socket above the chassis. The small trimmer in the center is the variable screen capacitor.

There are several dual triodes available for various receiving and TV applications. One that had escaped our notice previously was the 12BH7, a husky bottle with a plate dissipation rating of 7 watts, compared to a maximum of 5 watts for the 12AT7. This offered the prospect of somewhat more output from our exciter, if its larger structure would not impair its efficiency on 220 Mc., compared to the 12AT7.

The base connections are the same for both tubes, so a 12BH7 was substituted in the final

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

[1] "Crystal Control on 220 Mc.," Tilton and Southworth, February, 1954, *QST*, p. 16.

stage of the rig. The plate loop, L_6 in Fig. 1 of the February *QST* article, had to be reduced in size, and the grid resistor increased in value. The plate inductance for the 12BH7 was made from about 3½ inches of No. 14 wire, bent into a loop ¾ inch across. The ends that solder to the tuning condenser stators were bent down at ¼ inch back from the ends of the wire. The output coupling loop was reduced correspondingly in size, and the grid resistor was increased to 22,000 ohms. After neutralizing, the 12BH7 was ready to go. Operating at 300 volts, it provided up to 5 ma. grid current to the 6252, so the plate voltage on the triode stages was reduced to 250. At this level, the exciter runs very conservatively, and delivers adequate drive to the new amplifier.

Amplifier Details

The amplifier is built on a copper plate 4 15/16 by 6 15/16 inches in size. This makes a good fit for the standard 5 × 7-inch chassis. Sheet aluminum may be substituted, but the use of copper is recommended, if it is available. The plate line is made of strips of flashing copper ¼ inch wide and 7½ inches long, terminating in a by-pass plate of copper 1⅜ by 1⅞ inches in size. The tube ends of the line are bent back a half inch and drilled to pass a 4/40 screw for tightening the folded-back portions on the plate pins of the tube. The copper lines are twisted 90 degrees at a point about ¾ inch from the tube pins. They are bent around a half-inch radius at a point about 4 inches from the tube so that they run down vertically to the by-pass capacitor plate. The last ¼ inch is bent at right angles for soldering to the by-pass plate.

Tuning of the plate line is done with a small butterfly variable capacitor connected at the bend in the line. At this point the r.f. voltage is low enough so that the miniature type of condenser may be used without flashovers. The capacitor is mounted 2¼ inches above the base plate and connected to the line through straps of copper similar to the line. The antenna coupling loop is brought out to a crystal socket for an output terminal, just below the tuning capacitor.

Note that the tube socket is mounted on metal pillars ¼ inch above the base plate. A preliminary model was made with the socket below the plate, but it was impossible to stabilize the stage with this layout. This was undoubtedly the result of chassis current due to the long path between the cold end of the plate circuit and the cathode pin of the tube. At these frequencies r.f. currents travel entirely on the surface of the conductors, so the return to the cathode circuit was by way of the top surface of the plate, through the socket hole, and out to the cathode grounding point. With the mounting as shown, the path from C_3 to the cathode is a short space on the surface of the copper plate. The cathode, the cold end of the screen-tuning capacitor and the ground side of the heater, Pins 1 and 7, connect directly to the top surface of the plate.

Connections are made to the grid terminals through ⅜-inch holes in the copper plate, and the screen and heater leads come through smaller holes. The grid inductance, L_1, is nothing more than two pieces of No. 14 wire, bent as shown in the bottom-view photograph. The wires extend vertically downward from the grid pins about ½ inch, then are bent around a ¼-inch radius toward each other. After another half inch they are bent downward for about a half inch, and then bent parallel to the chassis and to each other, ⅝ inch apart. As may be seen in the photograph, a movable short is connected around the two grid wires and soldered in place once resonance is found (more about this later). The line from the driver stage is attached directly to the grid line about ¾ inch from the shorted end. (In this connection, be sure that the coupling loop at the driver end is adequately insulated from the plate coil. Even a brief flash of positive d.c. voltage on the grid will ruin the amplifier tube!) Input terminal J_2 is mounted 1¼ inches below the base plate, on a copper or aluminum bracket.

The by-pass capacitor, C_3, is insulated from the base plate by two sheets of vinyl insulation,

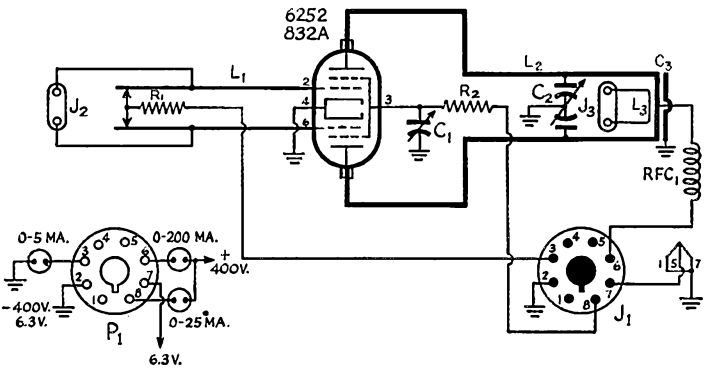


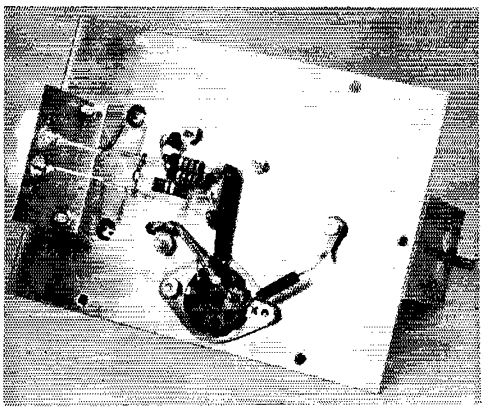
Fig. 1 — Schematic diagram for the 220-Mc. amplifier.

C_1 — 3-30 $\mu\mu$f. mica trimmer (National M-30).
C_2 — 11-$\mu\mu$f.-per-section miniature butterfly variable (Johnson 11MB11).
C_3 — Plate-line by-pass capacitor — see text and photograph.
R_1 — 15,000 ohms, 1 watt.
R_2 — 16,500 ohms, 2 watts (two 33,000-ohm 1-watt resistors in parallel).
L_1 — Two No. 14 tinned wires with adjustable short — see text and photograph.
L_2 — Plate line, ¼-inch-wide strips of flashing copper — see text and photograph. Strips spaced 5/16 inch between inner edges.
L_3 — Loop of No. 14 covered with spaghetti sleeving. Make from 4 inches of wire bent into U shape, about ⅝ inch wide. Main portion of loop is 1½ inches long.
J_1 — 8-pin male chassis fitting (Amphenol 86-CP-8).
J_2, J_3 — Crystal socket.
P_1 — 8-pin female cable connector (Amphenol 78-PF-8).
RFC_1 — Ohmite Z144 or Z235.

having a combined thickness of about 0.040 inch. This was obtained by cutting two sheets from a heavy plastic parts bag. Sheet mica or lucite may also be used, as the r.f. insulating qualities of the material are not important. The by-pass plate is held fast to the base by a 4/40 screw. This passes through a 5/16-inch hole and is held centered therein by a fiber washer with a nut and soldering lug on the bottom side.

The screen-dropping resistor is made by paralleling two 33,000-ohm 1-watt resistors. It and the grid resistor are brought to the two terminals of a tie-point near the middle of the chassis. Power is brought in on an 8-pin fitting, with provision for metering the plate, screen and control grid currents, as shown in the schematic diagram. It is well worth while to meter all these circuits continuously, if meters are available, but the metering may be dispensed with by running jumpers between suitable terminals in the plug attached to the power cable.

No neutralization of the crossover variety was found necessary. Instability was present when a fixed value of screen by-pass capacitance was used, so a small trimmer was connected between screen and ground. This is visible in the top view, at the right edge of the tube socket. Its cold end



Bottom view of the 220-Mc. amplifier. The grid tank circuit is at the left. The two paralleled resistors are in the screen circuit. The insulated B-plus feed-through is at the right.

is supported on a 1/8-inch brass sleeve, to prevent the adjusting screw from touching the base plate.

The only work required on the case is to file out a section of the folded-over edge at the rear, to clear the power fitting, and the cutting of a hole in the left end to pass the link from the driver stage.

Adjustment and Operation

Putting the amplifier into service is done most readily if a grid-dip meter that will work at 220 Mc. is available, but it is by no means necessary. The first step is to resonate the grid circuit. This is done with the unit out of the case, by sliding the short on the grid inductance along until a dip is found with the grid-dip meter at or near the middle of the 220-Mc. band. The short is then soldered in place. If no grid-dip meter is available, drive should be applied from the exciter, and the length of the grid line adjusted for maximum grid current. With no plate voltage applied, and with 250 volts on the exciter, it should be possible to develop 3 to 4 ma. grid current.

Now mount the unit on the base and apply drive again, but no plate voltage. Tune the plate circuit for a sign of change in grid current. If there is a downward kick, adjust the screen trimmer, C_1, until the dip disappears. There may be a slight rise in grid current at resonance, but there should be no downward flicker.

When this condition has been achieved, apply plate and screen voltage, as shown in the diagram. It is well to start with 250 volts or less, until proper operation is assured. Tune the plate condenser, C_2, for minimum plate current. Now connect a lamp load to the output terminal. The load can be a 15- to 25-watt lamp for the first checks. Solder stiff wires to the center contact and to the screw portion of the lamp base, and insert these wires into J_3, or connect them to a 300-ohm line plug and insert that in J_3. Retune the plate circuit for minimum current, which should coincide with maximum brilliance in the lamp load.

Now check for stability. Watching the grid current, remove plate voltage from the exciter output stage. With no drive present, the plate current of the 6252 should rise and the grid current should disappear. If some grid current remains, recheck the setting of the screen trimmer, leaving it at the point where grid current drops out. Do not operate the amplifier for more than a few seconds at a time in this condition.

The amplifier is now ready for testing at full power. Change the load lamp to 40 watts, increase the voltage on the driver stages, if necessary, to bring the grid current up to at least 3 ma. with no plate and screen voltage applied. Apply the full plate and screen voltage you intend to use, either directly, or in gradually-increasing steps. Adjust the position of the coupling loop for maximum output indication, retuning the plate circuit as this is done. With 400 volts applied the output should be around 20 watts, as indicated by slightly less than full brilliance in a 40-watt load lamp. Actually, lamps are none too good as loads at 220 Mc., but they will serve for a rough check.

During all the test procedure, watch the tube closely. Should there be a purple glow down between the tube elements, decrease the plate voltage at once as the tube is running too hot, even if the plate does not show color. Watch closely, also, for any gradual change in meter readings, as this is an indication of tube heating that is almost certain to have harmful effects if allowed to continue. If everything is operating properly, however, the tube should run conservatively at 400 volts on the plate. Lab tests have been made at up to 600 volts, and inputs in excess of 60 watts without harmful indications developing. The recommended maximum operating condition at 220 Mc., however, is 400 volts

(*Continued on page 120*)

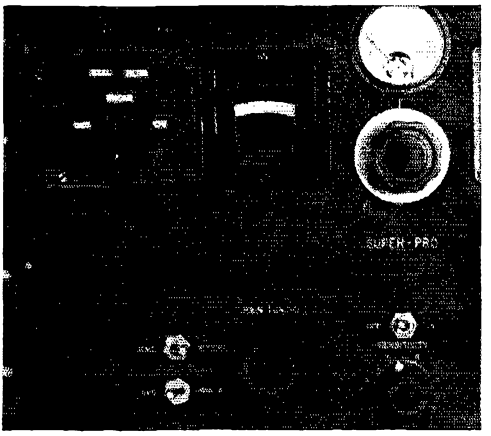
Cascaded Half-Lattice Crystal Filters for 'Phone and C.W. Reception

Installation in the SP-110X Receiver

BY HOWARD L. MORRISON,* W7ESM

• **Cascaded half-lattice crystal filters will give selectivity comparable with that obtainable by the best of other current methods — at negligible cost, so long as surplus FT-241A crystals continue to be available. In this article W7ESM describes such a filter as installed in a Super Pro; the application to other types of receivers should be fairly obvious once the details given here are understood.**

THE improvement in receiver selectivity obtained by a single half-lattice crystal filter,[1,2,3] together with the published selectivity characteristics of some of the newer commercial receivers, were incentives for trying a cascade arrangement in the main receiver at W7ESM — a prewar Super Pro. Despite its age this model of the Pro is an effective ham receiver without any modifications, as long-time owners or those who have acquired them as war-surplus items know. Its variable coupling in the i.f. amplifier provides good skirt selectivity in the minimum-bandwidth position. Consequently, even though the installation of a two-stage half-lattice filter produces a 'phone selectivity characteristic which compares favorably with those obtained by mechanical filters or 50-kc. i.f. systems, the improvement in this particular receiver is not as startling as might at first be expected. However, there is a noticeable improvement in readability when the QRM is really rough. In the absence of QRM, better readability is often obtained on a.m. signals with the filter switched out, for reasons recently given by George Grammer.[4] On c.w. both skirts of the selectivity curve are steep, and the operation is more "single-signal" than that of conventional crystal filters. The filter circuit herein described can be applied to other receivers, possibly with more beneficial effect.



Front panel of the receiver with the new filter arrangement replacing the original crystal filter. The switch mounting plate is slightly larger than the former one, but the four screws are in their original positions. The original bandwidth control in the lower left-hand corner has been "blacked out" since it has been fixed in position during the alignment process.

Mounting

The photos show how the filters squeeze into the space occupied by the original filter. There are two cascaded filters, one for 'phone with a nose bandwidth of 3 kc., and one for c.w., considerably sharper. Two crystals are common to both 'phone and c.w. filters so that six crystals do the work of eight. A three-position switch selects either filter, or straight-through operation. Even though the spacing of the two gangs of the switch was cut down, the mounting plate extended about an eighth inch beyond the front panel, so a second plate, with a hole in it large enough to recess the front of the switch, was used to fill the gap. Both plates were cut from the front panel of a BC-375 coil drawer. A thin piece of aluminum (from an old home-recording disk) shields the two sections of the switch from each other and is also sandwiched in between the two small boxes which contain and shield the three crystals associated with each of the two i.f. stages. A small angle is bent along the bottom edge of this piece so as to shield the leads from the first i.f. transformer to the first switch section from the wiring of the second switch section immediately above. This amount of shielding might seem scarcely enough, but no amplifier instability or adverse effects on the selectivity characteristic were noted.

Circuit

The basic filter circuit for each stage is that of Bill Good, W2CVI.[2] The inductance in the Pro i.f. transformers is enough to allow the low-C tuned circuits which are necessary for half-lattice filters, as has been pointed out.[1]

* Mount St. Michael's, Spokane 28, Wash.

[1] Morrison, "'Phone Selectivity for the BC-312," *QST*, February, 1954.

[2] Good, "A Crystal Filter for 'Phone Reception," *QST*, October, 1951.

[3] Titt, "A Dual-Crystal Q5-er," *QST*, September, 1950.

[4] Grammer, "The A.M. Equivalent of Single Sideband," *QST*, January, 1954.

The complete circuit is shown in Fig. 2. Balanced-to-ground i.f. transformer secondaries are obtained by sawing off all but three rotor plates of the original tuning condensers and adding additional condensers as shown.

Early tests revealed that the i.f. tank circuits would drift out of alignment as the set warmed up — an effect evidenced by the flat top of the selectivity curve becoming tilted The combination of negative and zero temperature coefficient tank condensers specified in Fig. 2 sufficiently minimizes this effect for practical purposes. The purist might want to add more negative coefficient condensers to all of the i.f. tank circuits, since the drift in alignment is due to the all-brass variable condensers used in this model of the Pro. However, getting inside the i.f. transformers and reassembling them, especially those with variable coupling, is no fun.

The original first i.f. transformer can be used by removing the inner shield can which contains the primary circuit, and relocating both primary and secondary coils by fastening their mounting boards to the outer edge of their respective ceramic supports. The latter procedure increases the mutual inductance and also permits 180-degree rotation of the trimmers. The link-coupling coils associated with the original crystal filter circuit can be left in place, but must be completely disconnected. There is ample room for the additional mica and ceramic condensers on the coil boards. The second i.f. transformer has only the secondary (upper) coil remounted as just described. (A tip on reassembling this transformer: Wrap several turns of string around the upper end of the guide rod so as to hold back the long compression spring until the rod is again in place; the string then can be pulled out with a little persuasion.) While both i.f. transformers are apart it will make future alignment easier by marking the trimmer adjustment nuts in some way so as to indicate the position of the rotor with respect to the stator.

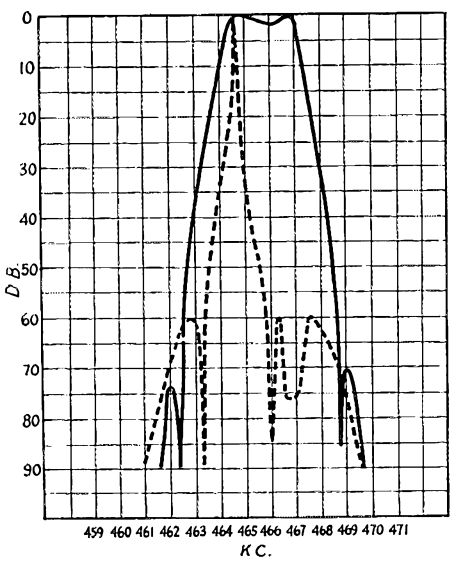


Fig. 1 — The solid curve shows the i.f. selectivity with the filter switched to the 'phone position. The bandwidth is 3.0 kc. at 6 db. down, and 6.1 kc. at 70 db. down. The dotted curve is for the c.w. position, and is 110 cycles wide at 6 db. down, 370 cycles at 20 db., and 1320 cycles at 40 db.

The shielded pair leading to the filter from the second i.f. transformer, along with the low-capacity grid leads for the first and second i.f. tubes, can be seen in the back-view photo. Up to 10 $\mu\mu$f. capacity in the grid leads doesn't do much to the filter except lower the gain; larger capacity will lower the terminating impedance of the filter, and may affect the selectivity characteristic. Auto-antenna lead-in cable is very practical for this use, but since none was at hand "home-brew" low-capacity leads were used. Ordinary shielded wire or the RG types of coax cable are not suitable in this case.

Two-pole switches must be used in each filter stage in order to disconnect completely the unused crystal and prevent irregularities in the selectivity characteristic.

Crystal Trimming Capacity

With filters in cascade, crystal trimming capacity is not as critical as with a single stage. This can be seen by taking the example of a half-lattice filter with enough excess capacity across the higher frequency crystal to produce side lobes only 30 db. down from reference level — a condition easily brought about by an extra micromike or two.[1] If two such filters are cascaded the side lobes would be 60 db. down, because the second stage responds 30 db. less to the side lobes produced by the first stage than it does to the first stage's peak. Hence in cascaded filters we can use relatively large trimming capacity to produce steeper skirts without introducing large side lobes as in the case for a single-stage filter. Trimming capacity is used only in the 'phone filters, as indicated in the diagram, and consists of one loop of hook-up wire in each stage as shown in the photos.

Crystals

Surplus FT-241-A-series crystals are used, each whose labeled frequency is the 72nd harmonic of the crystal frequency and can be directly used in the 'phone filters because alternate channels are 2.8 kc. apart; the selectivity curve will then be about 0.3 kc. wider than that shown in Fig. 1. Crystals in the 54th-harmonic series can be used, but must be shifted by plating or grinding so that they are at least 2.5 kc. apart; the nominal 1.9-kc. spacing of adjacent channels in this series is too narrow for a satisfactory 'phone bandwidth when cascaded filters are used, and the 3.8-kc. spacing of alternate channels is too wide. However, crystals in this series can be used in conjunction with those of the former, as shown in the first arrangement of Table I, to provide reasonable bandwidths for both 'phone and c.w. without requiring any crystal modification. This particular set of crystals also brackets the 465-kc. receiver i.f. very nicely; if a set of

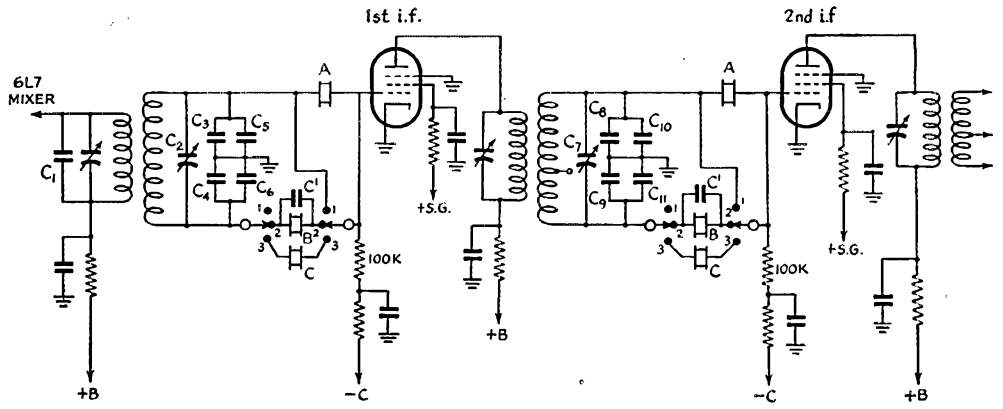


Fig. 2 — Circuit of cascaded half-lattice crystal filters as applied to the i.f. amplifier of the SP-110X. Unmarked components as in original receiver.

A, B, C — See Table I.
C_1 — 25-$\mu\mu$f. ceramic, negative temp. coeff. (N750 type).
C_2, C_7 — Original condensers with all but 3 rotor plates removed.
C_3, C_4, C_8, C_9 — 47-$\mu\mu$f. ceramic, negative temp. coeff. (N750), 5 per cent tolerance.
C_5, C_6, C_{10}, C_{11} — 100-$\mu\mu$f. zero temp. coeff. ceramic (NPO), or silver mica, 5 per cent tolerance.
C' — Crystal trimming capacity. See text.
Switch — 2-gang with 2 poles and 3 positions per gang.
Switch position 1: filter out
" " 2: 'phone
" " 3: c.w.

crystals is used which has the desired frequency separations, but does not bracket the original i.f., it will be necessary to touch up the r.f. alignment if the calibration of the main tuning dial is to be held. Realignment of the head end is not a bad idea anyway, especially in the case of a receiver which has been in service a good many years. The arrangements listed in Table I are representative only; other combinations can be used by shifting crystals with the methods of plating and grinding described in detail in a previous article.[1]

C.W. Selectivity

The c.w. selectivity of our receiver, shown in Fig. 1, will probably be considered too sharp by many; its 110-cycle nose bandwidth is the result of a 0.3-kc. separation between crystals *A* and *C*. Certainly, such sharpness is not very well adapted to the slight backlash in the tuning

TABLE I

Some Possible Crystal Arrangements

Crystals A Channel	*Crystals A* Kc.	*Crystals B* Channel	*Crystals B* Kc.	*Crystals C* Channel	*Crystals C* Kc.	*B*—*A* Kc.	*'Phone bandwidth at 6 db. down*	*C*—*A* Kc.	*C.W. bandwidth (estimated)*
1. 334	463.9	336	466.7	51	464.8	2.8	3.3 kc.	0.9	800 cycles
2. 334	463.9	336	466.7	51 shifted 0.4 kc. higher than crystal *A*		2.8	3.3 kc.	0.4	150 cycles
3. 333	462.5	335	465.3	50	462.9	2.8	3.3 kc.	0.4	150 cycles
4. 335 shifted 1.4 kc. lower	465.3	337 shifted 2.5 kc. higher than crystal *A*	468.0	51	464.8	2.5	3.0 kc.	0.9	800 cycles
5. 51 shifted 0.6 kc. lower	464.8	52	466.7	51	464.8	2.5	3.0 kc.	0.6	400 cycles

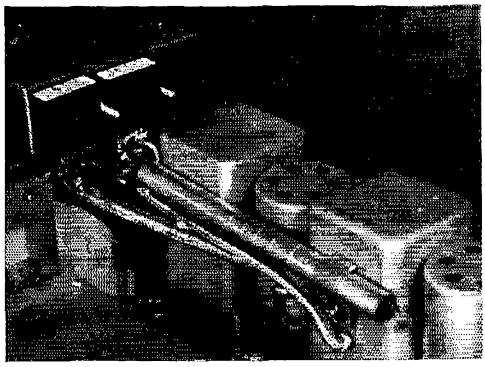
Crystal frequencies are nominal, and are for parallel resonance (labeled frequency divided by 72 for the 300-series channels, and by 54 for the 50-series channels). The series-resonant frequencies of the actual crystals used must be measured, and the difference frequencies, $B-A$ and $C-A$, must be as listed above in order to obtain the listed bandwidths. The above frequency shifts can be readily obtained by plating the crystals as explained in a previous article.[1] Many other combinations are possible by grinding crystals to increase their frequencies. A method of grinding is given in the same article.

If the 110-cycle c.w. bandwidth shown in Fig. 1 is desired, $C-A$ should be 0.3 kc.

mechanism, nor to the amount of h.f.-oscillator drift in the SP-110X; however, there are times when these shortcomings can be tolerated in the interests of separating a wanted signal. If further operation indicates that a wider bandwidth is more practical, it will be relatively easy to replace the *C* crystals with some a few hundred cycles higher in frequency. Some ringing also can be expected with such a narrow bandwidth, but it can be minimized by operating the receiver with high audio and low r.f. gain.

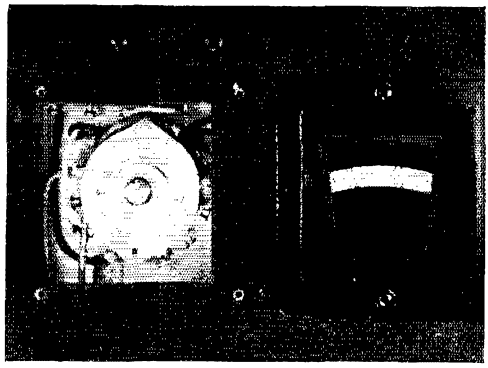
Alignment

The crystals are measured and modified as may be necessary, according to methods detailed in a prior article.[1] Since there is little difference in aligning either a one- or two-stage half-lattice filter, the procedure and test equipment also described in that article can be used. In this case make the following preliminary settings: filter switch to 'phone position, bandwidth control (variable i.f. coupling) to *3.7*, a.v.c. switch to MANUAL, b.f.o. switch to MOD, SENSITIVITY (r.f. gain) between *3* and *4*, bandswitch to one of the higher-frequency bands, audio gain to zero, h.f. oscillator tube out, high-impedance d.c. voltmeter (v.t.v.m. on 10-volt scale, or 20,000 ohms/volt meter on 2.5-volt scale) across



Rear view with the aluminum box which contains the three crystals in the second stage removed. The second switch section is directly beneath the middle crystal, which is the second *B* crystal. The loop of wire around one prong of this crystal is the trimming capacity for the second stage. The lowest shielded lead comes through the plate which shields the two switch sections, and goes to the grid of the first i.f. tube; it consists of large-diameter varnished tubing with a small-sized hook-up wire inside to keep the capacity low. The center shielded lead is for the connections to the secondary of the second i.f. transformer. The upper "pipe" is a low-capacity lead to the grid of the second i.f. transformer, and has its center conductor supported by a ceramic bead at each end. Auto-antenna lead-in cable would be satisfactory for the two low-capacity leads. The second-i.f. grid resistor, partially covered with varnished tubing, is visible near the dial.

second detector load resistor (PHONO terminals), and signal generator midway between the series-resonant frequencies of crystals *A* and *B*. Clip the signal generator through a blocking condenser to the grid of the third i.f. tube and adjust the trimmers of the fourth and fifth i.f. transformers for maximum output. Next clip the generator to the grid cap of the second i.f. tube, adjusting the third i.f. transformer, and so on until the generator is connected to the grid of the 6L7 mixer, and the first i.f. transformer aligned. Then tune the generator between 460 and 470 kc. and note the two peaks of maximum output; the frequency exactly midway between them is the final alignment frequency, and all the trimmers in the amplifier should be touched up with the generator at this frequency and connected to the grid of the 6L7. Go over the



Showing the first switch section. The two wires leading downward in the lower left corner are from the first i.f. transformer. The loop of wire in the upper left corner is the trimming capacity for the first *B* crystal, whose prongs are just visible in the upper right corner. The first *A* crystal is to the right, out of view. The two screws above the panel opening support the crystal boxes as shown in the rear view. A 3-pole 3-position switch, with one pole unused, is shown.

entire series two or three times and again check the two peaks; they should match within a few per cent, and the dip between should not be down more than 20 per cent of peak. In Fig. 1 the dip is 15 per cent down, or 1.5 db. If the dip is greater than 20 per cent, reduce the i.f. transformer mutual inductance by turning the bandwidth control counterclockwise a little, and repeak the amplifier. If there is little dip, with the peaks scarcely noticeable, so as to make a sharp-nosed selectivity curve, increase the mutual inductance. (If a receiver with fixed i.f. coupling is being modified, mutual inductance can be reduced by sliding the coils apart, or by a shorted turn of heavy copper wire around the form midway between them. If the transformer has tank capacity greater than 100 $\mu\mu$f., mutual coupling can be reduced along with the C/L ratio by means of an additional coil in series with each secondary as previously explained.[1]) If one of the peaks is greater than the other, the response can be leveled by slightly readjusting some of the trimmers so as to favor the lower peak. For example, if the low-frequency peak is down, some of the trimmers can be set a little (very little!) higher in capacity than the setting which provides maximum output at the alignment frequency. The final alignment adjustments should be made only after the set has had plenty of time to reach normal operating temperature.

(Continued on page 128)

A Compact Two-Element Beam for Twenty

Center Loading for Restricted Space

BY CARL M. GETTER,* W1MIJ

• W1MIJ hasn't let space restrictions keep him from the benefits of a rotating beam for 20-meter DX. In this article, he describes a compact center-loaded two-element array that has "made the elusive ones less elusive."

WHEN DXing with low power, a few db. can mean the difference between snagging or missing a rare one. After missing too many of these, it was decided to try a two-element beam. However, a radius of only a little over 10 feet was available. It was decided to see what could be done with shortened elements loaded at the center.

The general idea is shown in Fig. 1. Each of the two elements, radiator and reflector, is made up of two sections of ½-inch aluminum tubing 10 feet long.

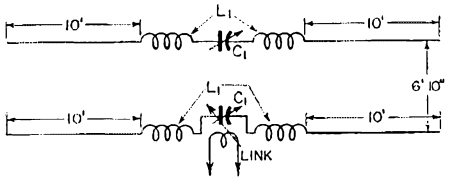


Fig. 1 — Schematic of the center-loaded 20-meter beam antenna. The tuning condensers, C_1, are 100-$\mu\mu$f. variables. Each of the loading coils, L_1, consists of 8 turns No. 8 wire, 3½-inch diameter, 4¾ inches long over all, with a ¾-inch space at the center. The link for the driven element has 3 turns. B & W HDVL-20 coils were used (inductance approximately 7 μh.).

The loading coils each side of center are B & W HDVL-20. The one in the driven element has a 3-turn plug-in link for coupling the RG-8/U line to the array. Each element is tuned by a 100-$\mu\mu$f. variable condenser with 0.07-inch (or greater) plate spacing. The spacing between elements is 0.14 wavelength, and the parasitic element is tuned as a reflector, because this arrangement proved to be less critical in adjustment.

Construction

The completed beam is shown in the photograph. As Fig. 2 indicates, the boom is made up in ladder fashion. A 12-inch-square piece of ¾-inch *exterior* plywood supports a pair of 2×2s 7 feet long.

These 2×2s are spaced apart by ¾-inch dowels at intervals of 1 foot. Holes 1 inch deep are bored in the 2×2s and the dowels glued in place, using "Weldwood," or similar waterproof glue. Pieces of exterior plywood 12 inches square also are used at the ends of the boom to provide a mounting for the element supports.

A 1-inch hole is bored in the middle of the center plywood piece, and a 1-inch pipe flange (bored through from the bottom side to allow the threaded end of the rotating pipe to pass through) is lined up with the hole, on each side of the plywood. The flanges and plywood are clamped together with bolts through the flange mounting holes. A threaded pipe cap is placed over the end of the rotating pipe where it protrudes from the upper flange.

Fig. 3 is a sketch of the element supports. Both are identical. Each consists of a pair of 1¼×¼-inch lath or lattice wood, 7 feet long, spaced by 1¼-inch blocks of 2×3 pine. The block at the center is 12 inches long to match the plywood at the end of the boom. I used ¼-inch galvanized bolts to clamp the assembly together.

Fig. 4 shows a sketch of the method of insulating the elements. The two large stand-off insulators are fastened to adjacent spacing blocks in the element supports. Spanning these is a 4×8-inch sheet of ¼-inch polystyrene on which is centered a third stand-off insulator to which the aluminum-tubing elements are fastened. Each of the two beam elements has four of these insulator assemblies, two each side of center. The insulators should be of the type with a metal base clamp, such as the Johnson type 62 or 66; ceramic-base insulators crack too easily. The banana plugs are removed from the coil jack bars, and brass bolts

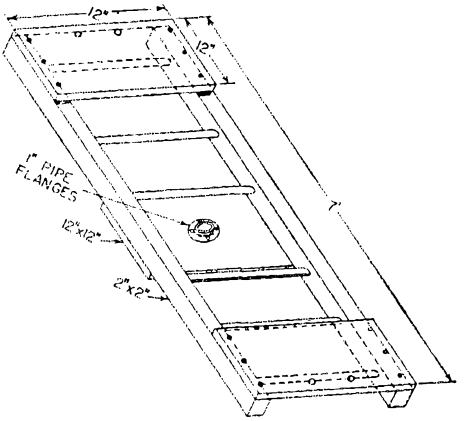
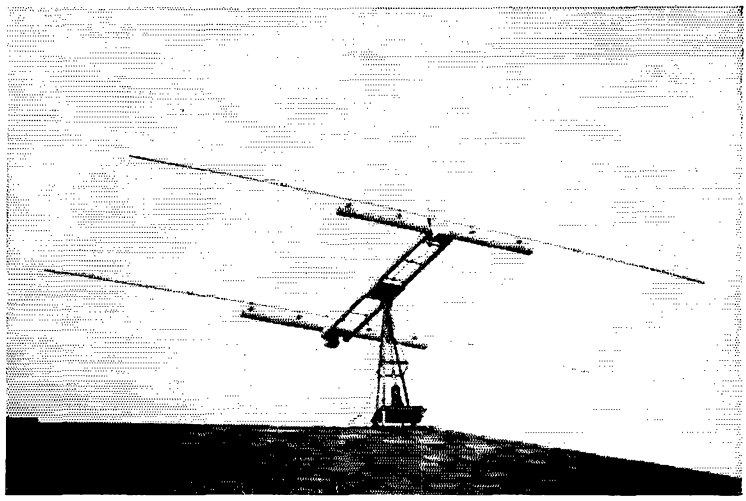


Fig. 2 — Sketch showing the construction of the boom. The pipe flanges at the center thread onto a 1-inch rotating pipe. The holes in the end pieces should match up with the holes in the center blocks of the element supports in Fig. 3.

* 185 Early St., Providence 7, R. I.



W1MLJ's center-loaded beam is mounted on a 5-foot TV tower. The boom is only 7 feet long, while the elements have an over-all length of only 20 feet. The assembly is light enough to be turned with a TV rotator. A rotating guy-wire ring (Crown Mfg. Co.) is used as a bearing for the pipe at the top of the tower.

substituted at the centers and ends. Each coil is fastened between the inner ends of the element sections, by means of the end bolts. The ends of the aluminum tubing are flattened out and drilled to take the bolts.

The tuning condensers are mounted on stand-off insulators in metal weatherproof boxes. Connections to the coils are made through feed-through

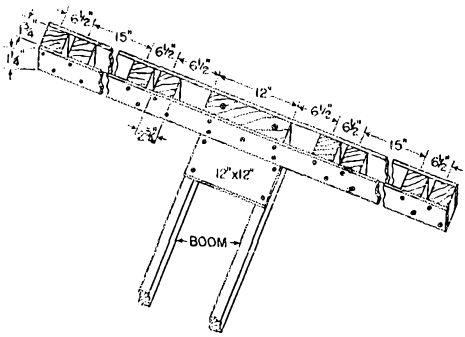


Fig. 3 — Sketch showing the detail dimensions of the element supports mounted at each end of the boom. Drawing is not to scale.

insulators in the tops of the boxes. Insulated couplings bring the tuning shafts out of the bottoms for easy access. The coils are unprotected, but only slight detuning occurs during rain or snowstorms.

After the beam was completed, the entire wood structure was given two coats of good-grade deck paint, and all metal parts were covered with zinc chromate to minimize corrosion.

The completed beam weighs only 36 pounds, and a Radiart TR-2 TV-antenna rotator handles it very easily and should give long trouble-free service. This rotator, of course, is equipped with a direction indicator, and it requires only 40 seconds for a complete revolution.

Adjustment

Tuning the beam is a simple matter, since all it involves is turning the two knobs. Set the transmitter at the center of the desired operating range. (The beam will load over a range of about 120 kc. without retuning.) Push the link of the driven element about three quarters of the way in, so that full control of the loading will be possible from the transmitter end. Either a field-strength meter, or a receiver with an S-meter, a few miles away (with some form of communication between the two points) will provide suitable indication of adjustment. The beam is pointed at the indicator, and the connections to the reflector coil and condenser are opened while the driven element is tuned for maximum intensity. The connections to the reflector are then completed, and this element also tuned for maximum. Then the driven element is touched up for maximum. When the reflector was resonated, a jump of four S points was reported at the receiving point two miles away. A decrease of three S points was reported when the beam was tuned with its back

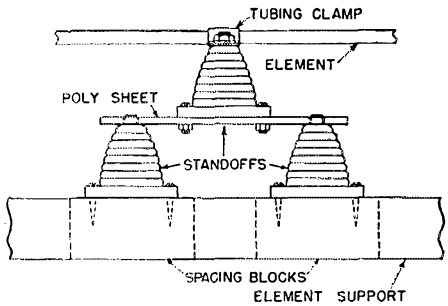


Fig. 4 — Four of these insulator assemblies are mounted on each of the two element supports, as shown in the photograph.

toward the receiving point. No attempts were made to measure the actual gain or front-to-back ratio. The jump in S-meter reading was enough to satisfy all concerned that the array was "beaming." DXCC was made soon after putting up the beam, and the elusive ones became less elusive. It made the 125-watt c.w. rig feel like a California kilowatt. Try one!

The VP (Vest Pocket) Beam

A 20-Meter Array with 10-Meter Dimensions

BY JERRY HEMMEN,* WØVZC, AND WYMAN PIGG,** WØQFG

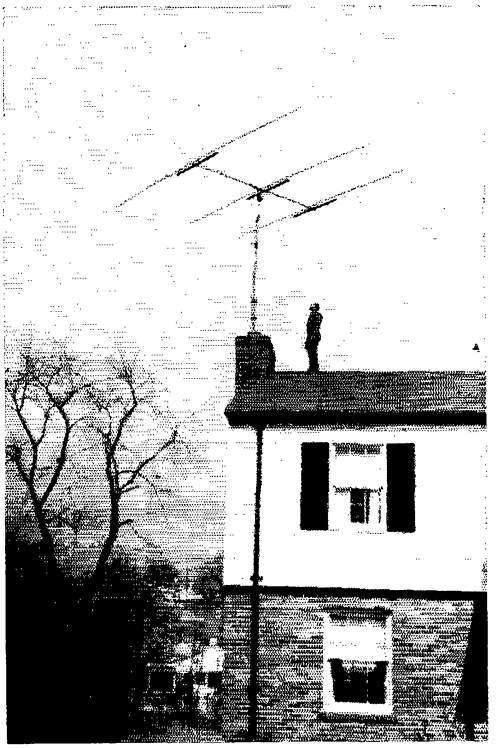
• Hard on the heels of W1MLJ's story (pages 25–26) on his compact 2-element beam came this description of a 3-element job that is even smaller! This array has been given a thorough workout by several hams in the Midwest and elsewhere. The performance of the VP in restricted space is reflected in the enthusiasm of all who have tried it.

WHAT are you using for an antenna on twenty meters? If you are using a dipole, or a simple long wire, because you are pressed for space or other restrictions, here is a simple solution.

The VP Beam is a result of two years of experimentation. Those who have built the beam from specifications given here report that it far outperforms a dipole, and often approaches the results obtained from a full-sized beam on both short skip and DX. Checks with local and distant stations show a front-to-back ratio of 20 to 28 db. and, on receiving, discrimination against unwanted signals is adequate. The construction of the beam is strong enough to withstand heavy winds, yet sufficiently light in weight to be easily rotated with a TV type rotator. And, best of all, the elements are no longer than those of a 10-meter beam.

Loading Coils

After you have assembled the necessary materials (see list of materials), it is suggested that you start by winding the three coils. The polystyrene rods on which the coils are wound are ¾ by 13 inches. Three inches of each end are inserted into the ⅞-inch aluminum tubing, as shown in the sketch of Fig. 1. This leaves 7 inches of rod for winding the coil and interwinding the plumb line (sometimes known as chalk line) which is about the same diameter as No. 12 wire. Drill a small hole to accommodate No. 12 wire, 3½ inches from each end of the rod, to serve as anchor points for the coil winding. Allow sufficient length for the connection to the element.



WØFBT making a check on his copy of the Vest Pocket 3-element beam.

* 5940 Bartmer Ave., St. Louis, Mo.
** 2402 South 13th St., St. Louis 4, Mo.

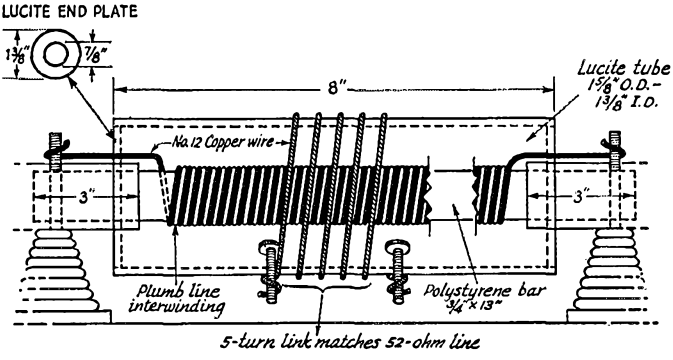


Fig. 1 — Detailed sketch of the loading and coupling coils at the center of the driven element, and its mounting. Similar loading coils (see text) are used at the centers of the director and reflector.

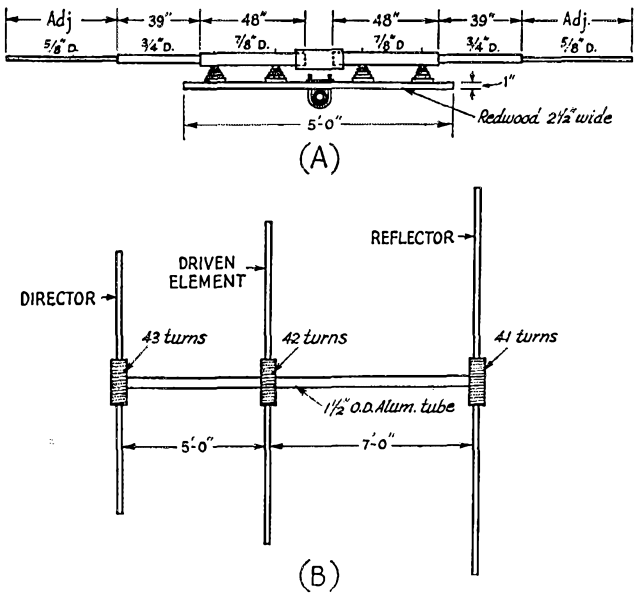


Fig. 2 — A — Side view of a typical element. B — Top plan of the beam showing element spacing and loading-coil dimensions. Elements are made of aluminum tubing. Construction of the loading coils and adjustment of the elements are discussed in the text. Mounting of the boom is shown in Fig. 3. End-section lengths of 41 inches for the reflector, 40 inches for the driven element, and 10 inches for the director will be close to optimum.

The coils should be sprayed with Krylon, and covered with plastic electrical tape, then sprayed again. The plumb line provides even turns spacing for the coils, and adds rigidity to the unit.

Elements

The aluminum tubing required for the elements is as follows: two 12-foot lengths of ⅞-inch o.d., two 12-foot lengths of ¾-inch o.d., and two 12-foot lengths of ⅝-inch o.d. tubing. For good telescoping, element wall thickness of 0.058 inch is recommended. Cut each length into 4-foot sections. This not only allows for sufficient length in tuning, but adds to the rigidity of the completed element. Sketch A (Fig. 2) shows a complete element assembly. The ends of the tubing sections should be slotted to permit adjustment, and secured with clamps, so that the joints will not work loose in the wind. Perforated grounding clamps can be used for this purpose.

You are now ready to mount the element tubing on the redwood crosspiece. This piece is 5 feet long, 2½ inches wide, and 1 inch thick. The stand-off insulators should be placed, one near each end, while the two inner insulators should be placed 5½ inches each side of center. The element may now be marked and drilled as shown in the sketch.

After the holes are drilled, the coil assembly will be placed in the center. Mark and drill the polystyrene rod. When inserting the polystyrene rod into the tubing, be sure to place the lucite end plate over the element end, because it will not pass over the coil winding later. File a small notch in the end plate to allow the No. 12 wire to pass through. Mount and secure the first half of the element to the crosspiece. Then slip the plastic shield and lucite end plates over the coil. Insert the remaining element sections. Now the element may be secured to the stand-off insulators. The lucite end plates are secured to the shield with three self-tapping screws.

You now have a complete typical element as shown in Fig. 2A.

Boom

Once the elements are finished, you are ready for the beam assembly. The boom for the

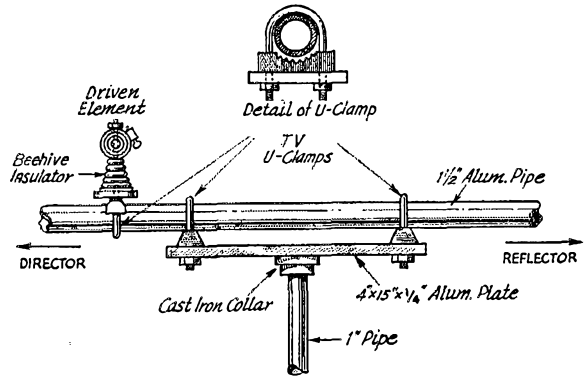
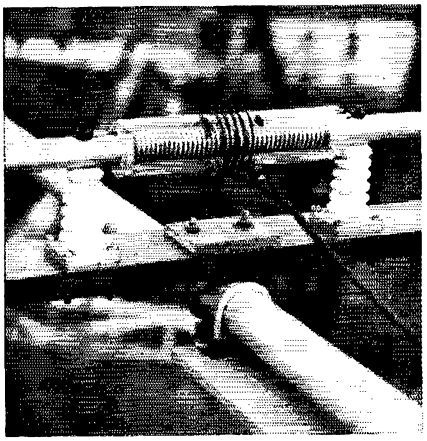


Fig. 3 — Detailed sketches of boom and element mounting. Beehive insulators—Birnbach 4176, or similar.

VP beam is a 12-foot length of 1½-inch o.d., 0.125-inch wall 61 ST aluminum tubing. The boom-mounting plate consists of a 15-inch piece of aluminum plate 4 inches wide and ¼ inch thick. Secure to the bottom side of this plate a



Close-up showing the loading and coupling coils at the center of the driven element. The loading coils in the parasitic elements are similar, minus the coupling coil.

1-inch galvanized pipe flange, and thread into the flange an approximate 2-foot piece of 1-inch pipe for mounting on a TV-type rotator. See sketch of Fig. 3.

The beam may be assembled either on the ground or in its permanent position. After the boom is mounted on the rotator, slip the driven element on to a position 5 feet from one end.

Materials List for VP Beam

6 pcs. ⅞" × 4' 0.058"-wall aluminum tubing.
6 pcs. ¾" × 4' 0.58"-wall aluminum tubing.
6 pcs. ⅝" × 4' 0.58"-wall aluminum tubing.
} elements

1 pc. 15" × 4" × ¼" aluminum plate. (boom plate)
1 pc. 12' × 1½" o.d. 0.125"-wall 61 ST aluminum tubing. (boom)
3 pcs. 5' × 2½" × 1" redwood. (element supports)
1 pc. 2' × 1" galvanized pipe — threaded at one end. (boom-plate support)
3 pcs. 8" × 1" o.d. × 1⅜" i.d. lucite or plastic tubing. (coil shields)
3 pcs. ¾" o.d. × 13" polystyrene rod. (coil forms)
12 3-inch stand-off insulators — metal-base type. (element mounts)
6 1⅜" o.d., ⅞" hole, ¼" thick lucite or plastic washers. (coil-shield ends)
1 1-inch galvanized pipe flange. (boom plate mount)
5 1½-inch TV-type U bolts, *with curved plate.* (element and boom mount)
12 aircraft-type hose clamps, ⅞". (element clamps)
4 ¼" × 1" f.h. brass bolts and nuts.
80 1½" × 12-24 r.h. brass machine screws and nuts.
70 12-24 brass washers.
1 roll No. 12 enam. copper wire, soft-drawn.
1 can Krylon.
1 roll Scotch plastic tape.
1 roll chalk or plumb line.
1 small box ½" hex-head metal screws.

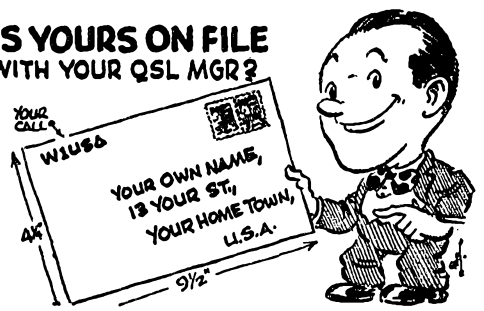
Mount the director and reflector at either end. Remember that the director has the coil with 43 turns and is spaced at 5 feet, while the reflector has the coil with 41 turns and is spaced at 7 feet. Each element is secured to the boom with TV-type U clamps (with teeth), and the boom plate is secured to the boom with two 1½-inch TV U clamps (with teeth). See Fig. 3.

Adjustment

Matching the line is accomplished with a simple link at the center of the driven element (the director and reflector have no link), and experience has shown that five turns spaced ¼ inch apart provide an impedance of about 52 ohms, but any transmission line in common use may be matched by varying the number of turns. This link is wound on the *outside* of the driven-element shield. See Fig. 1. The bolts that secure the link are inserted from the inside of the shield. These bolts also act as tie points for the feed line.

Because the elements are short and coil-loaded, their physical length bears no relation to frequency. In most cases, the dimensions for the end sections given in the caption of Fig. 2 will be found to be close to the optimum. However, if you want to check the adjustment, first resonate the driven element to the desired frequency in the 14-Mc. band with a grid-dip oscillator. Then resonate the director to approximately 14.8 Mc., and the reflector to approximately 13.6 Mc. This is not critical and only serves as a rough point for the final tuning, which is done by use of a conventional field-strength indicator. Check the transmitter loading and readjust if necessary. Adjust the director for maximum forward gain, and then adjust the reflector for maximum forward gain. At this point, check the driven element for resonance and readjust if necessary. Turn the reflector toward the field-strength indicator and adjust for back cut-off. This must be done in small steps, for this is the most critical adjustment.

You are now ready to test the VP beam's overall performance on the air! The VP beam is not expected to replace full-sized beams, and was not designed for that purpose. It is merely the result of the authors' need for a rotatable antenna for limited space, with worth-while gain a requisite. We wish to pass this information on to those who, like us, may benefit by its use.



(See page 134, April *QST*)

R.F. Chokes for High-Power Parallel Feed

An Answer to the Multiband Choke Problem

BY C. VERNON CHAMBERS,* W1JEQ

WHEN an r.f. choke is used in a parallel-feed circuit, it must stand the full r.f. voltage generated in that stage. With a high-power amplifier this means that several thousand volts of r.f. may be applied across the choke. Besides having the insulation necessary to stand this voltage, the choke must have low r.f. loss, not only for the sake of over-all circuit efficiency but also to prevent failure of the choke because of overheating. This means that the impedance of the choke must be high compared with that of the tube load for all frequencies at which the amplifier is to operate. To fulfill this requirement, it is generally considered that the inductance of the choke must be very much greater than the inductance of the tank coil across which it is connected.

The construction of a choke that will have high impedance over a wide frequency range is most seriously hampered by the behavior of any practical coil. At frequencies low enough so that distributed capacitance is of no consequence, the equivalent circuit of a coil is an inductance in series with a resistance, the latter representing the power-consuming element in the coil. As the frequency is increased, distributed capacitance begins to affect the apparent inductance and, at some frequency, the coil effectively becomes a parallel-resonant circuit as shown in Fig. 1. At still higher frequencies, the reactance becomes

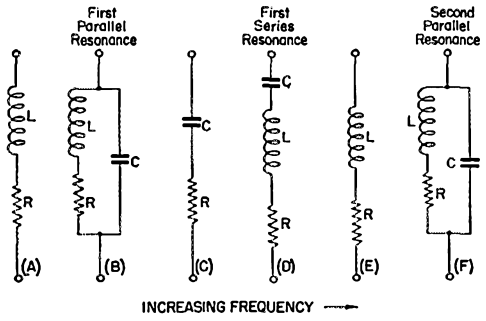


Fig. 1 — Effective coil impedance as a function of frequency. The impedance is inductive at low frequencies, as at A. As the frequency is raised, the coil becomes successively a parallel-resonant circuit (B), then a condenser (C), and then a series-resonant circuit (D). After this, the cycle starts again, as shown at E and F.

capacitive instead of inductive, until eventually a frequency is reached where the coil acts like a series-resonant circuit. Above this frequency, the reactance again becomes inductive and the behavior repeats cyclically. These impedance variations resemble the input impedance variations of a short-circuited transmission line, except that the resonances are not in harmonic relationship.

Since the impedance of the coil is highest at its natural "parallel" resonances, it is in the frequency region around these resonances that the coil works best as a choke. Conversely, the impedance is relatively low at a "series" resonance point and the coil will be a poor choke in such frequency regions. At in-between frequencies the choke may be either good or fair, depending on its actual impedance and the impedance of the circuit across which it is connected. For operation over only a small band of frequencies it is easy to make an excellent choke simply by winding a coil that is parallel-resonant at the center of the band.

The Choke Problem

In view of the above, it would appear that a logical start toward constructing a choke that will work well over a wide frequency range would be to wind a solenoid of such dimensions as to be parallel resonant at the lowest frequency in the range. Unfortunately, the frequency range over which this method is successful is limited to about 2 to 1, because the first series resonance usually appears at something like 2.5 times the lowest parallel-resonant frequency. This series resonance cannot be avoided, but since the amateur bands are scattered spots in the spectrum there is at least the possibility that a choke design could be found that would have only parallel resonances in or near the amateur bands, letting the series resonances or "holes" fall in between where they would do little harm. In practice, this approach works quite well over a frequency range of 3 to 1 or so, but in an ordinary solenoid the higher-order resonances, both series and parallel, tend to occur so close together that the choke may be good at one end of a wide band such as 28 Mc. and poor at the other.

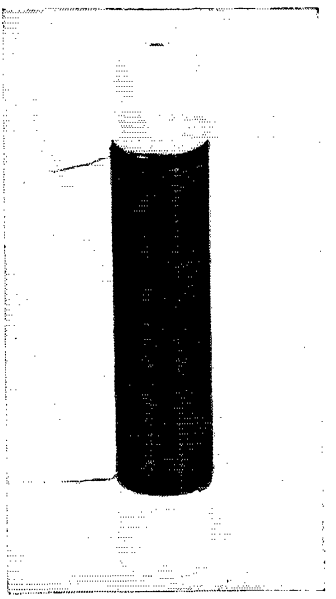
In commercial choke designs the two types of resonances are controlled to some degree by employing sectionalized windings of the universal type. One type of resonance may overlap another, giving an average result that is for many purposes quite adequate for operation over a wide frequency range. Since the ability of a choke to operate without breakdown is dependent on the actual power consumed in the choke, and this in turn is a function of the r.f. voltage applied to it, chokes of this type generally will stand up well in low-power circuits — up to perhaps 500 volts on the amplifier plate. However, they all have bad-enough holes in some part of one or another of the amateur bands between 3.5 and 30 Mc. to cause burn-up, if the plate voltage is much higher

* Technical Assistant, *QST*.

and the operating frequency happens to be near a hole frequency. This is also true of all the universal-wound transmitting-type chokes we have tested, although these in general will operate safely at plate voltages of 1000 to 1500 unless the frequency happens to be near a bad spot.

A Different Approach

It is entirely possible that solenoids employing sectional-type windings would offer more flexible control of the resonances. (The National R-175 choke is a good illustration of what can be accomplished by using sectional windings, but unfortunately, this choke was designed long before the 21-Mc. band became available.[1]) However,



The 78-μh choke. The 1 × 6-inch ceramic form (a standard size of stand-off insulator) on which this choke is wound is tapped at both ends to accommodate ¼–20 threaded rod. Such mounting rods could be drilled axially and then tapped with 6–32 threads so that ceramic TV-type high-voltage capacitors could be mounted directly on the choke for plate blocking and by-passing. This choke is wound with enameled wire, but with space-wound coils the insulation is unimportant.

the separate sections of a sectionalized choke are not independent; changing the resonant frequency of one always affects the resonant frequencies of one or more of the others, so it was apparent that finding the right combination, if one existed, would take hours and hours of cut-and-try.

On the other hand, measurement showed that the impedance of a simple solenoid designed for a frequency range of 3 to 1 as discussed above (that is, with the first parallel resonance considered as the lower-frequency limit of the range) remained high enough at still lower frequencies to permit extending the low-frequency limit to give at least a 4 to 1 total range. This suggested the possibility of increasing the usable range still more in the low-frequency direction by adopting

[1]This was written before the R-175A was announced.

• High power with parallel feed places a big burden on the r.f. choke — sometimes with disastrous results. Building on the basic characteristics of straight solenoid coils, this article suggests a somewhat different approach to choke operation and describes a choke design that has proved satisfactory on all bands from 3.5 to 30 Mc., in amplifiers operating with up to 3000 volts on the plate.

a somewhat different attitude in this region — in brief, to allow the choke to operate not as a choke as such operation is ordinarily visualized, but as a simple coil in shunt with the plate tank coil. Thus, at low frequencies the "choke" is deliberately allowed to carry part of the tank current. The requirements for such a scheme would be low losses at the lower frequencies, necessitating a coil of good Q, together with proper design for true choke operation at the higher frequencies.

On this basis, the principal design problem is to find the optimum dimensions for a coil that, while having its first series resonance approximately midway between 21 and 28 Mc., will also have as much inductance as possible at low frequencies so that the tank current flowing through it at 3.5 Mc. will be as small as possible. A coil having its first series resonance in the right spot was wound in order to try out the method, and operating checks confirmed its practicability.

Optimum Design

A few preliminary trials showed that the low-frequency inductance to be expected would probably be between 70 and 100 microhenrys, when the first series resonance was in the neighborhood of 25 Mc. A rough calculation based on this order of inductance and the r.f. voltage to be expected across it with a 3000-volt plate supply indicated that the wire size should be not smaller than No. 28, to carry the current safely at 3.5 Mc.

A large number of coils was constructed in order to determine the dimensions that would result in the largest low-frequency inductance for a first series resonance near 25 Mc. The various sizes of B & W Miniductor provided a convenient source of low-loss coil material, and a series of tests on chokes made from Miniductor showed that coils having a length/diameter ratio of 4 or 5 to 1 had a good deal more inductance for a given series-resonant frequency than ones wound with the same length of wire to a larger length/diameter ratio. (To a first approximation, the total wire length determines the resonant frequencies.) The smaller L/D ratio also was superior in a second respect — the frequency-spread between the series-resonant frequencies was greater.

These tests showed that, with attention paid to form factor, it was possible to construct a choke having an inductance of approximately 95 μh. and having its first parallel and series resonant frequencies at 14 and 25 Mc., respec-

tively. The second parallel resonance for this type of choke came at approximately 26 Mc. and the second series resonance fell far outside the range of interest. One of these chokes, a 4¼-inch length of B & W 3016, was tested under actual operating conditions in a 3000-volt amplifier. It did an admirable job on all bands, its chief drawback being that it is somewhat difficult to mount. There is also some question as to whether the insulating material would stand up mechanically when exposed to the heat inside a boxed-up amplifier.

Making use of the data that had been accumulated, chokes using wooden, formica, polystyrene and isolantite forms were made up. Any type of test made with the chokes utilizing the wooden and formica forms indicated that these two materials increased the distributed capacitance to an objectionable extent. On the other hand, chokes using space-wound turns on polystyrene rod were comparable ine very respect with their air-wound counterparts. One particular 92-μh. choke, wound with 115 turns of No. 24 d.c.c. to a length of 3¼ inches on a 1-inch diameter poly rod, was also tested in the 3000-volt amplifier and found to be satisfactory. However, it is conceivable that in some installations heat would play havoc with the polystyrene.

The choke shown in the accompanying photograph combines good electrical characteristics with adequate mechanical safeguards. The ceramic form employed does increase the distributed capacitance of the winding, but not so much as to offset the advantages gained by using a form material that is both mechanically and electrically stable at high temperatures. The form is an isolantite stand-off insulator (Centralab type X3022H) measuring 1 by 6 inches. The 3⅞-inch-long winding has 112 turns of No. 26 enameled wire, space-wound (wire diameter), and has an inductance of 78 μh. This size wire can be wound double on the form without much trouble. The only tricky part of the job is removing the spacer wire after the windings have been completed, and even this is not difficult if the windings are tight. The ends of the coil are fastened in place with Scotch electrical tape and the entire coil is coated with several layers of clear plastic spray.

This choke has parallel resonances at 10.8, 25.7 and 34 Mc. and series resonances at 24.6 and close to 34 Mc. Fig. 2 shows how its effective parallel resistance (calculated from *Q*-meter measurements) varies over the 3- to 30-Mc. range. These values represent the loss resistance that the choke adds in parallel with the load resistance of an amplifier. It can be seen that the effective resistance is high even at 27 Mc., which is only 2.4 Mc. away from the series-resonant point at 24.6 Mc. At 21 Mc., on the other side of the series-resonant frequency, the resistance is nearly 0.3 megohm. At all other amateur frequencies the resistance is still higher.

The upper section of Fig. 2 shows the detuning that took place when the r.f. choke was placed in parallel with an oscillating circuit. The positive region indicates that capacitance had to be added, and the negative region

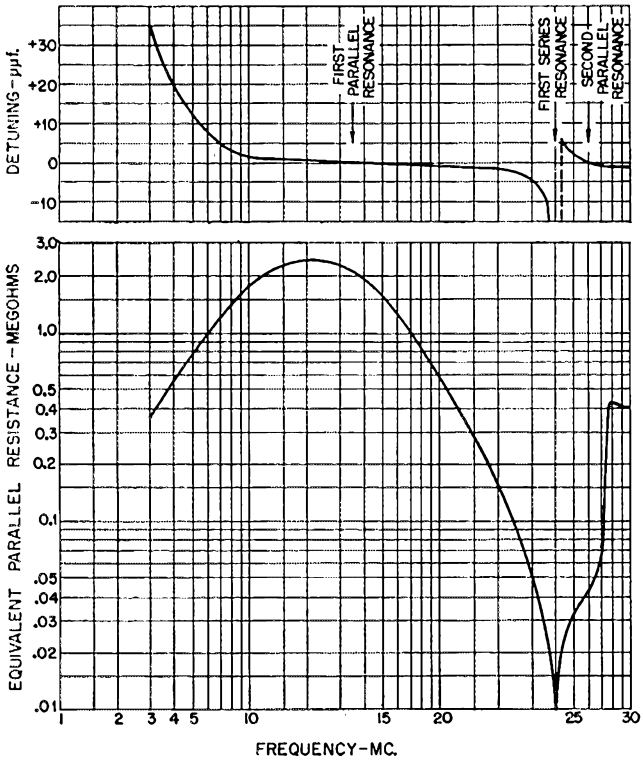


Fig. 2 — Chart (lower section) showing the effective parallel resistance of the 78-μh. choke at frequencies between 3 and 30 Mc. The significance of the "detuning" chart (upper section) is explained in the text.

indicates that capacitance had to be subtracted in order to bring the circuit back to the same frequency when the choke was connected in parallel. In other words, the choke exhibits inductive reactance in those frequency regions where the curve is above the zero axis and is capacitive where the curve is on the negative side. These reactive effects are very small (of the order of a few $\mu\mu$f. plus or minus) at frequencies where the coil is operating well as a choke. The reactance goes through rather rapid fluctuations near the series-resonant frequency; that is, adding the choke to the circuit causes marked detuning near this frequency.

The large plus values of capacitance at the low-frequency end of the range are not associated with self-resonances in the coil but simply represent normal circuit behavior with respect to resonant frequency when two coils are connected in parallel. In this region the "choke" is actually becoming part of the tank circuit inductance, as described earlier. Knowing the inductance of the choke and the inductance of the tank coil across which it is to be connected, the resultant inductance can readily be calculated and the proper capacitance needed for resonance will be determined from the resultant inductance. In circuits designed for operating at a tank Q of 12, the choke inductance can be expected to be at least four times the inductance of the tank coil across which it is connected, so in the worst case the reduction in total tank inductance should not be more than about 20 per cent.

Checking with the Grid-Dip Meter

The choke shown in the photograph was given a thorough test in a Class C amplifier operating with 3000 volts on the plate, at representative frequencies in each of the various amateur bands between 3.5 and 30 Mc. At each frequency the amplifier was run continuously for at least a 20-minute period, it being assumed that this would allow time enough for "hot spots" or other evidence of failure to become evident. In every test it came through with flying colors, showing no more heating than other components in the tank and having no observable effect on the over-all operating efficiency. It may be assumed, therefore, that this approach to the choke question is a useful one, and that it is perfectly practical to build a choke that will operate well over at least an 8 to 1 frequency range provided that

1) There is only one series resonance in the range and it is strategically placed. In the case of the 3.5 – 30-Mc. range the optimum frequency for this resonance is about 25 Mc.

2) The "choke" is allowed to become part of the total tank inductance at the low-frequency end of the range and is treated accordingly in constructing the amplifier. This requires that it be wound with wire of sufficient size on a low-loss form, and that the r.f. path between the choke and tank circuit be kept short — at both ends of the choke.

3) The coil is constructed in such a way as to achieve a high ratio of low-frequency inductance to the frequency of the first series resonance.

The important characteristics of a given coil can be found quite easily with the aid of the grid-dip meter. It is necessary to simulate the conditions under which the choke will operate, and since one end will be at ground potential for r.f. in a normal amplifier, all resonance checks should be made either with the choke mounted in its final position or in a simulated installation made by mounting the choke in a corresponding position on a chassis or flat piece of metal of comparable size. This is indicated

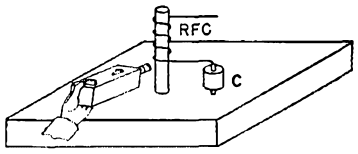


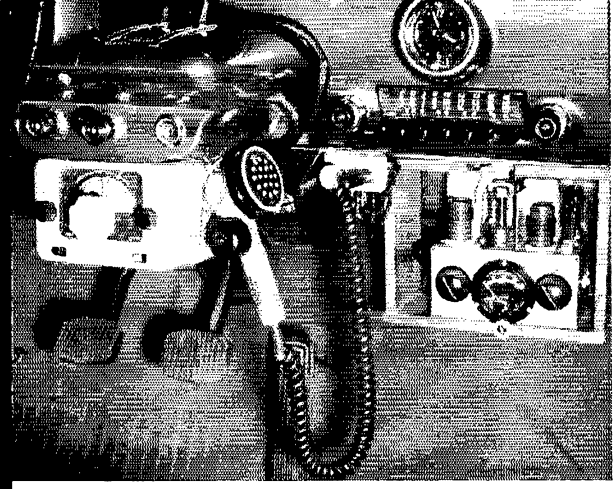
Fig. 3 — The choke and its by-pass capacitor may be mounted on an old chassis for the grid-dip meter tests. The chassis area should be fairly large — say, 10 by 10 inches.

in Fig. 3. Parallel-resonant frequencies will be found with the choke standing in place but with the top or "hot" terminal floating. The series-resonant frequencies can be checked with the choke terminals short-circuited. In either case the bottom end of the choke should be connected to the chassis either directly or through a by-pass condenser.

When making such checks, couple to the bottom of the choke and keep the coupling as loose as possible. Also, keep the metal case of the grid-dip meter as far from the coil as is practical. Any metal near the choke will have some effect on its resonant frequencies, so if the coil is checked on a separate chassis or metal plate a clear space of at least a few inches in all directions should be provided. In making checks for parallel resonance, disconnect all leads from the top end; even a short piece of wire adds considerable "top loading" and will affect the resonant frequencies.

In view of the sensitivity of a coil to the presence of near-by objects in its field, the testing is best done in the final operating position, but the separate chassis is a convenience if several coils are to be tried. In the event that it is used, the choke should be checked again after installation in the actual amplifier, with all components in place but without connecting the hot end to the amplifier circuit.

The low-frequency inductance of coils of the type discussed here — that is, having a diameter of about 1 inch and a length/diameter ratio of 4 or 5 to 1 — can be found with sufficient accuracy by using the common inductance formulas or the ARRL *Lightning Calculator*. The probable inductance values also are within the range of measurement possible by the grid-dip meter method described in the chapter on measurements in the *Handbook*.



"Mighty Mo Senior" sits in a suspended shelf, made of wood, under the dash of W1GAC's car. Its small size (the chassis is 3 by 4 by 6 inches) means that the transmitter can be accommodated in almost any odd space available.

"Mighty Mo" Gets Mightier

More Than Twice the Power in the Same Space

BY GEORGE MOURIDIAN,* W1GAC

• W1GAC's "Mighty Mo" — *QST*, December, 1951 — has grown in power without growing in physical dimensions. Now using a 6146 final amplifier, the midget mobile operates at Class C plate inputs as high as 40 watts.

THE 75- and 20-meter bands are a little more crowded now than they were in the days when our original "Mighty Mo" poked its 20-watt mobile signal into the 1950- and 1951-type QRM and was written up in the December, 1951, issue of *QST*.[1]

With the initiation of the beardless youths (and the trim young YLs) holding General Class tickets into the select circle of mike addicts on 75 and 20, we have felt the need to pack a little more punch in the handy little three-band gadget mounted under the dash of our Mercury.

Because many amateurs have felt that this is a practical rig for the average mobilist — easy to build and, of course, inexpensive — we've been asked frequently for the details. Here they are:

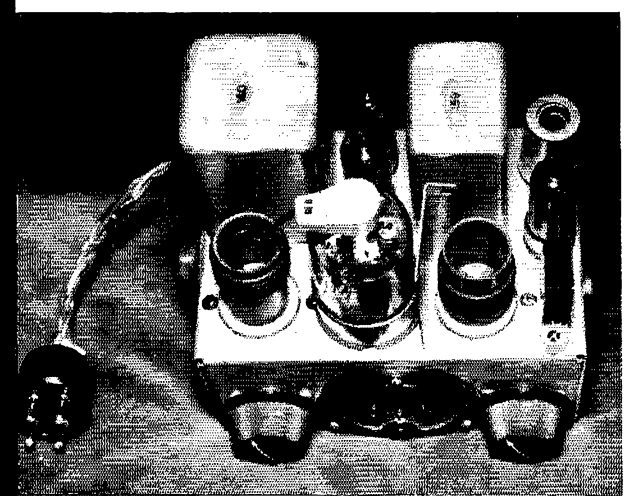
Transforming the "Mighty Mo" into the "Mighty Mo Senior" on the same 3 × 4 × 6-inch chassis size, we swapped the original triode 6C4 crystal oscillator for a 6BF5. The 6BF5 now drives a 6146 instead of the original 2E26 as an amplifier on 75 and 20 meters and as a doubler on 10 meters. We still use 20-meter crystals for the last two bands.

In the speech department, we inserted a 6AK5 speech amplifier into the back of the chassis (in place of the original 9003) along with two 6BF5 modulators. The microphone current is taken from the two modulator cathodes.

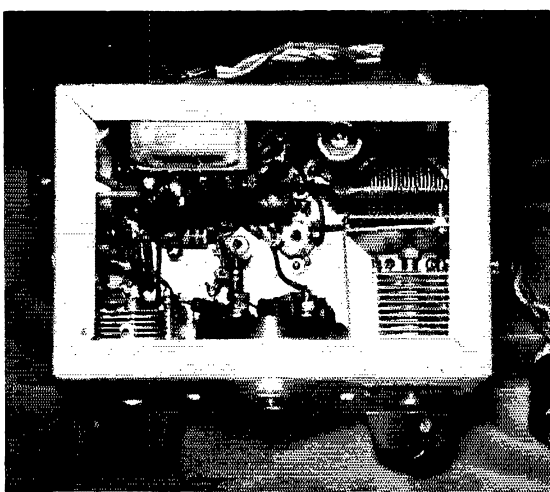
*1124 Concord St., Framingham, Mass.

[1] "Mighty Mo," p. 34, Dec., 1951, *QST*.

The chassis layout is straightforward. The oscillator tube, crystal and coil are at the right front, with the 6146 amplifier and output coil at the left. The tube at the rear right is the speech amplifier. The modulator tubes and transformers occupy the remainder of the space at the rear of the chassis.



In this bottom view the oscillator tank condenser is at the left and the amplifier condenser, enclosed in a folded shield, at the right. C_3, for adjusting loading, is at the upper right. The control on the left-hand chassis wall is for audio gain; the microphone jack is just below it and the mike transformer is to the right.



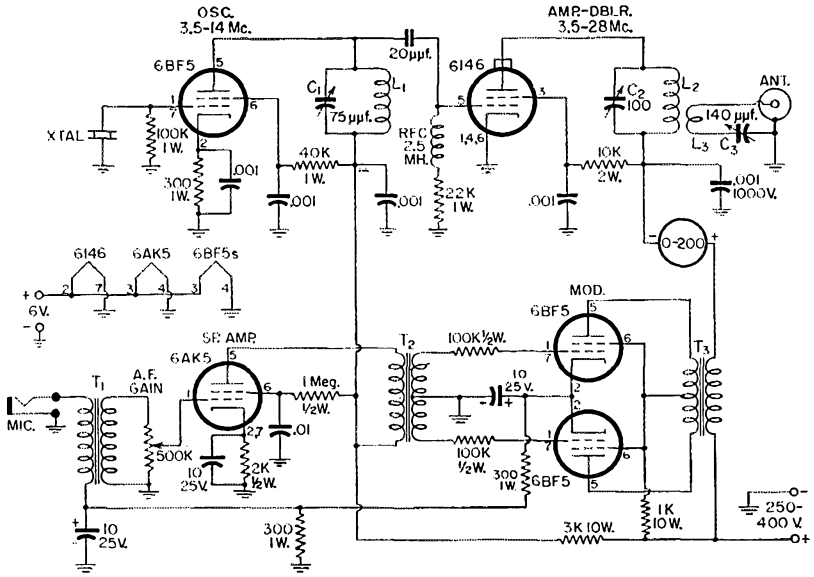


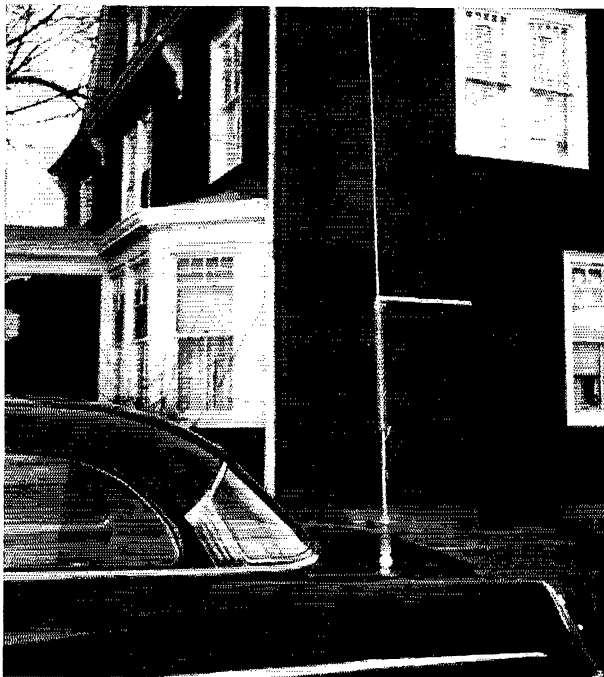
Fig. 1 — Circuit diagram of "Mighty Mo Senior." Capacitances are in μf. except where specified otherwise.

C_1 — 75-μμf. midget variable.
C_2 — 100-μμf. midget variable.
C_3 — 140-μμf. air-padder type variable.
L_1 — 4 Mc.: 35 turns No. 22 enamel on 1-inch form. 14 and 28 Mc.: 10 t. No. 18 d.c.c., 1-inch form.
L_2 — 4 Mc.: 35 turns No. 22 enamel on 1-inch form. 14 Mc.: 10 turns No. 18 d.c.c. on 1-inch form. 28 Mc.: 5 turns No. 18 d.c.c. on 1-inch form.
L_3 — 4 Mc.: 8 turns No. 18 d.c.c. inside L_2. 14 and 28 Mc.: 3 turns No. 18 d.c.c. inside L_2.
T_1 — Microphone transformer.
T_2 — Interstage audio, single-ended to push-pull.
T_3 — Modulation transformer, approx. 10,000 ohms (plate-to-plate) to 3000 ohms.
T_1 and T_2 are surplus transformers from SCR-522.

For the power supply, we mounted in the firewall a Carter dynamotor, having nominal ratings of 400 volts at 300 ma., in place of the single vibrator from which the original "Mighty Mo" used to draw its power. Now we have a power input of 40 watts in the same tiny chassis.

We mounted a Premax antenna on the rear deck of the car with the stub (cut in half) between the loading coil and the spring. Turns can be added on the bottom of the loading coil to make up the resonant frequency. A clip with a piece of ground strap over the loading coil is used to hop from the high end to the low end of the 75-meter band.

The final plate meter should read 170 ma., off resonance. The no-load plate current is around 5 or 10 ma. With the antenna loaded properly, the current should dip to 100 to 130 ma., depending on the plate-supply regulation, for 40 watts input.



The antenna installation is similar to the one used originally but now includes a piece of ground strap that can be clipped on for shifting to a lower frequency in the 75-meter band. The length of the strap is adjusted to provide the capacity loading required to give the desired frequency change.

HAMFEST CALENDAR

ALABAMA — On Sunday, May 30th, the Amateur Radio Club of Mobile will hold a Hamfest at Grandview Park, Mobile, Ala. No registration fee. For other info contact A.R.C.M., P. O. Box 4422, Mobile.

ALABAMA — The Birmingham Amateur Radio Club will have a sectional organizational meeting and Hamfest on May 16th. The Roebuck Community Center is the site and a good dinner is planned. Inquiries for tickets may be directed to W4EBD.

ILLINOIS — May 23rd, third annual Mississippi Valley Hamfest at Rock Island County Conservation Grounds on Big Island, Millan, Ill. Plenty of good fun and food for OMs, YLs, XYLs and harmonics. Tickets are $1.25 advance registration or $1.75 at the gate. For advance registrations write Robert Hutchins, W9OXA, Preemption, Ill., before May 16th.

ILLINOIS — The Starved Rock Radio Club Hamfest will be held June 6th at Boy Scout Camp Ki-Shau-Wau, the same place as last year. Follow "Hamfest" signs south from junction of Illinois routes 178 and 71 near Starved Rock State Park. Persons traveling Route 51 turn east at Tonica, follow blacktop road. Watch for big "Hamfest" signs. This is the 20th year of affiliation with ARRL and we plan to make this hamfest the most entertaining ever. There will be games, contests and entertainment for all. The ever-popular SRRC Trading Post again will be in operation. No charge is made for gear disposed of. Free coffee and doughnuts from 10:00 A.M. until 10:30 A.M. Registration $1.00 in advance, $1.50 at the gate. Mail advance registration requests on or before May 25th to Starved Rock Radio Club, W9MKS, Utica, Illinois.

KANSAS — The Central Kansas Radio Club of Salina, Kans., is having its sixth annual Hamfest June 6th at Salina. The location is Kenwood Park, and there will be transmitters on 10 and 75 meters for those mobiles who would like directions. For information write WØILB, 826 Merrill St., Salina, Kans. Registration fee is 75 cents per couple.

KANSAS — The sixth annual Radio Amateur Picnic (better known as Christy's Picnic) will be held at Osage City, Kans., on Sunday, May 23rd. This is the earliest large-scale radio ham get-together in this section of the state. Registration is 50 cents. For other info, contact WØMDL.

MAINE — The Androscoggin Amateur Radio Association will hold its third annual Hamfest at the Sons of Italy Club Rooms at Lewiston, Me., on June 20th.

MISSOURI — The Ham Butchers 40-Meter Net Picnic will be held at the Eldon city park on May 30th and 31st. All hams, XYLs and YLs are invited. Special entertainment will be provided. Cabins available at $2.00 to $4.00 per person. Reservations may be obtained from Paul M. Cooper, WØTGG, and should be accompanied by cash payment.

MISSOURI — The eighth annual Missouri Emergency Net Picnic is to be held in Kansas City at Swope Park, Shelter House 8, on June 6th. Basket-style lunch. Free refreshments and entertainment. Stand-by mobiles to guide you in. Everyone invited. Registration, $1.00. For further info contact Paul M. Cooper, WØTGG.

MISSOURI — Greater St. Louis Radio Amateurs annual Hamfest, May 23rd. Attendance awards, games, entertainment for adults and children. Refreshments obtainable on grounds. Admission: adults, $1.00; children, free. Mollerus' Grove, Highway 66 (near Chain of Rocks Bridge), St. Louis County.

NEW YORK — Rochester again will be the headquarters for the Western New York Hamfest on Saturday, May 15th, at the Doud American Legion Post on Buffalo Rd., Rochester, New York. Program includes mobile contest, DX forum, v.h.f. talk, code-speed contest, hi-fi recording demonstration, civil defense meeting, and many other features. Registration starts at 1 P.M. and closes at 5:30 P.M. Dinner at 7 P.M., $3.75 per person. R.A.R.A., P.O. Box 1388, Rochester, N. Y.

OKLAHOMA — The Northfork Amateur Radio Club is holding its annual Hamfest and Picnic at Quartz Mountain State Park, June 12th and 13th. Lots of fun in store for those who attend. Reservations to be sent to Elmer Triplett, Secy., N.A.R.C., Sayre, Okla.

PENNSYLVANIA — The Western Pennsylvania Emergency Net will have a Hamfest at the Lodge-North Park, Pittsburgh, Penna., on Sunday, May 23rd. No registration fee, but voluntary contributions will be accepted. Picnic baskets are advised, and plenty of room is available, indoors or out, for family picnics. Free coffee served all day. Registration opens at noon and activities conclude at dark. Rag-chewing goes on as long as you want. Activities are being planned by a special committee.

SASKATCHEWAN — The Moose Jaw Amateur Radio Club will hold the annual Saskatchewan Hamfest at the Moose Jaw Legion Hall on May 24th. There will be an ARRL and an S.A.R.L. meeting, a program for the ladies, transmitter hunt, Gus Memorial, demonstration of equipment and a liars' contest. The club transmitter, VE5MA, will be on 3780 kc. For preregistration accommodations and information, contact Bill McKay, VE5WM, McKay Radio Service, 954 Montgomery St., Moose Jaw, Sask.

TEXAS — The Kerrville Radio Club will be host for the South Texas Emergency Network Convention on May 29th and 30th. General chairman is Morley Bartholomew, W5QDX, Austin, Tex.

WISCONSIN — Saturday, May 8th, at the Youth Building, Wausau — annual Hamfest of the Wisconsin Valley Radio Association, Inc. Scheduled for the afternoon is a meeting of the Wisconsin Council of Radio Clubs delegates at 1 P.M., followed by a Wisconsin Section meeting of appointees and net members at 3 P.M. Starting at 6 P.M., a well-rounded program has been arranged featuring an excellent banquet, entertainment, and awards. YLs and XYLs are invited to attend. Transmitters on 3950 kc. and 29,620 kc. will be on the lookout for incoming mobiles. Please make reservations in advance. Tickets, $3.00, available from Dennis Shawl, W9PBB, 809 Adams St., Wausau.

A.R.R.L. ROCKY MOUNTAIN DIVISION CONVENTION

Estes Park, Colo. — June 12 - 13, 1954

The ARRL Rocky Mountain Division Convention, sponsored by the Denver Radio Club, will be held at Elkhorn Lodge, Estes Park, Colorado, on June 12 and 13, 1954.

The program will consist of a well-rounded series of technical talks, entertainment for both OMs and YLs, transmitter hunts on 75 and 10 meters, awards and exhibits. Banquets will be held both Saturday night and Sunday afternoon.

Elkhorn Lodge is situated in the heart of the Rockies near one of the nation's best-known mountain playgrounds, Rocky Mountain National Park. This scenic wonderland is best known for its unspoiled wildlife and wonderful views of high snow-capped mountains. It also offers visitors a variety of outdoor sports, including fishing and mountain climbing. The area can be reached by the finest of highways.

Registration is $2.50 per person until June 4th, and $3.50 thereafter. Rooms with private bath, including Sunday morning breakfast, $4.50 per person. Cottages with shared bath, including breakfast, $3.50 per person. Saturday night banquet is $2.50 per person and Sunday banquet is $3.50 per person. Room assignments will be made in the order received. Send your registration and requests for reservations to Walt Reed, WØWRO, 1355 East Amherst Circle, Denver 10, Colorado.

COMING A.R.R.L. CONVENTIONS

June 6th — Southeastern Division, Atlanta
June 12th-13th — Rocky Mountain Division, Denver
June 26th-27th — Oregon State, Klamath Falls
July 3rd-5th — Pacific Division, San Jose
Oct. 2nd-3rd — West Gulf Division, Kerrville, Texas

Some Principles of Radiotelephony

PART I — *Plain Talk About A.M. Fundamentals*

BY BYRON GOODMAN,* W1DX

ACTUALLY the basic principles of radiotelephony are not complicated. At least they are no more so than most other phases of radio that we amateurs are interested in. Why so many misconceptions about radiotelephony should have developed through the years is only a matter for conjecture, but surely much of it can be attributed to a lack of knowledge of fundamentals.

Some (or all) of the information in this article may not be new to you. It is being included so that a complete picture can be presented, and the only assumption we'll make is that you have passed an exam or have hopes along that line.

Sound

Everyone knows that he "hears" with his ears. If questioned further, he might add that what he hears with his ears is "sound." If he remembers some of his high-school physics, he can tell you that "sounds" are vibrations in the air caused by any of a myriad of sources. The only requirement of a sound-generating source is that it be able to transfer a vibration to the air (or other medium, since sound can travel through gases and most liquids and solids). Vibrations of less than about 20 cycles per second are "felt" rather than heard — examples are the rumblings of passing trucks or trains sometimes felt through the floor or earth, or the blast from an explosion. The average person can "hear" as high as 12,000 or 15,000 cycles per second, with a few capable of hearing up to 20,000 or above. Many animals can hear much higher than this. The important thing to remember is that sound is a mechanical vibration transmitted through gases, solids and liquids — our inability to hear it doesn't make it something else, although sounds outside the normal hearing range are usually called "sub sonic" or "super sonic."

Various sounds have two basic properties that enable us, through our hearing, to distinguish them from others. These basic properties are the *pitch* (or frequency) and the *amplitude*. For example, our ears can tell us when different keys are hit on a piano (different pitches or frequencies), or when the same key is hit harder or softer (different amplitude or loudness).

It is relatively rare to encounter a sound that is a single frequency — most of them will contain several frequencies. The piano notes mentioned above, for example, do not consist of a single frequency, and that is true of most musical instruments. Instead, a single musical note will be made up of a predominant frequency plus several others of lesser amplitude. The same note (predominant frequency) played on another instrument will sound different because the amplitudes of the lesser-amplitude frequencies will be different than for the piano. Sounds that are made up of more than one frequency are called "complex," in contrast to a single, or "pure," frequency. The "voice" sounds are quite complex, and are always made up of at least two or three frequencies at any instant. The closest we can come to a pure frequency is in whistling, and even then it isn't too close to pure.

In a wonderful manner that has never been duplicated mechanically, we generate voice sounds through complex control of muscles and air in the throat, and transfer the vibrations (variations in air pressure) to the air just outside of the mouth.

Telephony

The DX limitations of the human voice were recognized some time ago, and several methods have been devised for increasing the range of communication by sound. One method is to "can" it on a solid of some kind, carry it bodily to the distant point, and by some means get it out of the "can." Examples of this are the phonograph and tape and wire recordings — they work, but a significant time delay is involved.

A much faster approach is to use a direct link of some kind between the speaker and the listener. The simplest answer to this is the familiar "tin-can telephone" that children make with two tin cans and a long piece of string. Here the vibrations of the speaker's voice strike the tin can and make it vibrate the same way. This vibration is transmitted directly to the string, which in turn vibrates the tin can at the listener's ear. That tin can then vibrates the air around it, and the sound travels a short distance through the air to the listener's ear. The tin-can telephone has distinct DX limitations, and is not offered as a substitute for the electric telephone.

The telephone we use every day starts out like the tin-can telephone, in that the speaker's voice vibrates a thin plate called a "diaphragm"

• Here's some "down-to-earth" talk about the whys and why-nots of a.m. radiotelephony. Reading it won't make you an expert on single-sideband (sidebands aren't even mentioned) or even the Einstein Unified-Field theory, but it will give you a clearer picture of some aspects of a.m. and basic electricity, if you are a little hazy in that department.

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that is mounted in the "microphone" you speak into. These vibrations are transformed into similar variations in an electric current. In other words, if at some instant your speech consists of a 500-cycle and a 1500-cycle tone, the current through the microphone varies at the same rate and in the same proportionate amplitudes. This electric current passes along wires to the listener's "headphone" or "receiver," where it is used to vibrate another diaphragm.

At first glance it would seem that there isn't much basic difference between the tin-can telephone and the electrical telephone (there are obvious physical differences). But there is, and it is a big difference. In the tin-can telephone we always worked with sound, although it went from sound in air to sound in a solid and back to sound in air again. In the electric telephone we went from sound in air to *electricity in wires* and then back to sound in air. In other words, to be able to duplicate the speaker's sounds at a far

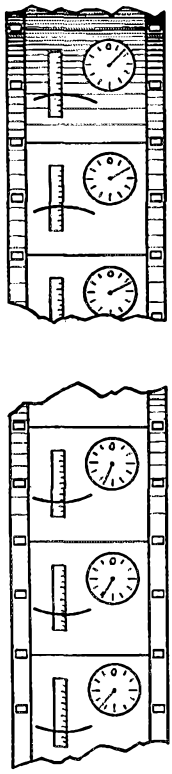


Fig. 1 — Sections of a high-speed movie taken of microphone-diaphragm positions, with a high-speed clock in the background for timing. (The time could also be established by the film frame.) Adjacent film frames show very little change, because the pictures are taken at high speed. Other sections, taken when the diaphragm is moving fastest, would show more change in the diaphragm from frame to frame.

point we had to make an electrical current vary in the same way that the air pressure was varying at the speaker's mouth, and then re-create these air-pressure variations near the listener's ear. It is possible to substitute a beam of light or heat (or radio) for the wires, and thus "transmit" sound over these links. But always bear in mind that the sound itself is not transmitted — it is translated into similar variations in the link medium and then translated back into sound at the far end. You can't "hear" 60-cycle house-wiring electricity — you can hear a 60-cycle "hum" if the electrical variations can be translated into mechanical vibrations.

Radiotelephony

Before we settle down to a close look at radiotelephony, let's draw a picture or two. Suppose we could take some slow-motion movies of a microphone diaphragm. The movies would have to be taken through a microscope, because when the diaphragm is made to vibrate by sound hitting it, the diaphragm doesn't move very far. But to enable us to see how far the diaphragm does move, let's assume our movie is taken against a small scale graduated in ten-thousandths of an inch. And just to make everything still more scientific, let's put a clock in the picture, a special clock that shows hundred-thousandths of a second. Two random sections from the film might look as in Fig. 1 — only the clock hand seems to move in *adjacent* frames. However, when any such slow-motion movies are projected, we will see the diaphragm lazily moving back and forth as sound hits it.

Finally, let's take two movies — one with sound that is a pure (single) frequency of 1000 cycles per second, and another with a complex sound like a voice syllable. When we project these movies, the one using the 1000-cycle pure sound will show us a diaphragm moving back and forth at a regular rate. It will look just like a rope being twirled by two children for rope-jumping — viewing the rope from the side (and without 3-D) it looks like the rope is moving up and down. It moves most at the center and least at the edges.

The other movie, the one with the complex sound, will show the diaphragm moving in a crazy sort of way. It will start down, back up a little, go down more, back up, and so on. However, if we watch it long enough we might detect a regular repeating pattern.

Now suppose that, having nothing better to do, we take the movies frame by frame and make a tabulation of diaphragm position (in ten-thousandths of an inch above or below the resting point) and the corresponding time as indicated by the clock in that particular frame. Some weeks later, when we've finished the job, we can then transfer these values to a chart. The charts will look like Fig. 2, if we've done our work accurately. But, you say, those curves don't show the individual points — they're drawn as lines. No, the points are there, but they're so close together the ink ran a little and made lines.

If your high-school physics is still coming back, you will recall that the shape of the curve in Fig. 2A is called a "sine wave." This term "sine wave" is one you will hear kicked around in radio and electricity a lot, so just remember how you arrived at it, by plotting the excursions of a diaphragm driven by a single frequency (or the excursions of a rotated rope as viewed from the side). One cycle of this particular sine wave (a cycle is the complete action that keeps repeating) takes 0.001 second — this time is called the "period." Dividing the period into 1 gives the "frequency" ($1 \div 0.001 = 1000$ cycles per

second) and, conversely, dividing the frequency into 1 gives the period ($1 \div 1000 = 0.001$ second). You'll be talking "frequency" in radio,

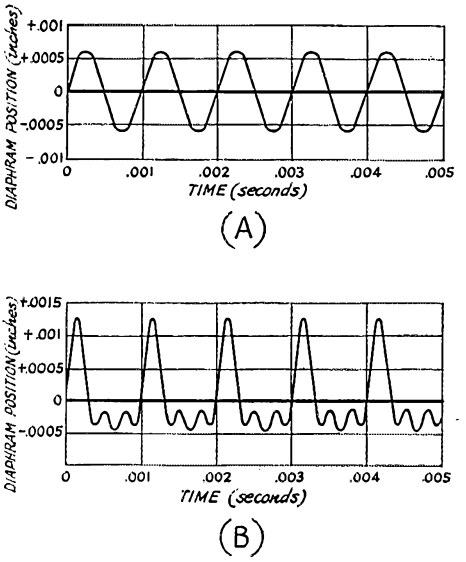


Fig. 2 — Hypothetical plots of microphone-diaphragm positions *vs.* time, as taken from a slow-motion movie.
(A) A single audio frequency (rare in nature).
(B) A more likely "complex" signal.

so you don't have to remember that stuff about "period."

About the only thing you can say for the complex wave in Fig. 2B is that it's a peculiar shape. But wait a minute — there are a couple of significant points. For example, it repeats itself every 0.001 second, so its predominant frequency (actually its lowest, or "fundamental," frequency) must be 1000 cycles. And the diaphragm moves farther in the "+" direction than it does in the "—" — how can that be? Any complex wave can do that, but if you examine it carefully you will find that the *area* above the "0" line is the same as the *area* below. This has to be true of any complex wave like this — the *average* excursions either side of the mean must be equal, although the *peak* excursions may be unequal. Don't ever forget this point about the average of any waveform — if it isn't the same above and below the mean, something has been added. (We'll run into that something later on.)

By now it has probably occurred to you that if we were to plot the current through the microphone that we used in the movies, a plot of the current would look just like Fig. 2A, except that the vertical scale would read "Current (amperes)" instead of "Diaphragm Position." Of course the scale (numbers) might be wrong, but that's all relative and doesn't change the shape of the curves at all. Notice that the current would be increasing or decreasing about some value (marked "0" in the sketches) — this value is called the "d.c. (direct current) component," since it is the steady value about which the changing value, or "alternating current" (a.c.), swings. It is the steady value that would be read by a d.c. milliammeter, since the needle wouldn't be able to follow the rapid current changes. If this "a.c. + d.c. signal" is fed to a transformer- or capacitor-coupled circuit, only the variations can get through, and we will have removed the d.c. component. Carbon microphones give an output that has a d.c. component, while crystal or dynamic microphones give an a.c. output with no d.c. component. It makes no difference, of course — you're only interested in the variations (a.c.). Fig. 3 illustrates this point.

Thus far we have an electrical current, or signal, that follows the diaphragm variations which, in turn, are following the air-pressure variations that we call "sound." Our next problem is to get it to some distant point by radio, and this you can already guess about. We will take our radio transmitter and turn it on, so that we have a steady flow of power from the antenna and (we hope!) through space to the receiving antenna. To the receiving antenna we connect a radio receiver, a device of

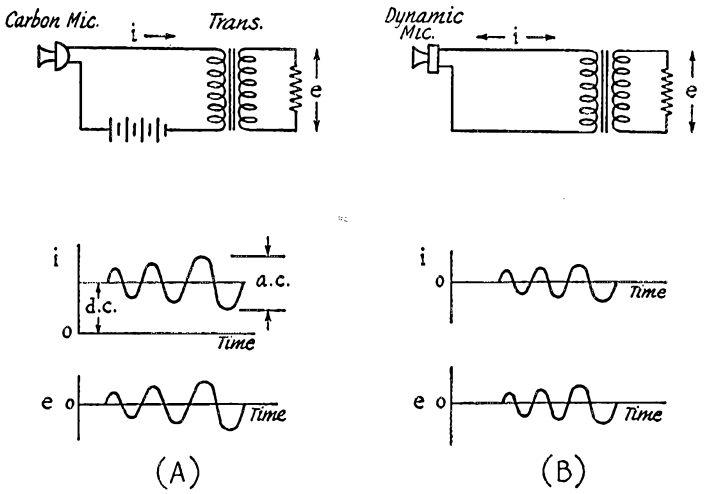


Fig. 3 — Illustrating the presence of a d.c. component in the current through a carbon microphone (A) and the lack of it through a dynamic microphone (B). In either case, the resultant output after transformer coupling is the same.
The carbon microphone controls the flow of battery current in (A), while the dynamic microphone generates its own alternating current (B). The permanent-magnet field of the dynamic microphone might be considered to be the d.c. component in the latter case, although it isn't obvious. If the dynamic microphone had no permanent magnetic field, it could generate no output.

some kind that responds to radio-frequency energy. For convenience right now, let's think of the receiver as something that gives, say, one volt of d.c. output for a given radio signal. This receiver has an electrical output proportional to the amplitude of the radio signal, so if we double the amplitude of the signal that gave one volt output, we will have two volts output. And, of course, no signal gives no output. Thus the receiver output is proportional to the signal coming from the transmitter, if all other things remain constant (no fading over the radio path).

Now we take a "modulator" and connect it to the transmitter. This modulator has the ability to control the transmitter output in accordance with an a.c. signal fed to the modulator. If we take the signal of Fig. 2A and feed it

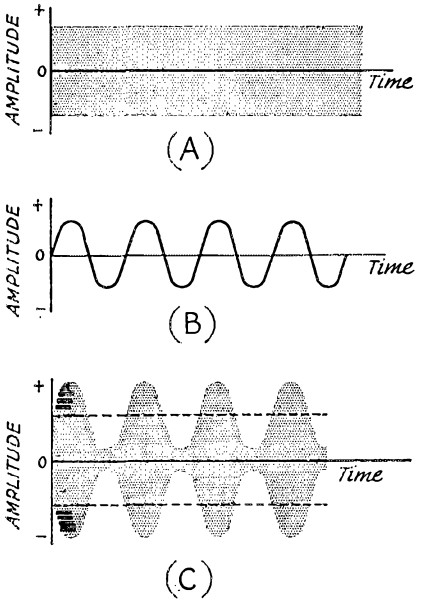


Fig. 4 — (A) Plot of a constant-amplitude radio-frequency signal *vs.* time. Because the time interval is long, individual cycles are hard to see. If the sketch could be expanded along the "Time" axis, the cycles would have the same shape as in Fig. 2A.
(B) A single audio frequency plotted to the same "Time" scale as Fig. 4A.
(C) When the audio frequency of Fig. 4B is used to control the amplitude of the r.f. in Fig. 4A, the resultant would look like this.

to the modulator, the transmitter output will increase and decrease about its steady value in just the way that the signal (and also the microphone-diaphragm position) did. If we use the signal of Fig. 2B, the same thing will happen, and the transmitter output will vary in this more complex manner.

Since the output from the receiver is proportional to the transmitter output, it's easy to see that we now have a signal at the receiver that varies like the transmitter (and the microphone diaphragm). All we have to do is take the electrical signal at the receiver, feed it into a headphone (or loudspeaker), and the diaphragm there will re-create the sound that was striking the microphone diaphragm. In the earlier paragraph the receiver output was called "d.c.," but it should be apparent that if this d.c. changes, as a result of the changing signal, it becomes the "a.c. + d.c." signal mentioned earlier. If the headphones are connected to the receiver output through a transformer, the diaphragm responds only to the a.c., which is all we're interested in anyway.

This process of radiotelephony is called "amplitude modulation," and its derivation is obvious: we are changing, or "modulating," the *amplitude* of the radio signal. There are other methods of using a radio link for reproducing sound (f.m. or "frequency" modulation, and p.m. or "phase" modulation), but amplitude modulation ("a.m.") is the most common.

Incidentally, that steady value of transmitter output we have when no modulation is present is, unfortunately, called the "carrier." This leads some people to think that it "carries" the sound, which of course it doesn't. It is there to give an operating point about which the amplitude can swing. Many amateurs wonder why the carrier is required at all, and some of them "invent" ingenious ways for doing without it, but the sad fact is that it *must* be there when the modulation takes place, and it must be there again at the receiver when "detection" takes place. In between we can sometimes do without it, but that's another story.

Perhaps you have been wondering why we don't just connect the transmitting antenna to the microphone output, and use the voice-controlled electrical current to jump through space to the receiver. This would be a very convenient way to do it, but the trouble there is that electrical currents at audio frequencies don't travel far through space, and higher-frequency ("*radio*-frequency") currents are required.

To review this business a little, let's draw a picture of the r.f. we've been talking about. Fig. 4 illustrates a few of the points. For simplicity, only the single-frequency modulation case is used, but it should be remembered that in practice a voice signal is always complex. However, the single-frequency case is easier to talk about, and everything that is said about it applies in the same way to the complex case.

The unmodulated r.f. is shown in Fig. 4A. Although it is a sine wave like Fig. 2A, the frequency is so high that the cycles are crowded close together and you can't distinguish them when they're drawn to this scale. Fig. 4B is a duplicate of Fig. 2A — it represents the single-frequency modulating signal. When it is applied to the modulator, the modulator varies the output of the transmitter accordingly, and the resultant r.f. output is as in Fig. 4C. The dashed lines represent the no-modulation, or carrier, level, about which the output varies. You have heard, or certainly will hear, about "percentage of modulation." This is a percentage of the available carrier that is modulated or changed. If, for example, the sketch of Fig. 4C showed the

amplitude at times being reduced to zero instead of not quite reaching zero as shown, it would be said to represent "100 per cent modulation." Since the headphones at the receiver are respond-

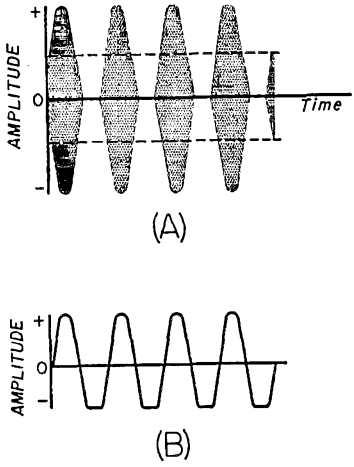


Fig. 5 — If the audio signal of Fig. 4B is used to control the r.f. signal of Fig. 4A beyond its capabilities, the result is as (A). This is called "overmodulation." (B) The audio output of a receiver receiving this signal would be "distorted" in this manner.

ing to the *changes* in transmitter output, it is apparent that a high percentage of modulation, for any given carrier, will give a receiver headphone (or loudspeaker) output of greater amplitude. This, of course, is why you hear so much concern expressed over one's "percentage of modulation" — to make maximum use of the available carrier amplitude, the modulation percentage must be kept high.

But "percentage of modulation" is somewhat meaningless except for the maximum-amplitude components of speech, because obviously with one's voice varying in amplitude from syllable to syllable, only the highest-amplitude components should modulate the rig 100 per cent.

"But," you ask, "if I talk still louder, won't the output of the transmitter increase even more?" Good question, and the answer is "Yes." But let's take a closer look at what happens, and get the whole story. To simplify things, let's say you're talking with a sine wave, although we know you won't be. If we apply enough sine-wave signal to the modulator, the transmitter output might look like Fig. 5A. Assuming a good transmitter capable of this, the output does increase on half of the audio cycle, and the increased-output swings do go right on up. But since we can't go below zero output, the decreased-swings flatten off, as shown. The receiver output would look like Fig. 5B, and you can see that the resultant audio signal is not the same as the original (Fig. 4B) — the bottoms are flat, and the signal is said to be "distorted." In actual practice, a little distortion like this isn't too bad, and only a trained ear would notice much difference when listening to something like Fig. 4B or Fig. 5B. But for reasons that won't be taken up now, the transmitter signal of Fig. 5A requires a wider band of radio frequencies for its transmission than does that of Fig. 4C. It is said to "splatter," and these splattering signals interfere in adjacent radio channels that would otherwise be clear. It is easy to see that "overmodulated" signals like this would be undesirable in a crowded amateur band. And even though the receiving operator might not notice the distortion, overmodulated signals are illegal by FCC rule because they interfere unnecessarily with adjacent-channel signals. It is important to remember that one cannot be certain of overmodulation when listening "on" the signal (any distortion present might be a result of other causes, or the operator might not be able to hear the distortion). The only check for overmodulation (lacking an oscilloscope properly connected in the receiver) is to listen "off" the signal for "splatter," with a selective receiver that isn't overloading.

An interesting point is the fact that the percentage of modulation is not always the same for positive peaks (increased output) and negative peaks (decreased output). Referring back to the voice signal of Fig. 2B, you will recall that it swings upward more than downward (for reasons given when it was described). If this signal is fed to the modulator, the transmitter output could instantaneously increase more than it decreased, or the converse could be true, depending

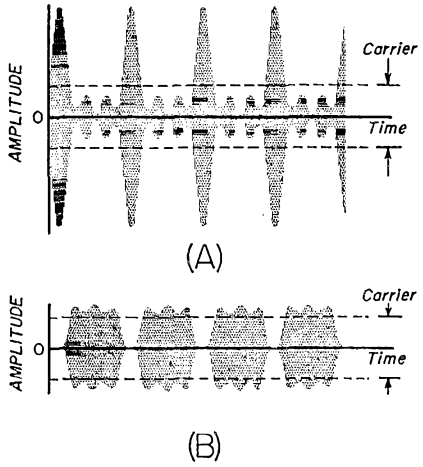


Fig. 6 — Showing how positive peaks can exceed 100 per cent modulation. In each case above, the modulating signal is similar to that of Fig. 2B. In (A) the positive peaks rise well above the 100 per cent modulation. In (B) the polarity of the modulating signal is reversed, and it is obvious that the positive peaks cannot now go to 100 per cent modulation without overmodulation on the negative peaks.

upon how we connected the modulator. Thus in practice we can exceed 100 per cent modulation on positive peaks without distortion, but we can never exceed 100 per cent modulation on negative peaks without running into distortion and splatter. This is illustrated in Fig. 6.

[*Part II of this article will appear in a subsequent issue.* – ED.]

Hints and Kinks For the Experimenter

TEST-LEAD STORAGE

After construction of a v.t.v.m. had been completed, storage of the three test leads presented a problem. They did not lend themselves to being wrapped around the case or to being jammed under the handle. The usual stunt of providing holding clamps at the rear of the meter was not favored because of the long plastic handles on the leads.

The idea finally settled upon is depicted in the accompanying photograph. The 2 × 4 × 4-inch

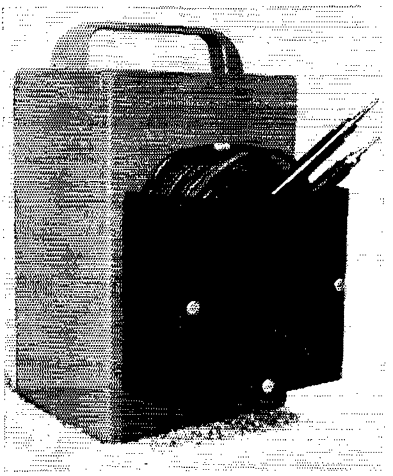


Fig. 1 — A utility box can be used to good advantage as the storage bin for V.T.V.M. test leads as shown in this assembly.

utility box has one end removed and is held to the back of the v.t.v.m. by means of self-tapping screws.

An added advantage to the set-up shown is that the meter can be tilted back so that it rests on the lower rear edges of both the meter and the storage bin. In this position, it is an easy matter to watch the meter while testing. Actual positioning can be left to the discretion of the individual — the box can be fastened flush with the bottom of the meter case or farther up to give an extreme angle of tilt.

— *James E. Brugh*

I.F. TRANSFORMER FOR THE "GOOD FOUR-TUBE SUPERHET"

Many amateurs interested in building Goodman's two-band four-tube superhet[1, 2] have encountered difficulty in locating a Millen type 62161 i.f. transformer for the receiver. Inasmuch as the transformer is a 1700-kc. job, it has not been easy to solve the problem by turning to the *exact replacement* chart of another manufacturer. However, the situation can be simply and inexpensively handled by utilizing two Carron type S-398 wavetraps as the substitute for T_1.

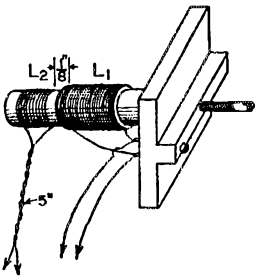


Fig. 2 — Drawing of a Carron wavetrap modified for use in the "Good Four-Tube Superhet." L_1 is the original trap winding and L_2 is the 10-turn coil discussed below.

Figs. 2 and 3 show how the wavetraps and the receiver circuitry are modified.

After disassembling each trap, lay 10 close-wound turns of No. 28 enameled over the vacant space at the bottom of each form. Leave a 1/8-inch space between the new and the original windings, allow 5 inches of lead length to remain and then dope the 10-turn coils in place. It is not necessary to alter the original windings for the traps because these tune to 1700 kc. as is. Fig. 2 shows a revamped assembly. Before the units are reassembled, provide a feed-through hole at the top of one of the shield cans for the lead which will run between the secondary coil and the grid cap at the top of the 6K8.

A partial schematic of the receiver, Fig. 3, shows the i.f. stage with the substitute coupling

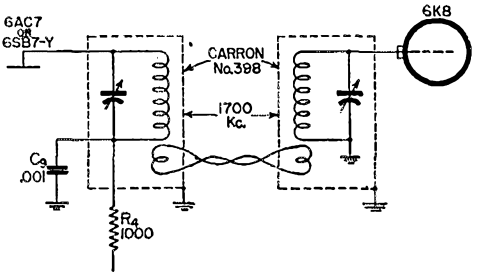


Fig. 3 — Partial diagram of Goodman's receiver showing the i.f. stage modification recommended by W2VSX.

system wired in place. Notice that link coupling is used between the 10-turn coils of the primary and secondary sections of the transformer. Installation of the modified Carron circuits requires no changes in the rest of the receiver.

— *Adelbert Kelley, W2VSX*

[1] Goodman, "A Good Four-Tube Superhet," *QST*, January, 1953.

[2] Goodman, "Some Notes on Improving Small-Receiver Performance," *QST*, December, 1953.

Coupling to Coaxial Lines

FIG. 1 is a circuit often used for coupling the output of an amplifier to a coaxial line, C_1L_1 being the usual plate tank circuit and C_2L_2 a series-resonant circuit having R, the

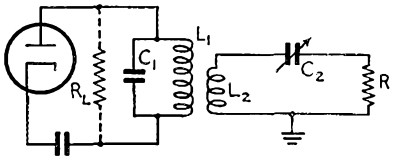


Fig. 1 — Series-tuned coupling circuit for coaxial lines operating at a low standing-wave ratio.

characteristic resistance of the line, as its load. The coupling reflects an equivalent resistance, R_L, across the plate tank circuit; thus R_L is the load "seen" by the tube.

The Q of the tank or primary circuit is

$$Q_1 = \frac{R_L}{2\pi f L_1}$$

when C_1L_1 is resonant at the operating frequency. If C_2L_2 also is tuned to resonance, its Q is

$$Q_2 = \frac{2\pi f L_2}{R}.$$

With these conditions, the coefficient of coupling that will just give maximum power transfer — or more accurately, will cause the proper value of R_L to be reflected across the primary — is

$$k = \frac{1}{\sqrt{Q_1 Q_2}}$$

For reasons other than coupling, it is desirable that the primary should have a Q of the order of 10 or more, 10 being a value that it is usually convenient to obtain with available coils and condensers. Substituting 10 to Q_1 and rearranging gives

$$Q_2 = \frac{1}{10k^2}$$

as the minimum value of Q_2 that will give sufficient coupling for a given coefficient of coupling between the two coils.

Coefficient of Coupling

The coefficient of coupling between two coils is principally a function of their relative spacing and dimensions and not particularly of the number of turns. Fig. 2 shows the shapes of several typical cylindrical coil combinations of the type used for transmitting circuits, together with the measured coefficient of coupling in each case. The coefficient is least when a small coil, such as a link of a few turns, is coupled at one end of a large coil, and increases if the same small coil is moved to the center of the large coil. The largest values of coefficient will be obtained when the smaller of the two coils is fairly sizable in comparison with the larger, and when it is placed on the outside of the larger coil at its middle.

When the series-tuned method of coupling is used for coaxial lines the coupling coil usually is considerably larger than the conventional "link," so the coupling coefficient can be expected to run between 0.5 and 0.6, depending on whether the coupling coil is at the end or center of the tank coil. Using these values in the formula above (for a tank Q of 10) shows that Q_2 should lie between about 0.4 and 0.28, the larger value being required for the smaller coefficient of coupling.

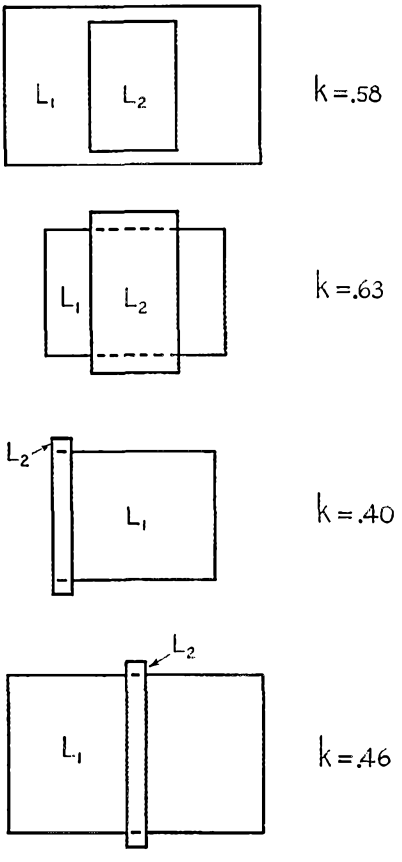


Fig. 2 — Measured coupling coefficients for typical transmitting coil configurations (side views of cylindrical coils). So long as the same *relative* dimensions are maintained for a given pair of coils the actual physical dimensions do not affect the coupling coefficient. This also holds approximately for varying numbers of turns.

Applying the figures to a practical case, suppose that the frequency is 7.15 Mc., that R is 75 ohms — that is, a 75-ohm line properly terminated so that the s.w.r. is 1 to 1 — and that the coupling coefficient is estimated to be 0.5. Then the required Q_2 is 0.4 and the value of inductance needed at L_2 is

$$L_2 = \frac{Q_2 R}{2\pi f_{mc}} = \frac{0.4 \times 75}{2 \times 3.14 \times 7.15} = 0.67\ \mu h.$$

The capacitance required at C_2 for tuning the secondary circuit to resonance is

$$C_2 = \frac{10^6}{4\pi^2 f^2 L_2} = \frac{10^6}{4 \times 9.9 \times 52 \times 0.67} = 725\ \mu\mu f.$$

This is an inconveniently large value for C_2 (and would be even more inconvenient if the frequency were changed to 3.5 Mc., where the capacitance required would be twice as great) and in practice the chances are that some available value of variable condenser would be selected — such as 250 $\mu\mu$f. — and the inductance of L_2 increased accordingly. Since this would increase Q_2 by a factor of 3 or so it becomes obvious that, with this type of coupling circuit, there is no difficulty in obtaining sufficient coupling to load the amplifier. With Q_2 equal to 1, the coefficient of coupling required is only about 0.32.

The principal disadvantage of using a higher Q_2 than the minimum required is that the tuning of the secondary circuit becomes somewhat more critical. Also, the secondary cannot be operated at exact resonance, which would cause R_L to be lower than the desired value and thus overload the amplifier, but must be detuned somewhat to cause the proper value of resistance to be reflected. Since the circuits are overcoupled when Q_2 is larger than necessary, the reactance reflected into the tank circuit also is fairly large when C_2L_2 is detuned. There is thus some effect on the setting of the plate tank condenser, C_1, for resonance. Although somewhat undesirable from a tuning standpoint, this is unimportant so far as operation of the amplifier is concerned, and C_2 makes a smooth and convenient coupling control.

Higher Standing-Wave Ratios

The calculations above are based on a perfectly matched line. Even though the line is perfectly matched at one frequency it is unlikely to remain so over an appreciable band of frequencies, so it is of interest to see what must be done to make the coupling circuit compensate for a mismatch.

The effect of a mismatch is to make the input impedance of the line (this impedance now substitutes for R in Fig. 1) contain both resistance and reactance. Depending on the line length and termination, the reactance can be either capacitive or inductive, so the coupling circuit must be capable of adjustment to compensate for either type. The maximum value of reactance that must be compensated is a function of the s.w.r., and Fig. 3 shows the limiting values for both 50- and 75-ohm lines. The resistive component of the input impedance will vary between

$$R_{max} = Z_o \times (SWR) \text{ and } R_{min} = \frac{Z_o}{SWR}$$

but these maximum and minimum values will occur only at points where the reactance is zero — i.e., at current loops and nodes along the line.

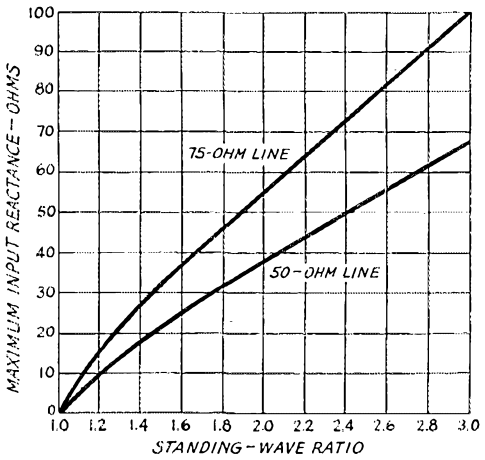


Fig. 3 — Maximum reactive component of the input impedance of 50- and 75-ohm lines as a function of the standing-wave ratio. The values given occur only at certain critical line lengths (which in turn depend on the s.w.r.) and will be smaller at all other line lengths. The reactance may be either inductive or capacitive.

The values of R_{max} and R_{min} affect the value of Q_2, since L_2 is assumed to be fixed in value. Hence Q_2 must be chosen to give sufficient coupling in the worst case — that is, when R is equal to R_{max}. To take the same example of a 75-ohm line and a median operating frequency of 7.15 Mc., let us assume that as the frequency is varied from 7 to 7.3 Mc. the maximum s.w.r. encountered is 2 to 1. Then R_{max} is $2 \times 75 = 150$ ohms, so for $k = 0.5$ and thus minimum $Q_2 = 0.4$,

$$L_2 = \frac{0.4 \times 150}{2 \times 3.14 \times 7.15} = 1.3\ \mu h.$$

This is again smaller than desirable because about 350 $\mu\mu$f. would be required for resonance, but indicates that there is no problem in getting sufficient coupling since a larger coil probably would be used for other reasons.

In this case the principal "other reason" is likely to be the necessity for providing sufficient reactance change in the secondary circuit to compensate for the reactance in the input impedance of the line. The two general cases are shown in Fig. 4. Depending on the line length, the line may "look like" either a resistance and capacitance or a resistance and inductance. The resistance R needs no further consideration, since it has already been determined that the circuit Q will be large enough when R has its maximum value. The problem is thus one of finding a set of constants for L_2

and C_2 that will have enough tuning range to keep the entire circuit formed by L_2, C_2, C' and R in resonance at any operating frequency in the band, and the same for L_2, C_2, L' and R.

For an s.w.r. of 2, the maximum reactance, either inductive or capacitive, is shown by Fig. 3 to be about 56 ohms for 75-ohm line. Hence the reactance of C_2 and L_2 in series must be variable plus or minus 56 ohms from the resonance value of zero in order to effect compensation. The total reactance of L_2 and C_2 in series is

$$X = X_{L2} - X_{C2}$$

and since the reactance range is plus or minus 56 ohms in the present case the required range of X_{C2} is

$$X_{C2} = X_{L2} \pm X = X_{L2} \pm 56 \text{ ohms.}$$

Obviously X_{L2} has to be at least 56 ohms, and even this value would necessitate an infinitely large capacitance at C_2 to compensate the limiting case of capacitive input impedance. The proper approach is to select the largest available value of variable condenser and tailor L_2 to fit. The 250-$\mu\mu$f. condenser used in the earlier example will do; at maximum capacitance its reactance at 7 Mc. is

$$X_C = \frac{10^6}{2\pi f C_{\mu\mu f.}} = \frac{10^6}{2 \times 3.14 \times 7 \times 250} = 91 \text{ ohms.}$$

Since decreasing the capacitance increases the reactance, the smallest capacitance needed will be that having a reactance equal to 91 ohms plus

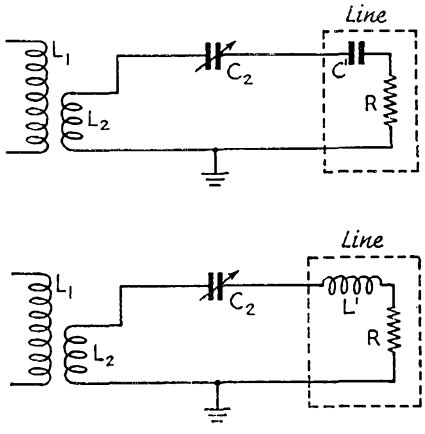


Fig. 4 — The equivalents of the coupling circuit and line input impedance. The values of C' and R are uniquely related by the line length and s.w.r. (this is also true of L' and R) but can be treated separately in designing the coupling circuit.

twice 56, or 91 + 112 = 203 ohms. Hence the minimum capacitance required is

$$C = \frac{10^6}{2\pi f X_C} = \frac{10^6}{2 \times 3.14 \times 7 \times 203} = 112 \ \mu\mu\text{f.}$$

The reactance for resonance in C_2L_2 is the median, or 91 + 56 = 147 ohms, and this is also the value of reactance required for L_2, so

$$L_2 = \frac{X_{L2}}{2\pi f} = \frac{147}{2 \times 3.14 \times 7} = 3.3 \ \mu\text{h.}$$

Notice that the lowest frequency in the band was used in these calculations because the reactance change, for a given capacitance change in C_2, is least at this end of the band and hence represents the most severe condition. The high end seldom will give any trouble unless the s.w.r. is unusually high and the minimum capacitance of C_2 is not low enough to meet the extreme of high capacitive reactance required.

Plainly, the higher the s.w.r. that has to be handled by the coupling circuit the higher the L/C ratio must be. This has the effect of making Q_2 higher than is needed for adequate loading of the amplifier, and while some leeway in coupling is desirable the attendant reaction on the tank tuning may not be. There are two obvious steps that can be taken: Match the antenna to the line as closely as possible so that the s.w.r. will be low, and use a condenser at C_2 having the largest available capacitance so that the inductance of L_2 will approach the minimum necessary. With Q_2 low, the r.f. voltage developed across C_2 also is low, and only receiving-type spacing is needed for medium power.

External Loading

In Fig. 5 the secondary circuit is split into two parts, L_2 and L_3, it being assumed that there is negligible coupling from L_3 to either L_1 or L_2. This arrangement can be used when L_2 is too small to meet the values determined as above, as might be the case when L_2 is the link provided on a manufactured transmitting coil. Inductance values of less than 1 μh. are typical of such links, and in general the inductance is not large enough — at least at the lower frequencies — to permit much control of coupling by means of C_2 in the simple series circuit of Fig. 1. In Fig. 5 the additional loading inductance, L_3, provides the needed means for compensating for the input reactance of the line when the s.w.r. is greater than 1 to 1.

There is a basic difference between Fig. 1 and Fig. 5 that has an important bearing on the practical application of these circuits. In Fig. 1, increasing the inductance of L_2 also increases the voltage induced in the secondary (even if the coefficient of coupling does not change) because as L_2 is made larger the mutual inductance between L_1 and L_2 also increases. In Fig. 5, adding L_3 has no such effect, since the mutual inductance between L_1 and L_2 remains the same.

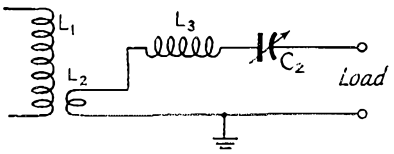


Fig. 5 — External loading coil, for cases where the inductance of L_2 cannot be altered.

For this reason the inductance of L_3 does not enter into the value of Q_2 when the formula given earlier relating k, Q_1 and Q_2 is used. For purposes of determining coupling, Q_2 must always be

based on the value of inductance in L_2 alone.[1] L_3 and C_2 simply provide the variable reactance by means of which the secondary circuit can be tuned to resonance, and L_3 may be looked upon as being merely a convenient way of extending the effective range of C_2. (For example, if the reactance of L_3 is just a bit smaller than that of C_2, the resultant of the two will be a very low value of capacitive reactance; i.e., the combination is equivalent to a condenser of very large capacitance.)

The other side of this picture is, of course, that if L_2 by itself is not large enough to load the amplifier properly when the secondary circuit is tuned to resonance, the only means available for increasing the coupling is to increase Q_1. This can be done by making the primary circuit higher-C, provided it is done in such a way that the coefficient of coupling between L_1 and L_2 is not decreased. If the C/L ratio is increased by removing turns from L_1, the turns should be taken off the end or ends of the coil farthest from L_2 — probably the most convenient way in nearly all cases — since this will tend to increase k and give a further improvement in coupling.

To illustrate, we continue the frequency of 7.15 Mc. and assume a fixed link having an inductance of 1 μh., the coefficient of coupling between L_1 and L_2 being 0.4. Since L_2 is fixed, Q_2 is likewise fixed for a given load resistance. If the circuit is to handle an s.w.r. of 2 to 1 in 75-ohm line, the maximum load resistance will be 150 ohms, and Q_2 therefore should be based on this figure. The reactance of L_2 at 7 Mc. is

$$X_{L2} = 2\pi f L_2 = 6.28 \times 7 \times 1 = 44 \text{ ohms}$$

so Q_2 when the secondary circuit is tuned to resonance by C_2 is

$$Q_2 = \frac{X_{L2}}{R} = \frac{44}{150} = 0.29.$$

A rearrangement of the formula given earlier results in

$$Q_1 = \frac{1}{Q_2 k^2}$$

so the Q_1 required for sufficient coupling is

$$Q_1 = \frac{1}{0.29 \times (0.4)^2} = 21.6.$$

The total value of secondary inductance required for handling the 2-to-1 s.w.r. is calculated in just the same way as described earlier. The figure obtained in the sample calculation was 3.3 μh., and when applied to Fig. 5 the difference between the total and the inductance of the link coil, L_2, should be made up in L_3. In this case, $L_3 = 3.3 - 1 = 2.3$ μh.

As we have observed many times before in these pages, it is unfortunate that the links provided on manufactured coils are almost invariably too small, on the lower frequency bands, to provide sufficient coupling to anything but very small load resistances. Measurement shows that the link inductance on some of the medium-power coils for 3.5 Mc. is not even as much as 1 μh. As the calculation above shows, this is not large enough for coupling into a line operating at a reasonably low s.w.r. even at twice the frequency, unless a plate tank Q considerably higher than the usual 10 or 12 is used. Assuming $Q_1 = 10$ and $k = 0.4$, the minimum Q_2 for sufficient coupling is

$$Q_2 = \frac{1}{10 \times (0.4)^2} = 0.625,$$

so for load resistances up to 150 ohms the required reactance for L_2 is

$$X_{L2} = 0.625 \times 150 = 94 \text{ ohms.}$$

At 3.5 Mc. the corresponding inductance is

$$L_2 = \frac{X_{L2}}{2\pi f} = \frac{94}{6.28 \times 3.5} = 4.3 \text{ } \mu\text{h.}$$

This is around four times as much as some coils provide. A 1-μh. link cannot be expected to give full coupling into a load of more than $1/4.3 \times 150$ ohms, or 35 ohms. This, it must be remembered, is with the secondary circuit tuned to resonance. Without such tuning, something of the order of 20 to 25 ohms is the limit.

Checking Circuit Values

Coil dimensions can be calculated from the formula in the *Handbook* or by means of the *Lightning Calculator*, in most cases, although *when the inductance is small the results tend to* become inaccurate. In this event, a better method is to adjust the coils to the proper inductance by measurement. A grid-dip meter and an inexpensive "standard" condenser are all that is needed using the method described in the chapter on measurements in the *Handbook*. Measurement can also be used for L_1, the plate tank coil, although either the formula or *Calculator* is amply accurate for such coils.

Following the charts for tank Q as given in the transmitting chapter in the *Handbook* is quite

(Continued on page 124)

[1] On the other hand, L_3 does increase the Q of the secondary circuit insofar as the selectivity of that circuit is concerned, so again it is desirable to use the smallest value of L_3 that the other requirements permit.

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.

• New Equipment —

The LW-50 and LW-61 2-Meter Transmitter and Converter

• Even though you may be of the build-it-yourself rather than the buy-it-ready-made school, the chances are you're just as interested as the next one in knowing what's in the new gear offered for sale by manufacturers. Realizing this, we're opening a department in *QST* to discuss the technical details of new receivers, transmitters, and the like, as they come along. The idea is to give an over-all picture of the circuit and mechanical features, with particular accent on innovations that not only are interesting in themselves but that may be adaptable to homemade ham equipment as well.

Here is the first, and we hope you'll find it, as well as succeeding reviews, informative and useful.

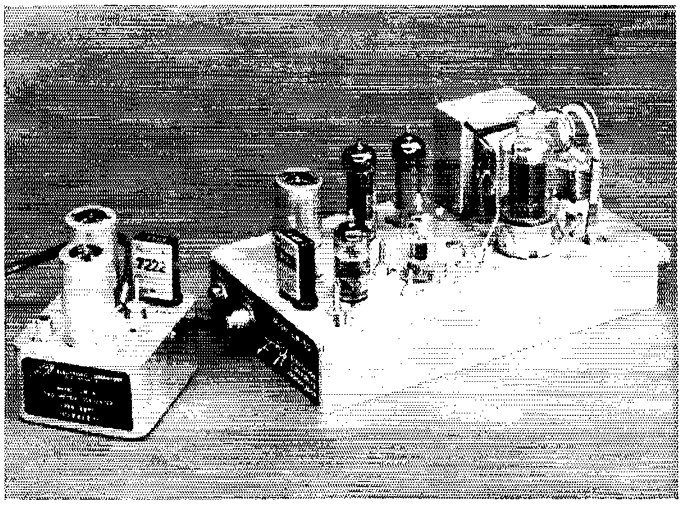
THE LW-50 is a 15-watt 2-meter rig of compact construction, suitable for mobile or fixed-station use. The r.f. section, modulator and speech amplifier are built on a single 4½ × 8-inch chassis. Power supply requirements are 300 volts d.c. at just under 200 ma. and 6.3 volts, a.c. or d.c., at 3 amperes. Provision is made for either crystal or carbon microphones. The transmitter may be bought in kit form, or completely wired and tested.

The LW-61 is a midget-sized converter intended for mobile or casual home-station use on 144 Mc. Using only two tubes, it occupies a space only 2⅝ by 2⅞ inches, 3⅜ inches high. It is crystal controlled and may be obtained for intermediate frequencies in the broadcast band, or in the 7- or 14-Mc. ranges. Current drain is 6.3 volts a.c. or d.c. at 0.75 ampere and 150 to 250 volts d.c. at about 3 ma.

Transmitter Features

The transmitter r.f. section uses a 6J6 overtone oscillator with 8- or 24-Mc. crystals, tripling in the second section to 72 Mc. This drives another 6J6 with its sections in parallel, doubling to 144 Mc. The final stage is a 2E26 neutralized amplifier. Input runs about 15 watts at 300 volts. The modulator is a pair of 6AQ5s Class AB_1, driven by a 6U8 speech amplifier. Choice of crystal or carbon microphone is made by the use of a two-circuit plug for the crystal or a single-circuit plug for the carbon. No change in wiring is required. Gain is controlled by a screwdriver-adjusted potentiometer next to the microphone jack, on one end of the chassis. The antenna connector and the power fitting are at the opposite end.

Output coupling is set up for coaxial line. A single-turn link is fed through a length of soft copper tubing that is soldered into a hole in the chassis. The tubing serves as a support, and also as the outer conductor of a coaxial line to the antenna terminal. The cold end of the link is returned to a metal sleeve around the copper tubing and insulated from it. The capacitance thus formed is approximately right to tune out the reactance of the link. This will not, of course, compensate for any reactive component introduced at the antenna end of the coaxial line, but it does eliminate the necessity for any tuning, other than that of the final plate condenser, with well-matched antennas.



Amateur gear for 144 Mc. by LW Electronic Laboratory. At the left is the LW-61 2-tube crystal-controlled converter. The larger unit is the LW-50 transmitter. Tubes across the back of the picture are the speech amplifier and modulators. The r.f. section is nearest the camera.

The degree of coupling available is suitable for coaxial-line fed mobile antennas or beams. If open-wire line is used to feed the 2-meter array, a balun or antenna coupler should be connected between the transmitter and the line. The final plate circuit is separated at the center to make room for the variable link. Tuning is done with a series condenser at the opposite end of the split tank from the 2E26 plate.

Circuitwise, the LW-50 follows familiar practice in the r.f. section. Test points are provided for measuring the oscillator plate, final grid and final plate currents without breaking into the wiring or using jacks.

Depending on the type of microphone plug used, the first stage of the modulator operates as a high-gain amplifier (for crystal microphone) or as a grounded-grid amplifier, with the carbon microphone connected in the cathode circuit. Speech clipping is obtained when the 6AQ5 modulators draw grid current on speech peaks. A uniformly high level of modulation can be maintained without overmodulation, if the final stage input level is properly adjusted.

Mechanically, the LW-50 is ruggedly designed, to stand up under the rigors of mobile operation. The chassis is double plated with copper and cadmium for easy soldering and good conductivity. Wafer-type tube sockets with low-inductance lugs that solder directly to the chassis permit the short r.f. grounding paths so necessary to insure stable and efficient r.f. operation at v.h.f.

The Converter

The LW-61 converter is a midget package designed primarily for mobile reception on 144 Mc. Because of its small size and simple circuitry, it lacks some features necessary for optimum performance in the home station, but it will do for casual operating at home.

Two dual-triode tubes are used. A 6BZ7 is a combined grounded-grid r.f. amplifier stage and triode mixer. A 12AT7 overtone oscillator-multiplier supplies crystal-controlled injection. Crystals are in the 7- to 8-Mc. range, the exact frequency depending on the i.f. to be used. When the i.f. is a car broadcast receiver, the tuning range is only a part of the band, and additional crystals are needed to cover the entire four megacycles. A single crystal will do where the i.f. is a higher frequency. The converter is supplied normally for broadcast, 7- or 14-Mc. i.f., but other frequencies are available on special order.

The current drain of the converter is so low that power for it is normally drawn from the receiver with which it is used. Coaxial fittings of

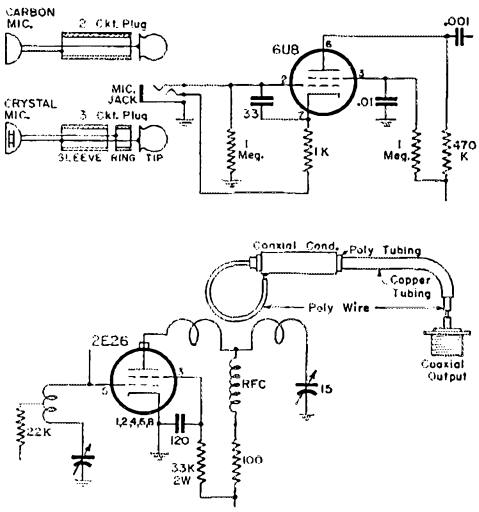
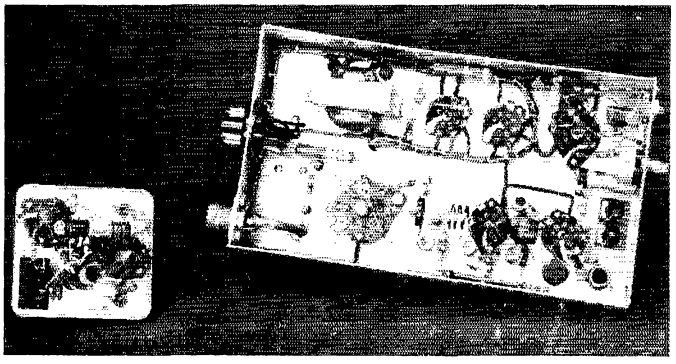


Fig. 1 — Two neat tricks used in the LW-50 2-meter transmitter. At the top is shown the method by which either crystal or carbon microphone may be used, with no changes in transmitter wiring. Setting of the gain control is about the same for either microphone, as the full gain of the 6U8 pentode section is utilized with the crystal. With a carbon microphone the stage works as a grounded-grid amplifier.

At the bottom is a sketch of the final amplifier plate circuit and output coupling system. Reactance of the coupling loop is tuned out by means of a simple coaxial capacitor, so that only the final plate circuit need be adjusted when the antenna is connected.

the phono type are provided for antenna input and i.f. output connections.

Where space permits, the converter may be placed inside the receiver cabinet. In mobile service it may be fastened to the car receiver case, or mounted elsewhere in the car where it is out of the way, as tuning is done with the receiver proper. Because of its simplicity, the converter is not sold in kit form. Manufacturer: LW Electronic Laboratory, Route 2, Jackson, Michigan. — *E. P. T.*



Bottom views of the LW-61 and LW-50 2-meter units.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

The YLs to be found working s.s.b. are still few and far between. W4VKL, Jackie Batchelor, of Monroe, Georgia, tells those of us who haven't yet discovered what it's about that we really are missing something. She is so sold on s.s.b. operation that perhaps her own words will inspire us to dig into the *Handbook* and back into *QST* issues for the past couple of years and do a little "thinking" and "learning" for ourselves on the subject. Two articles by Richard Blanchard, W6UYG, — "Sugar-Coated Single Sideband" and "More Sugar-Coated Single Sideband" in October '52 and '53, respectively, are particularly recommended for an introduction. And in his February '54 column, *QST* Asst. Technical Editor W1DX advised how to acquire — at no cost — a group of articles that have appeared in GE *Ham News*, and which are "musts" for the newly interested.

But let's let W4VKL, perhaps the most active YL on s.s.b. at the moment, tell of her experiences:

First, I must say that my OM, Joe, W4EGK, built my transmitter. It is very compact — smaller than an HQ-129X. I have 200 watts of s.s.b. and can flip two switches and have 75 watts of a.m. I have been operating s.s.b. since July 7, 1953, with my own station and using my own call.

Many people do not like s.s.b., the reason being they "can't read it," but the only trouble is: they haven't learned to tune it in. You have to tune *exactly* to the proper frequency. The method is explained in *QST*. You can receive it very nicely on any normal receiver having a b.f.o. Of course, a single-sideband "slicer" is very nice to have — even when receiving a.m. signals.

One reason why I like s.s.b. is that, with voice-control, a group of hams all over the country can carry on a QSO just as if they were sitting in one living-room talking. Anyone can break in at any time and all of the others can hear — in other words, when you are talking the transmitter is on, but between words or sentences the transmitter goes off and the receiver comes on. Also, two QSOs can be carried on, on the same frequency, without interference to each other — one on the upper sideband and one on the lower sideband.

When I am talking on a.m., I have to say all I'm going to say for a while and I just get tongue-tied and can't think of anything more to say; but when I am on s.s.b. I have someone to talk right back to me and I don't know when to stop!

Come on, girls, get on s.s.b. — let's really enjoy our hamming with almost no interference and really carry on in round-table style! BCNU on s.s.b.!

What say, girls — shall we do some investigating to see if we come up with the same conclusions?

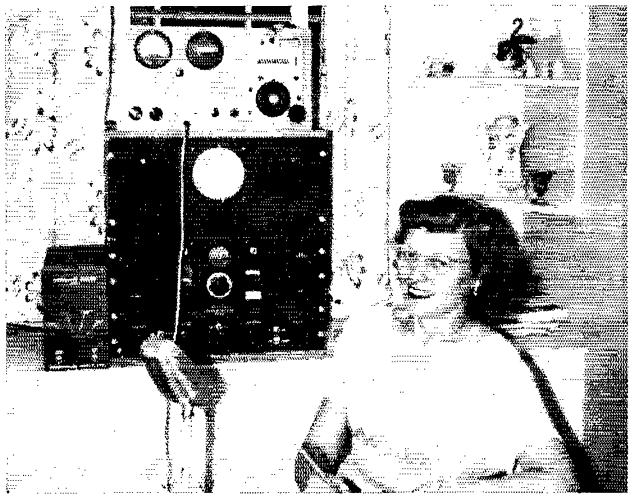
(*Continued on page 126*)

As a result of her "outstanding and meritorious service during the tornado which recently struck Worcester," Gertrude "Tweet" Hines, W1ULF, received a "Woman of the Month" award in February from the Whiting Milk Company of Massachusetts. She is shown here accepting an engraved silver Paul Revere pitcher from Mr. John Connors, Worcester manager for the company.

The service that she and W1RLQ, Chata Swenson, and W1SCS, Ruthe Ferguson, rendered inspired the poetic tribute by Raymond Cotton, W1BTY, that appeared in this column for September, 1953.

The XYL of W1ULE and mother of two young daughters, Tweet works 10 and 75 'phone, and 20 and 80 c.w., with a Viking I and a Collins 75A-2. She is a member of the YLRL, has BPL and RCC certificates, and is alternate net control of the Deep Sea Dragnet of New England.

S.s.b. enthusiast Jackie Batchelor, W4VKL.



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

Novice & Technician Exams by Mail

Revised FCC Procedures Effective June 10th Include New 75-Mile Limit for Conditional Class Exams

EFFECTIVE June 10, 1954, amateur examination procedures specified by the Federal Communications Commission are revised to provide that:

1) examinations for Novice and Technician Class licenses will be available only by mail; and

2) applicants for "standard" amateur privileges conveyed by the General Class license will be permitted to take the examination for Conditional Class (conveying the same privileges) when they live more than 75 miles from a quarterly examining point, instead of the present 125-mile limit.

These revised procedures were conceived largely in the interests of economy of operations, inasmuch as the Field Engineering & Monitoring Bureau of FCC has found itself thoroughly overloaded with work and almost unable to operate within its budget the last year or so because of the huge increase in amateur examinations brought about by the establishment of the Novice and Technician classes of license. Additionally, the workload has been compounded by the fact that most such applicants reappear within a short time for another examination for a higher class of license.

This FCC action places a great deal more responsibility on the amateur body in the administration of license examinations. Under the new arrangement approximately one-half the total FCC examinations of amateur applicants will be supervised by one of us rather than an FCC engineer. It is important, therefore, that we all know the procedures to be followed in mail examinations. While of course the entire story is in the *License Manual*, we shall summarize it here for the information of all amateurs.

Novice and Technician Exams

It is important to understand that the Novice and Technician examinations are not simply permissive or optional on a mail basis; the mail procedure is compulsory. At the present time a Novice or Technician applicant may take the mail exam if he lives more than 125 miles from a quarterly examining point (or is physically disabled or in military service); others have to appear in person before an FCC examiner at the proper time. But after June 10th these examinations will be available *by mail only*. Even if an applicant lives across the street from an FCC district office, he will take his examination by mail. After that date, neither FCC offices nor traveling engineers will conduct examinations for Novice and Technician licenses.

The mail procedure is precisely the same as that now used; it will simply affect all applicants instead of only a portion as at present. The rules provide that a mail examination will be conducted and supervised by not more than two volunteer examiners (not more than one examiner for the code test, and not more than one examiner for the complete written examination). The person administering the code test must be the holder of an Extra Class, Advanced Class or General Class amateur license, or shall have held, within the 5-year period prior to the date of the examination, a commercial radiotelegraph operator license issued by the Commission, or within that time shall have been employed in the service of the United States as the operator of a manually operated radiotelegraph station. The person supervising the written examination must be at least 21 years of age. The customary practice is to have a single amateur conduct the entire examination by meeting both age and class-of-license requirements.

After June 10th, if you are an applicant for Novice or Technician license, no matter where you live, you will write the FCC Engineer-in-Charge of the district, tell him in what class of license you are interested, and ask for the mail examination papers for that class. He will send you the application form and a sealed envelope containing a set of examination questions, as well as detailed instructions on procedure. *Before doing anything else, read the instructions carefully.*

First, you fill out the application Form 610 and (assuming it is for a station license as well as an operator license) swear to it before a notary. Next you get your code examiner to give you a code test at the speed prescribed for the license involved. If you pass, he then completes the certification on the back of the form. Then, and only then, are you ready for the written examination. If you fail to pass the code test, you must return the examination envelope unopened and wait a month before trying again. If, for some reason, you are unable to undertake the examination within 15 days of receipt, the completed application form and the unopened envelope should be returned to the district office.

Assuming you pass the code test, your witness for the written examination (who is probably the same person giving you the code test) may then open the sealed envelope. He inspects it and sees that it consists of a number of sheets of paper bearing the examination questions. He hands these to you. You proceed to the answering of the questions, making certain to sign your name on each sheet in the space provided as you go along. Your witness must remain constantly present, and your work must proceed without interruption; at the conclusion

your witness certifies on the back of the application form that he opened the envelope and that you wrote out the answers in his presence without assistance from any source. Then you put both the application form and the completed exam sheets in the envelope provided and mail them back to the district office.

If you have passed, your license will come to you in a few weeks; you may not operate until you receive the actual license, of course. If you fail, you will be notified; you can try again after another month.

Conditional Class Exams

After June 10th the present mail procedure for Conditional Class examinations will remain the same (as described above), but a considerably larger number of amateur aspirants will be eligible to use it. The present rule provides that anyone residing within 125 miles airline of a city where examinations are available at least as often as four times per year must appear in person to take a General Class examination before an FCC engineer; applicants residing beyond that distance may take the same examination by mail, in which case the license is known as Conditional Class. After June 10th the distance limit will be only 75 miles, so obviously a much larger territory is opened for the use of mail examination procedures.

It is to be noted that the Conditional Class examination is not compulsory for distant applicants; it is permissive. In other words, an applicant living more than the 75 miles from a quarterly point may, if he wishes, appear at an FCC examining point and take a General Class examination.

In an adjoining column we list the cities where, at the present time, examinations are conducted regularly at district offices or suboffices, or at least four times a year by traveling engineers. These cities are centers of circles which may be drawn with a 75-mile radius to indicate eligibility for the mail examination. It is important to note that the distance measurement is made by FCC from city-center to city-center. In other words, if the center of one city is 74 miles airline from the nearest quarterly examination point, all amateurs in that city are considered as coming within the limit and therefore required to appear for personal examination; an applicant is not eligible for the mail exam because he happens to live on the far side of town and perhaps actually 75½ miles away from the FCC point.

An applicant for a higher grade of license will be given credit for specific requirements in the examination only if the license he currently holds was issued on the basis of an examination before an FCC Engineer. For example, a Novice licensee who obtained his ticket by mail will, when he takes his Technician exam, have to take the 5-w.p.m. code test again. Similarly, a Technician who obtained his ticket by mail will, when he takes his Conditional or General Class exam, have to take the written exam all over again (in addition to the higher speed code test). We mention this to point out that after June 10th all Novice and Technician examinations, because they will be by mail, will therefore not carry any credit toward higher license grades.

—*J. H.*

Quarterly Examination Points

Amateur license examinations are conducted regularly at district administrative FCC offices in the following 24 cities:

BOSTON, MASS.	PORTLAND, ORE.
NEW YORK, N. Y.	SEATTLE, WASH.
PHILADELPHIA, PA.	DENVER, COLO.
BALTIMORE, MD.	ST. PAUL, MINN.
NORFOLK, VA.	KANSAS CITY, MO.
ATLANTA, GA.	CHICAGO, ILL.
MIAMI, FLA.	DETROIT, MICH.
NEW ORLEANS, LA.	BUFFALO, N. Y.
HOUSTON, TEX.	HONOLULU, T. H.
DALLAS, TEX.	SAN JUAN, P. R.
LOS ANGELES, CALIF.	JUNEAU, ALASKA
SAN FRANCISCO, CALIF.	WASHINGTON, D. C.

Exams are similarly available on frequent schedules or by appointment at the following suboffices:

ANCHORAGE, ALASKA	SAN DIEGO, CALIF.
BEAUMONT, TEXAS	SAVANNAH, GA.
MOBILE, ALA.	TAMPA, FLA.

In addition, the following cities are visited at least four times per year by FCC traveling engineers to conduct amateur examinations:

BIRMINGHAM, ALA.	NASHVILLE, TENN.
CHARLESTON, W. VA.	OKLAHOMA CITY, OKLA.
CINCINNATI, OHIO	OMAHA, NEBR.
CLEVELAND, OHIO	PHOENIX, ARIZ.
COLUMBUS, OHIO	PITTSBURGH, PA.
CORPUS CHRISTI, TEXAS	ST. LOUIS, MO.
DAVENPORT, IOWA	SALT LAKE CITY, UTAH
DES MOINES, IOWA	SAN ANTONIO, TEX.
FORT WAYNE, IND.	SCHENECTADY, N. Y.
FRESNO, CALIF.	SIOUX FALLS, SO. DAK.
GRAND RAPIDS, MICH.	SYRACUSE, N. Y.
INDIANAPOLIS, IND.	TULSA, OKLA.
JACKSON, MISS.	WILLIAMSPORT, PA.
KNOXVILLE, TENN.	WINSTON-SALEM, N. C.
LITTLE ROCK, ARK.	
MEMPHIS, TENN.	
MILWAUKEE, WIS.	

These 61 cities are known as quarterly examining points and are the bases for measurement of the distance determining eligibility for the Conditional Class examination, now 125 miles or greater but to be 75 miles or greater after June 10, 1954.

Strays

In all fairness it should be pointed out that the Charactron Morse-code converter described in the March issue is not the first converter of this kind. Horace W. Babcock, ex-W5JMS, described a machine that did the same thing in a slightly different way in the June, 1948, issue of *Electronics*. In that device the presentation was on a slowly-revolving phosphorescent disk backed up by a rapidly-rotating back-lighted (by a strobe lamp) stencil disk.

Happenings of the Month

BOARD MEETING

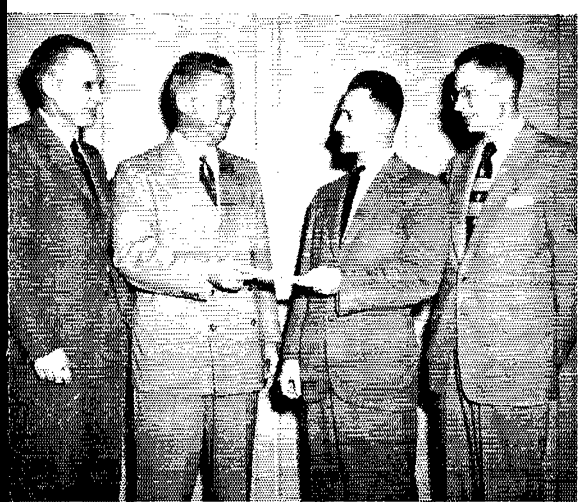
Once again in May the Board of Directors of the American Radio Relay League will meet (this year in Denver, Colorado) to examine the affairs of the League, hear reports of its committees, discuss current problems in amateur radio, consider various motions and proposals by individual directors, examine current FCC proposals for amateur rules changes, and make policy decisions to guide our course for the ensuing year.

Through bulletins, correspondence, on-the-air activity, and visits to club meetings, hamfests and conventions, the several directors of the League have been gathering background on problems and viewpoints presented by individual members in their divisions. They can't make personal contact with every amateur, of course; but they are always interested in knowing what each of you thinks about various topics of the day in ham circles. Write him; his address appears up front in this and every issue of *QST*.

At press time we have knowledge of several specific items which are scheduled to be brought up at the meeting. For one thing, current FCC proposals [1] relating to expansion of the voice sections of 10 and 20 meters, authorization of AØ emission on 6 meters, and the general question of subdividing our bands for more specialized groups (such as mobile) will receive considerable attention by the Board. Directors Brabb and Roberts are separately proposing, with slight variations in wording, amendment of Article 12 of the ARRL Articles of Association so there will be no possibility of misunderstanding that the requirement for director candidacy in elections is four years' continuous ARRL membership immediately preceding the election.

Director Noble proposes an amendment of Article 8, with the aim of requiring an election to fill any vacancy in the office of Vice-Director. Various committees of the Board will be reporting on such subjects as League finances, membership, RACES, public relations, "new-equipment" column in *QST*, and handicapped persons in amateur radio. The meeting commences Friday morning, May 14th, and promises to be a busy one. Be sure your director knows your views on matters of the day. If you should write him a last-minute letter, address it c/o Brown Palace Hotel, Denver, Colorado.

[1] April, 1954, *QST*, p. 45.



NOVICE & TECHNICIAN CHANGES

In March, FCC took final action in Docket 10712 and effective June 10, 1954, Novice and Technician Class amateur license examinations will be available *only* by mail. As of the same date, the present 125-mile distance from quarterly examining points determining eligibility for a Conditional Class license is reduced to 75 miles. As these changes are of considerable effect on amateur licensing procedures, they are discussed in detail in a separate article elsewhere in this issue.

QST ARTICLE AWARDS

At its meeting last year the ARRL Board of Directors established cash awards of $300, $200 and $100 for the three articles judged by the Executive Committee to be the most meritorious of those appearing in each yearly volume of *QST*. After careful deliberation, the Committee has selected the following three articles as the outstanding ones in 1953:

First award: Mack Seybold, W2RYI, for his January *QST* article, "Harmonic Radiation from External Nonlinear Systems."

Second award: Oswald G. Villard, jr., W6QYT, and Allen M. Peterson, W6POH, for their April *QST* article, "Meteor Scatter."

Third award: J. S. Belrose, VE3BLW, for his September *QST* article, "Short Antennas for Mobile Operation."

The Committee's job was not easy; a number of other articles were considered and several were real contenders for prize honors right up to the final decision. We express our congratulations to the authors of these articles, and are certain that all amateurs will join us in agreeing that they represent real contributions to amateur radio's technical progress.

♦

At the IRE show in New York, General Manager A. L. Budlong, W1BUD (second from left), presents an ARRL check to Mack Seybold, W2RYI, as first award for the outstanding *QST* article for 1953. Watching the proceedings are Asst. Technical Editor Byron Goodman, W1DX, and Technical Director George Grammer, W1DF.

♦

QST for

F.C.C. DISTRICT CHANGES

The Commission has made some modifications in the organization of its Field Engineering & Monitoring Bureau. Of primary interest to amateurs is the shift of the state of New Mexico from the Dallas district office to the jurisdiction of the Denver office; New Mexico ham aspirants should hereafter write to Denver for application forms, etc. There has also been a reshuffling of the jurisdiction of Regional Managers. The new set-up is of interest to us because the Regional Managers are the people in FCC who are directly charged with the responsibility of sponsoring and supervising the work of TVI Committees. We show below a list of the eight offices, their addresses, and the FCC districts and home offices they cover:

F.C.C. FIELD ORGANIZATION

REGION	*INCLUDES DISTRICTS*
1 954 Federal Bldg. 641 Washington St. New York 14, N. Y.	1. Boston 2. New York 3. Philadelphia 4. Baltimore 5. Norfolk, Va. 24. Washington, D. C.
2 411 Federal Annex Atlanta, Georgia	6. Atlanta & Savannah 7. Miami & Tampa 8. New Orleans & Mobile 9. Houston & Beaumont 10. Dallas 22. San Juan, P. R.
3 323-A Customhouse San Francisco 26, Calif.	11. Los Angeles & San Diego 12. San Francisco 15. Denver
4 802 Federal Office Bldg. Seattle 4, Washington	13. Portland, Ore. 14. Seattle
5 P.O. Box 1142 Lanikai, Oahu, T.H.	21. Honolulu
6 P.O. Box 644 (Rm. 52 U. S. P. O. Courthouse) Anchorage, Alaska	23. Juneau & Anchorage
7 832 U. S. Courthouse Chicago 4, Illinois	16. St. Paul 17. Kansas City 18. Chicago
8 1029 New Federal Bldg. Detroit 26, Michigan	19. Detroit 20. Buffalo, N. Y.

NATIONAL AMATEUR RADIO WEEK

As reported in last month's *QST*, the roster of bills to be considered by the Congress includes a joint Senate and House Resolution to declare the third week of June each year as National Amateur Radio Week. For the information of members we reprint herewith the text of a statement filed by the League endorsing the Resolution and urging its passage:

Hon. William Langer, Chairman
Judiciary Committee
United States Senate
Washington 25, D. C.

My dear Senator Langer:

The American Radio Relay League, Inc., national nonprofit membership association of amateur radio operators, wishes to urge the favorable recommendation by your Committee of S. J. Resolution 124, to establish a National Amateur Radio Week, and presents the following brief statement in its support.

Amateur radio is a scientific hobby, defined in international law as a public service of "self-training, intercommunications and technical investigations carried on by . . . duly authorized persons interested in radio techniques solely with a personal aim and without pecuniary interest." From a humble beginning at the turn of the century, amateur radio in the United States has grown and progressed until today there are more than 114,000 citizens licensed by the Federal Communications Commission "in the public interest, convenience or necessity."

Amateur radio has, indeed, a magnificent record of public service. Perhaps foremost is the amateur's work, on a volunteer basis as always and using equipment acquired at his own expense, in providing emergency communications. In practically every major disaster, where commercial wire and radio circuits are disabled, the short-wave communications networks of amateurs have stepped into the breach to provide vitally-needed communications for rescue and rehabilitation purposes. These instances range from rescue of a snowbound train in the Colorado mountains in 1922, to the New England floods of 1936 where, despite property losses in seven figures, the almost negligible loss of life was attributed primarily to outstanding emergency communications; to the 1953 **Flint**, Michigan and Worcester, Massachusetts tornadoes which again found hundreds of volunteer amateurs on the job to provide disaster communications links from home-constructed self-powered personal radio stations, at home or in motor vehicles. Since 1945, amateurs have furnished message links in nearly 200 different emergency incidents and disasters in various parts of the nation.

In the technical field, amateur radio operators pioneered the short-waves, at a time when this portion of the radio spectrum was considered "worthless" by industry and government, and the improvements in technique developed by them are legion. The first Trans-Atlantic short-wave communications, in 1923, was by amateurs. Our present knowledge of the behavior of the "VHF" and "UHF" portions of the radio spectrum, now occupied by the television broadcast industry, is derived to a large extent from early amateur investigations.

Each amateur station can be considered a "field observation post" in technical investigation work, and amateur radio on several occasions has coöperated in government and industry research, especially in the field of propagation. These are merely examples. Amateur radio is also a prime source of engineering, operating and executive personnel for the electronics industry; many of today's leaders in the field chose electronics as a career because of an early interest and self-training through amateur radio.

The large body of self-trained operators in amateur radio constitutes a highly-skilled reserve which, as has been demonstrated in two world conflicts, is easily integrated into the military service. In World War II more than 25,000 amateurs (of the 50,000 licensed at that time) entered the service for military communications work. At present several thousand amateurs participate in training programs of the Military Affiliate Radio System of the Department of Defense. During World War II amateurs organized and largely manned the War Emergency Radio Service, an emergency civil-defense communications system; under the new name of Radio Amateur Civil Emergency Service, established by coöperative endeavor of the military authorities and FCC, amateurs continue to place their self-acquired skills at the disposal of state and community civil-defense organizations.

We should also mention the sociological importance of amateur radio to the nation. This scientific hobby teaches method, industry, self-reliance, consideration of others, and encourages an inquiring mind. It has been said that the leadership of the United States in the electronics field derives to a considerable extent from what may be termed "the amateur spirit in research." Since our national culture is only as good as the individuals who comprise it, obviously amateur radio is making many contributions toward its improvement.

The selection of the third week in June as a proposed National Amateur Radio Week is not an arbitrary one, but is based on the fact that that week culminates each year in the annual Field Day Tests of the American Radio Relay

League. This activity, another facet of the organized effort of amateurs to keep themselves in constant readiness for emergency communications needs, each year sees upwards of 5,000 amateurs transporting some 2,000 individual self-powered radio transmitters and receivers into remote spots throughout the nation and, by operating in relays, conducting a continuous 24-hour grueling test of personnel and equipment under simulated emergency conditions.

We believe it is fitting that the nation recognize the voluntary contributions of these self-trained communications specialists by the designation of a National Amateur Radio Week the third week in June. We urge the Committee's favorable recommendation on the measure.

Sincerely yours,

A. L. BUDLONG
General Manager

At the same time we are pleased to report that Maryland amateurs have scored a beat with the proclamation by Governor McKeldin of that State setting the week of June 14–20, 1954, as Amateur Radio Week! SCM Plummer, W3EQK, is leading a committee of local amateurs in plans for publicity and displays during that week. The text of the Governor's proclamation reads:

"Amateurs in the art of radio have contributed in a very considerable degree to the communication system of the Nation and State.

"Their work has often been of special value in times of emergency — in the hours of disaster — in floods, great fires and other natural and man-made catastrophes.

"They have helped those in distress. They have aided in the apprehension of criminals.

"These 'Hams' of the air, as they call themselves, have been and continue to be an important and indispensable element in our vast network established for Civil Defense — here in Maryland as well as anywhere.

"They receive no compensation for their work, and far less public recognition than they deserve.

"During the week beginning on June 14, radio amateurs all over the world will participate in demonstrations, tests and other field activities — a project in which the Baltimore Amateur Radio Club, Inc., and other groups of these radio enthusiasts in Maryland will participate.

"In grateful recognition of their patriotism, dedication to service and general activities in the public good, I, Theodore R. McKeldin, Governor, do hereby proclaim the week of June 14th through June 20th to be 'Amateur Radio Week in Maryland'."

LICENSE PLATES

The last few months have seen Arkansas, Indiana and Arizona join those states issuing call-letter license plates. In Arkansas, Charles Thomas, W5WVD, president of the Greater Little Rock Amateur Radio Club, was chairman of the committee for the Little Rock Club which sponsored the successful legislation.

When G. Hochstetler, W9KDV, president of the Indiana Radio Club Council, led the move in his state which was sponsored by the I.R.C.C.

Arizona joined the parade on March 10, 1954, when the Governor signed the law which will provide the distinguishing plate in lieu of the regular license plate, at an additional cost of $3.00. Application blanks will be available in the near future.

To all — a job well done.

LEAGUE OPPOSES LICENSE FEE

At its March meeting the Executive Committee of the League undertook an extensive examination of the FCC proposal in Docket 10869 dealing with a schedule of license fees for various services, that for the amateur being proposed at $3. After careful deliberation of various aspects of the proposal, the Committee directed that the General Manager file in opposition to the principle of a fee for amateurs; but that if it is determined by the Commission that some fee is required, it be not more than $1. The League's filing with FCC on the subject is as follows:

♦

Charles Thomas, W5WVD (left), with the first Arkansas ham license, and Senator Max Howell, Little Rock, who graciously lent of his efforts.

♦

Archie Waring, W6ACN (right), being presented the first California ham license plate by Gov. Goodwin Knight, a top booster for the bill.

♦

When G. Hochstetler, W9-KDV, Martinsville, president of the Indiana Radio Clubs Council, with his new call sign plates much in evidence.

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C.

In the Matter of Establishment of fees for the Commission's licensing and similar activities	DOCKET NO. 10869

COMMENT OF THE AMERICAN RADIO RELAY LEAGUE INC.

Pursuant to Paragraph 20 of the Notice of Proposed Rule Making in Docket 10869, released January 28, 1954, The American Radio Relay League files these comments on behalf of the more than 40,000 licensed amateur members of the League.

These comments were formulated after extensive deliberation by the ARRL Executive Committee and examination of the expression of views by League directors on behalf of their constituents, by various amateur radio societies, and by a number of individuals.

* * * * *

The position of the League is that we oppose the imposition of license fees in the amateur service. Should the Commission be unable or unwilling to except amateurs from its fee schedules, the League's view is that the fee for amateur applications including both station and operator's licenses should not be greater than the nominal amount of $1

Nature of the Service

Although well known to the Commission, we should like to include for the record a brief statement of the amateur's unique position among the services licensed by the Commission. Part 12 of your Rules specifically defines an amateur as "a person interested in radio technique solely with a personal aim and without pecuniary interest. . . ." The amateur is self-trained. On his own time and at his own personal expense he obtains a knowledge of the art sufficient to pass the license examination, and progresses in skill and technique. At no time does the amateur in his varied activities have any objective of material gain. The public service record of the amateur over the years in providing emergency communication in time of disaster is so well-known that we mention it only to point out that here, again, the amateur performs on a volunteer basis, on his own time and expense. The technical improvements in the art contributed by amateurs similarly do not need recounting here, but once more it is important to recognize that they have been accomplished strictly without pecuniary interest. As is also well-known, amateur radio is a prime source of personnel for the electronics industry, and many of today's leaders in the field chose electronics as a career because of an early interest and self-training through amateur radio; it has been said that the leadership of the United States in the electronics field derives to a considerable extent from what may be termed "the amateur spirit in research" — the thorough devotion to one's work which the amateur acquires early and carries through his career when employed in the professional field.

We believe that the voluntary, public-spirited contributions to our national life by the self-trained specialists making up the body of amateur radio are in themselves good and sufficient reasons to exempt the amateur service from payment of a license fee to the Government of the people we serve.

Amateurs Already Share Regulatory Costs

The League does not necessarily oppose the principle of each service standing a reasonable share of its costs to the Government. But we maintain that the amateur service does already on a voluntary basis conduct a number of its activities in a manner so as to obviate the need for certain federal regulatory supervision which would otherwise be required at great expense to the Government; and that in fact this procedure has been followed for so many years that the Commission may well have come to accept it as a standard procedure and thereby have overlooked its relevance to the current proposal.

Self-policing

The amateur service has an outstanding record in the field of self-enforcement of the Commission's rules. In no small measure this derives from the establishment by the League many years ago of a corps of volunteer Official Observers, who spend much of their time monitoring the amateur bands and advising stations as are found guilty of major or minor infractions of such discrepancies, either by direct radio contact or by postcard. Over the years this principle has become a part of the everyday approach of all amateurs toward their operating, and friendly notification or advice is regularly provided between amateurs in their daily contacts concerning compliance with regulatory provisions. Thus for many year the Commission has been able to conduct its supervisory and monitoring responsibilities with considerably fewer personnel than would be required if close attention to the amateur service were an essential, and there has been a consequent saving in costs to the Commission and the Government. Because this procedure has existed for so many years, this aspect of the amateur service helping to pay its own way may not always be fully appreciated in the examination of regulatory costs.

Interference Committees

The Commission has the responsibility for investigation and solution, insofar as possible, of mutual interference problems between the services under its jurisdiction. Particularly with the advent of the television broadcast service, these problems have compounded to the point where if normal measures continued to be employed the Commission would have been put to great expense in administration of such matters. In the amateur service, however, a solution which had proved successful in the early days of aural broadcasting was re-adopted for the current television interference problem — the establishment of "TVI" committees on a community basis to handle interference problems. More than 300 of these have now been set up, organized and staffed largely by amateurs under Commission sponsorship. Their success has been outstanding. Thus on a purely volunteer basis the amateur service has relieved the Commission of an immeasurable amount of investigative work which would otherwise have been necessary for the Commission to carry out its responsibility. The saving in dollars to the Commission has been and continues to be considerable.

Conduct of Examinations

With the continued growth of amateur radio, and the heavy upswing in the last few years of applications for amateur licenses brought about by the establishment of the Novice and Technician Classes of operator authorizations, the Commission's expense in supervising and conducting these examinations, both code tests and written portions, has become a serious problem. Largely as an economy measure, the Commission has recently adopted a new procedure whereunder examinations for Novice and Technician classes of amateur license will no longer be available at FCC offices or at points visited by traveling FCC engineers, but must be taken by mail. The Commission has delegated to any amateur holding a General Class (or higher) license authority to supervise the code test for these licenses, and similar authority to administer the written examination if the supervisor is 21 years of age or older. Thus the Commission is being relieved of considerable expense in conducting examinations for these two classes of license, which in the last year amounted to nearly half of the total applications received by the Commission in the amateur service. Further, the Commission has greatly expanded the areas where the Conditional Class license is available by mail. It is an important factor in the present discussion, we believe, to realize that purely by volunteer activity the amateur service is undertaking a considerable amount of the Commission's licensing workload, at a saving to the Commission of substantial proportions.

Discouragement of Newcomers

The United States has an established policy of encouraging the interest of its youth in scientific hobbies, and this policy has many times been held responsible for our world leadership in technical fields. There is no better example of such progress than amateur radio as a stepping stone to the electronics field. Just a few years ago the Commission, with our full support, established the Novice Class of amateur license to "create initial interest (among) particularly youth." The license fee proposal works a hardship on the Novice aspirant, not only in instances where he is a young lad for whom the acquisition of the necessary fee may be a problem, but also because when he chooses the Novice route

(*Continued on page 130*)

Correspondence From Members-

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

S.S.B.

114 Idlewilde Drive
Winston-Salem, N. C.

Editor, *QST:*

With all the good things that can be said about single-sideband, it must be admitted that it is not a method of transmission that is compatible with a.m. Would it not be well to give a portion of our bands to this method of transmission? I believe enough of us would see the value of it to do so *voluntarily* if a poll were taken. It seems to me that a 25-kc. segment on 75, 40, 20, 15 and 10 could be arranged on a trial basis. It would be well if the s.s.b. segment did not border on the a.m. band but would be separated from it. . . .

— *Lewis Kanoy, W4DCW*

3166 Bryant St.
Palo Alto, Calif.

Editor, *QST:*

. . . Looking back through some twenty years or more, the bands are crowded as never before. In the interest of easing QRM, it might help more than just a little bit if the s.s.b. stations were given, say, 25 kc. to operate in exclusively. By doing this, the rest of us old-fashioned people would stand a sporting chance.

— *Jack G. Hollenbeck, W6JIC*

225 Cambridge Ave.
Berkeley 8, Calif.

Editor, *QST:*

. . . Now I am going to introduce my ten cents' worth of suggestions which I hope will be considered along the constructive lines intended.

1) Q: I am not a Traffic Engineer and don't know anything about it but . . . I believe that it is common practice for the Traffic Engineer, before he recommends anything, to take what is termed a "traffic count." In this count he finds out what the present-day traffic consists of, where it is going, where it came from, peak periods, duration of peaks, etc. He also obtains an estimate of growth or decline. With this information in hand he can determine rather accurately, based on formulae of many previous surveys, just what facilities are going to be required (or what rearrangement of existing facilities can be made) to handle the present-day traffic. He can, by the use of his estimate, if taken for an advance period of, say, 5 years, inject and expand his formulae to obtain an idea of what facilities would be required at, say, yearly intervals for the next five years. He then might engineer his construction on an advanced planning basis and ask, "Now just how much of this should I allow for growth at the end of two years?" At the end of two years he might want to repeat the fact-finding so that he would be prepared to revise, if necessary, his first decision.

A: Before we can answer the question about s.s.b. we should have a "traffic count" and an "estimate of growth." How many hams are operating s.s.b. now? How many expect to be going to s.s.b. in the next 1–2–3–4–5 years? How many new hams do we estimate will be s.s.b.?

2) Q: The Traffic Engineer would, I should think, need to determine the type of traffic which would be permitted to operate over a system. For instance, it certainly would not be feasible to permit slow-moving vehicular traffic on a 60-m.p.h. freeway; yet if there is a large percentage of slow-moving traffic likely to exist for some time, satisfactory allowance has to be made for its existence. The facilities provided for either service should be expanded or reduced, depending on what our periodic traffic studies indicated.

A: Putting s.s.b. in frequency allocations for a.m. is not going to be satisfactory. The two types of communication are not compatible. Actually, s.s.b. is more closely associated with c.w.; the difference is that the carrier is triggered by the voice instead of by a bug. The techniques used in receipt of s.s.b. and c.w. are similar; a.v.c. off, r.f. gain down, audio level up, and even xtal filter in "sharp" position. (If you don't believe the last operation, try receiving s.s.b. on a stable a.m. receiver, and be surprised.) Even here, though, we still find that s.s.b. has characteristics which make it unsuited for operation in the c.w. bands.

3) Q: Well, what is the T.E. gonna do? He takes a good look at his survey and he is dismayed. He finds that all facilities are at present very much overloaded. He knows that he is not going to be able to expand his facilities — so, he has to improve on his allocations to permit c.w., a.m. and s.s.b. to operate at the speeds for which they are designed.

Getting back to straight talk again, my suggestion is that we should first take a square look at s.s.b. Find out what the present-day number of stations and comparable activity are. What is the expected trend toward s.s.b. going to be? What percentages of our bands are their numbers entitled to, taking into consideration the number of c.w. hams, a.m. hams, and the claims of s.s.b. of two-for-one operation compared to a.m. 'phone.

Then, for gosh sakes, let's end this fruitless battle of a.m. *versus* s.s.b. by taking a portion of the c.w. band and a portion of the present 'phone band and putting the s.s.b. boys unto themselves, until such times as conditions change.

Thanks for listening.

— *Bill Davis, W6VS*

[EDITOR'S NOTE: A common statement these days, heard over the air and found in the letters above, is that "a.m. and s.s.b. are not compatible." If this means that "one interferes with the other," then it is equally true that "high power and low power are not compatible."

If it is meant in the same sense that "compatibility" is used in color-TV work, "s.s.b." can be substituted for "color TV" and "a.m." for "monochrome." The definition of "compatibility" then becomes "the nature of the s.s.b. systems which permit substantially normal a.m. reception of the transmission by typical unaltered a.m. receivers designed for standard a.m." Further, "receivers are to be considered 'unaltered' if only receiver controls normally provided are readjusted" (page 22, *Proc. I.R.E.*, Jan., 1954).]

ROTTEN OPERATING

342 Brunswick Ave.
Toronto, Ontario

Editor, *QST:*

I am a snob.

For thirty-five years, man and boy, I have whacked the brass under this same call sign on many ham bands.

I am willing to send ten words a minute with what I hope is a fair amount of grace if I happen to run into a Novice. I will also discuss subjects such as the junior op's first tooth or what happened to the Dodgers in the '53 World Series — subjects of absolutely no interest to me. I will even handle any traffic that comes my way without a shudder at long-distance telephone delivery charges. But there's one thing I am very boorish about.

When VE3GE calls CQ and a station returns dead on my frequency with fifteen calls before he signs, there is a dead silence. So help me, if he is the rarest DX on the band, he gets no reply.

It should be a must for every ham operator to listen in one hour a week on 500 kc., to WCC, WAX, KFS and the like. Mebbe some of the delinquents would absorb the excellent operating techniques forced on these fellers by circumstances.

As the Old Man would have said, "The Rettysnitch to these long-callers."

— *Gord McClain, VE3GE*

QSLING

126 Chesterton Blvd.
Chesterton, Ind.

Editor, *QST:*

It has just come to my attention, through Fred Sawyer, W9FJI, of The Tri-State Amateur Radio Society, that a great number of QSL cards are not reaching the hands of hams due to incomplete addresses. This is the first I had thought of the problem the postal officials face every time a card or letter reaches their hands without a completely addressed cover.

To quote a paragraph from Fred Sawyer's letter:

"A QSL card addressed to W9XXX, Chief Operator John, Evansville, Indiana, certainly is not properly addressed. How many people in a city of approximately 150,000 are named John? And who but a fellow ham would know who W9XXX was? Certainly not the post office — Congress hasn't allowed them any money to buy Call Books — even if they did, it takes six months sometimes to get a new call in it."

This could be the very reason some of us are irritated because "W9XXX" hasn't answered that beautiful QSL sent to "John of Evansville." There are many answers to this problem. If you are interested in getting a QSL to and from "W9XXX," tell him your address or, as many do when operating c.w. and the address is a long one, tell him it's "OK in book."

I am sure this is the answer to my QSL problem and it could be the answer to yours.

— *D. B. Summers, W9VAY*

SIGN-OFF

Waterford, Conn.

Editor, *QST:*

I'm not a 'phone hound myself, but get a great kick out of listening to those boys on 3.8 Mc., especially to the slush and banana juice which they sling around when signing off. The correct signal for the expression "best regards" is just plain 73. This, in itself, is so overworked and so dry that it wouldn't take a Niantic River breeze to blow the dust away. But when the boys (and girls) come across with, "Well, I'll say 73s to the gang, etc.," which literally means "best regardses," it's all I can do to keep from chewing up my best quartz crystal and giving a kick to my only good rectifier tube. Under the right circumstances, I could see more sense in the use of the plural of 88.

Just to break the awful monotony, gang, why not just say "GB, you big bum" or anything else which you feel is appropriate, and let it go at that? After all, nobody takes this bunk seriously, and maybe the other fellow will think you have an original streak in your make-up. He's just waiting for you to get off the air, anyway.

— *Roy L. Gale, W1BD*

MOBILE FREQUENCY

4 Ploughman's Bush
Riverdale 71, N. Y.

Editor, *QST:*

This letter is to suggest some procedures which would help traveling mobile amateurs to make contact with each other and with local fixed stations. During the past five summers I have operated low-powered mobile rigs in all U. S. call areas except the fourth and also VE1, mainly with the objective of working stations immediately on the route. Technically, the results have been gratifying when stations within ten or twenty miles have been heard, and very pleasant contacts have ensued. Operationally, however, much more could have been desired because very few local signals have been heard, even in regions where I have passed a number of other mobiles on the road.

Probably the failure to make contact with local stations is the result of the random operation of the stations in a given area. This situation could be avoided by the adoption of a "mobile contact period" when traveling mobiles could establish contact with each other and with local fixed stations. I propose from 5:30 to 5:40 P.M. local time as the most convenient period. At this hour the traveler has just become settled in his motel while the local resident has usually just returned from work. Neither has started dinner or become involved in extended activities. The traveler could obtain local information early enough for it to be useful for him and, if desired, arrangements could be made to resume contact in the evening either on the air or in person.

If this idea is adopted, I suggest that operators, after calling "CQ mobile," tune the entire band for replies because many mobile stations are confined to a few frequencies by the absence of a VFO or to a limited segment of a band by the narrow bandwidth of low-frequency loaded antennas. Also, this period should be used mainly for establishing preliminary contact. An extended QSO should not take place without a check for other stations who might wish to join.

A procedure which would be helpful would be the publication in *QST* of "local mobile contact frequencies" (possibly one for each ARRL section, as determined by the SCM). I have observed that local usage of the bands varies considerably. Bands, or large portions of bands, virtually unused in one part of the country may be the most popular in others. Therefore it is possible at present for a mobile operator to discover that the equipment which produced numerous contacts at home is useless in the area to which he has gone or, in the case he has multiband equipment, that he has lost contacts by having had it tuned to an unfavorable frequency.

For this purpose it probably would not be necessary to specify an exact frequency but rather a band or a general portion of a band. As there would be some seasonal variation, these frequencies should be published at least twice a year; that is, "for summer" and "for winter."

— *Yardley Beers, W2AWH*

ANYONE FOR QRO?

7807th USAREUR Det.
APO 696, c/o PM.
New York, N. Y.

Editor, *QST:*

GM6MD's letter in February implies that the American "kilowatt" is more than is needed, an attitude many Europeans nurse about everything the American aims for . . . the best. I, myself, have been getting the razz from my DL friends for working on a pair of 813s. Every time they make a QSO with W-land on their 50-watter, they don't fail to let me know.

Here's my stock answer to all of them and they always admit I may have something here. Amateur radio communications may be compared to a forest. In America, 1000 watts is the legal limit. A 50-watter sapling in that forest is just overshadowed by the big boys when both signals finally reach DX-land, often that is. But a 50-watter in Europe is no sapling. Other European stations have comparable power. Therefore, the European signals have similar strengths when they arrive out in the DX country. Hence they're heard.

— *Wendall S. Johnson, DL4MK*

FILTERED

625 S. Sunset Canyon Dr.
Burbank, California

Editor, *QST:*

I have just developed the perfect receiver from the standpoint of selectivity. However, there is one minor bug left which I am presently working on. Perhaps you have some ideas.

You see, I was dissatisfied with the performance of the b.c. receiver in the car which is fed by my Gonset, so I decided to modify an old prewar Philco Transitone I had for use as a 1440-kc. i.f. I began by adding two i.f. cans on the set's 260-kc. i.f. frequency and an extra 6BJ6 i.f. amplifier. I peaked this set-up, modified the detector circuit, and added a noise squelcher. Then I decided further to increase the signal-to-noise ratio by cutting down the audio bandwidth. This I did, and the receiver performed beautifully, although it sounded rather tinny, with all the highs and lows missing.

With all the QRM on 75, it seemed like a good idea to make the i.f. still sharper by introducing a little regeneration into it. So, I coupled a little of the plate energy back to the grid of the 6BJ6. This increased the gain, and also sharpened it up very nicely.

Then the bug showed up. It seems that the i.f. is so sharp that it even clips the signal, so that everything above about 500 cycles is cut off in the i.f. The audio filter takes out

(*Continued on page 136*)

Results—Twentieth ARRL Sweepstakes

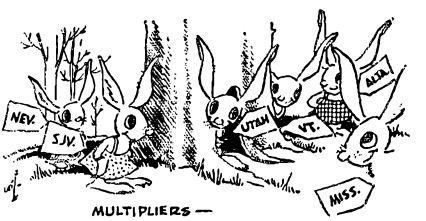
BY PHIL SIMMONS,* W1ZDP

At the stroke of 6:00 P.M. EST last November 14th, the ARRL Sweepstakes, celebrating its twentieth anniversary, got under way. And from that precise moment through the next 33 hours the call CQ SS rocked the bands, 'phone and c.w., from coast to coast and well beyond. The uproar was resumed with undiminished ardor the succeeding week end.

Why all the excitement? Well, there seems to be a certain something about the SS that appeals to countless amateurs, regardless of primary operating interest. To the contest veteran, it may be the thrill of vying with the local talent for the section award, or the challenge of breaking previous SS scoring records. To the newcomer to amateur radio, the SS can be a golden opportunity for a fast WAS and a fun-packed short cut to higher code speed and operating know-how. To the experimenter, it's a once-per-annum crack at seeing how long the transmitter will survive under pressure — pressure with a capital "P," that is! To the club enthusiast, the SS may stand for club certificate awards and that *beautiful* cocobolo gavel. And so forth.

If you've already participated in an SS or two, just skip this paragraph. If you haven't, a brief review of the whys and wherefores may be in order. Contestants aim to swap exchanges, similar to message preambles, with as many amateurs in as many of the 73 ARRL sections as possible. Those who run 100 watts input or less get a power multiplier to help them compete with the kilowatts, and a maximum of 40 hours of operating time is permissible. That's about all there is to it. You missed something if you weren't in the last one, but there'll be another when November, 1954, rolls around, and you can make up for lost time then.

The 1953 affair brought in 1641 logs, 1271 c.w. and 370 'phone. That's 488 more than the previous year's contest and a 42 per cent increase in participation. Yes, despite the continued sad status of the spectrum, the SS is bigger than ever! Seventy-three c.w. and 68 'phone operators bucked the growing tide, earned ARRL section awards. (See the tabulation of scores to determine who copped *your* section award.) Special certificates are also going to 10 Novices and to 73 club leaders. Nice work, guys and gals!



Now's let's have a look at how some of the gang made out . . .

The Brasspounders

When Larry LeKashman fired up his 4-65A 100-watter in the '53 SS, he probably figured he'd do okay. As an ardent SSer from W2IOP, W8IOP and now W9IOP, Larry always has. In this one he started rolling at the outset with 42 QSOs the first hour, carried on similarly for his remaining operating time. When it was all over, he was the new all-time SS champ with a tally of 199,199 points, had deposed by 8000 markers ex-record holder W6CUF, op of W6BJU in '51. Listening on a 75A-2, Larry latched onto 72 sections the first week end, got Alaska the second for his 73rd, had time for 1103 contacts as well. How does he do it? We don't know. Ask W9IOP.

Jerry, W3BES, added one more certificate to a stack already voluminous from previous DX, v.h.f. and SS work, with a 179,671-point total, the nation's second highest competitive score. Jerry reported 988 stations worked in all sections. His HT-18 drove an 813 at 100 watts input on 20, 40 and 80. Receiving gear was a DB-23 and NC-101X.

It isn't easy for W7s to accumulate the sort of totals the East Coasters do, what with 15 meters erratic and "good old ten" practically nonexistent for SS purposes. But W7PGX didn't let this worry him. Wheeling the 95 watts around 3.5, 7 and 14 Mc. with accustomed agility, Liscum came up with a walloping 993 exchanges in all sections but Vermont, weighed in at 176,310 points.

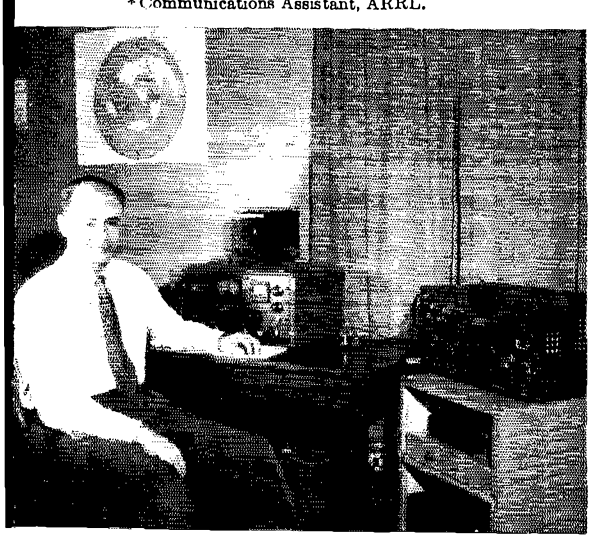
♦

Martin Fox, W6IXK, scored 125 grand to rank first among W6 brasspounders and take the Los Angeles section award hands down.

♦

QST for

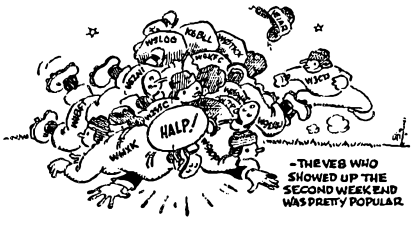
*Communications Assistant, ARRL.



Vic Clark, W4KFC, decided to forsake that 1.25 power multiplier, cranked up the p.p. 4-250As to 900 watts, set out to best the previous record of 1100 SS QSOs (W8IOP in '51). This he did — and then some! Using the same 20-40-80 band combination that served W9IOP, W3BES and W7PGX in such good stead, Vic piled up the fourth-position score of 171,988 points, worked 1183 stations, averaged a sizzling 29.6 contacts per hour. Operating aides included a BC-348 with Select-o-Ject and a CQ-SS wheel.

The following racked up over 125,000 points, too: W4KVX 166,050, W5LGG 162,790, W3EIS 160,326, W3DGM 157,620, W3JTK 152,730, W8PBU 150,120, W5GEL 144,175, W5DWB 134,280, W9ERU 134,010, W5KC 131,794, W5RID 130,159, W5TFB 128,340, W9YFV 127,203, WØTKX 125,563, W6IXK 125,010.

Competition for SS awards is always between stations in the same ARRL section. This is as it should be, because location differences render it impossible for some to compete with others on a national basis. A little plugging, though, will bring a section award to any amateur who discovers the right combination of antennas, clean keying, quick band-change and, above all,



"operator savvy." Listed below are the scores of licensing area leaders, all of whom have found the secret of SS winnership:

W1BFT	107,010	KL7EVR	20,670
W2SSC	104,966	KP4JE	42,210
W3BES	179,671	KZ5EU	24,125
W4KFC	171,988	VE1AR	48,480
W5LGG	162,790	VE2NI	91,040
W6IXK	125,010	VE3BBR	70,200
W7PGX	176,310	VE4MX	24,500
W8PBU	150,120	VE5LV	18,813
W9IOP	199,199	VE6MA	37,194
WØTKX	125,563	VE7RU	350
KH6IJ	59,938	VE8OG	6,435

Seventy-three sections were on hand for the first time, fledgling Santa Barbara having boosted by one the number available. Here are the sharpshooters — note the W3s with the pipeline! — that qualified for the full multiplier: W1RY, W3s ALB BES CTJ EIS EVW JTC KT LVF,

♦

Illinois winner Paul Edwards, W9NDA, worked five bands, was '53 SS 'phone champ with a 116,070-point tally. (*Photo by W9YZE*)

♦

Tenth-high c.w. score came from pipe-fancier Tom Gloystein, W8PBU, Ohio section and Ohio Valley Amateur Radio Assn. winner.

W4KFC, W5s GEL LGG RID, K6BLL, W9s IOP WFS YFV. Twenty-two others worked 72 sections but bemoaned the paucity of KL7, VE8 and Vermont representation, indicating those as the hardest to come by.

Sparked perchance by ARRL's offer of a special certificate to the top Novice in each section where three or more such logs were received, the yearlings were out in force. Number-one tally among WN and KN competitors comes from Wolverine State's Bill Engle, who posted 8138 points at WN8NGK within the confines of 3700–3750 and 7175–7200 kc. Other FB totals: WN9YDZ 3975, WN8OXI 3185, WNØQMZ 3088, KN2EIU 3048, KN6AYB 2826, KN6AUD 2875, WNØOWS 2801, WNØOZE 2563, WN4BLR 2275, WN9YXX 2200, WN4AUC 2161, WN1YNI 2114, WN1WZR 2000.

The A3 Contingent

A permanent spot in the Hall of SS Fame is due Paul Edwards, W9NDA, who became the first W9 to lead the 'phone brethren in postwar SS competition. Paul stayed at the 32V-2 to the tune of 530 exchanges in all sections, amassed 116,070 points. He relied on 20-40-75 but, missing no bets, made 10 and 15 pay off for a few QSOs during the 40-hour operating stretch, took the Illinois section award going away.

Not far behind was WØPRZ with a husky 107,201-pointer. Alvin chatted with 497 entrants in the 73 sections in just 30 hours, at the same time provided a scarce one for those questing

WAS. The lash-up included a 32V-1 and 75A-2, both bolstered by a fancy assortment of rotaries and Vee beams.

Only other 6-digit score among voicemen was that of W4HQN, with W4NTZ doing the talking. Milt got 66 section-markers out of 520 stations worked on 20-40-80, reported 102,460 points.

Other outstanding 'phone accumulations: W5YGL 71,181, KH6AWM 70,819, W8AJW 70,686, W4KZF 69,564, W5SFW 68,832, W5UBN 66,402, W4ESK 65,520, W1JEL 62,112, WØBCF 57,936, W6SUP 57,664, W4SOV 57,456, W5TTG 56,730, WØREP 53,676, W3VKD 51,204.

All 73 ARRL sections were active, but it took some digging! Heading the roster were W9NDA and WØPRZ, both of whom got 'em all, followed by W5SFW with 72 and W3JNN, W3MSK and WØBCF with 71.

So that each entrant can see how his score shapes up with the high man in his vicinity, here are the licensing area leaders:

W1JEL	62,112	W9NDA	116,070
W2SKE	45,356	WØPRZ	107,201
W3VKD	51,204	KH6AWM	70,819
W4HQN	102,460	KL7AON	28,740
W5YGL	71,181	VE2CB	6,278
W6SUP	57,664	VE3BVI	18,365
W7NPV	37,479	VE6EO	2,880
W8AJW	70,686	VO6U	133

Club Scores

Sixty-one groups tried out for the gavel that goes to the club whose members come up with the highest aggregate score. And for the fourth straight SS the Potomac Valley Radio Club, after a nip-and-tuck fracas with Frankford, outpointed its rivals and earned the coveted prize. The Ohio Valley Amateur Radio Assn. continued to creep up on the leaders and may well pass them by in the future. See the accompanying club box for full data on club totals and certificate winners.

CLUB SCORES

Club	*Score*	*Entries*	*C.W. Winner*	*'Phone Winner*
Potomac Valley Radio Club	2,730,341	47	W4KFC	W4HQN
Frankford Radio Club	2,567,904	39	W3BES	W3MDE
Ohio Valley Amateur Radio Assn.	1,560,621	35	W4KVX	W4KZF
El-Ray Radio Club	783,261	47	W1BOD	W1OTH
York Radio Club	590,693	11	W9YFV	.....
Chicago Suburban Radio Assn.	480,314	18	W9WFS	W9FVU
Richmond Amateur Radio Club	382,010	60	W4BZE	W4VUF
Milwaukee Radio Amateurs Club	348,715	16	W9GIL	W9VBZ
Westpark Radiops	335,938	21	W8VTF	W8AJW
Detroit Amateur Radio Assn.	320,371	25	W8YIN	W8GTI
Twin City Contest Club	315,983	6	WØTKX	.....
South Jersey Radio Assn.	267,766	17	W2PAU	K2BQW
Northwest Amateur Radio Club	264,075	8	W9NII	.....
Sioux City Amateur Radio Club	255,713	4	WØFZO	.....
Hampden County Radio Club	241,421	21	W1JYH	W1QWJ
Syracuse Amateur Radio Club	235,159	4	W2RQH	.....
Connecticut Wireless Assn.	229,047	4	W1BIH	.....
Michiana Amateur Radio Club	223,665	6	W9IOP	.....
Queens Radio Amateurs	212,649	9	W2GXC	.....
Levittown Amateur Radio Club	203,134	8	W2RDK	.....
Rebel Radio Club	197,328	4	W4BRB	.....
Buckeye Short Wave Radio Assn.	196,322	4	W8OYI	.....
North Suburban Radio Club	185,170	8	W9WJV	.....
Nassau Radio Club	184,271	13	W2VL	K2AAA
Central Connecticut Contest Club	179,697	8	W1WPO	.....
Pottstown Amateur Radio Assn.	167,782	4	W3BIP	.....
Dayton Amateur Radio Assn.	159,639	5	W8ZJM	.....
Lake Success Radio Club	144,424	21	W2OPY	W2BQM
South Lyme Beer, Chowder and Propagation Society	133,106	4	W1IKE	.....
Mid-Island Radio Club	130,195	3	.....	.....
Dade Radio Club	122,778	3	W4LVV	.....
St. Louis University Amateur Radio Club	111,090	6	W9GNG	.....
Philadelphia Wireless Assn.	109,744	5	W3QLI	.....
Aero Amateur Radio Club	107,361	5	W3QQO	.....
Johnson County Radio Amateur Club	106,298	5	WØBCI	.....
Norton Amateur Radio Club	103,721	14	VE3BXF	VE3BVI
Knickerbocker Amateur Radio Club	101,947	5	W2IVS	.....
Tri-County Radio Assn.	98,593	8	W2TWC	.....
Denver Radio Club	98,336	12	WØIC	WØBWJ
Garden State Amateur Radio Assn.	92,521	4	W2TPJ	.....
Martinsville Amateur Radio Club	89,500	5	.....	W9JVN
Columbus Amateur Radio Assn.	88,420	3	.....	.....
Bloomfield Radio Club	85,373	4	W2HWH	.....
Niagara Radio Club	79,348	9	W2FMF	.....
Baltimore Amateur Radio Club	79,326	3	W3GBB	.....
Pacifico Radio Club	79,040	4	W6KPM	.....
West Philadelphia Radio Assn.	78,834	3	.....	.....
Canton Amateur Radio Club	76,027	8	W8AL	.....
Rochester DX Assn.	67,686	4	.....	.....
Point Radio Amateurs	63,139	6	W9BCC	.....
Southern California Teen Age Net	57,489	9	W6NJU	W6MYQ
Delaware Valley Radio Assn.	52,240	4	.....	.....
Mountaineer Amateur Radio Assn.	49,348	5	W8MBA	.....
Coronado Radio Club	44,480	4	W6JVA	.....
Northeast Philadelphia Radio Club	44,247	7	W3CLC	.....
Tri-County Radio Club	40,446	4	W1NHJ	.....
Browning School Amateur Radio Club	34,998	4	W9WAN	.....
Avenel Radio Club	34,916	6	W2JCO	.....
Fall River Amateur Radio Club	21,649	7	W9VJD/1	W9VJD/1
Swani Amateur Radio Club	5662	3	.....	W9TPA
Central High School Radio Club	3376	4	WØDSP	.....

With 600 watts to 813s at W6SUP, Bob Metke paced California 'phone entrants and provided SSers with the Sacramento Valley section multiplier.

Sidelights

A new "Entries" figure, indicating the sum total of 'phone and c.w. logs submitted by a club, has been added to the tabulation of club scores. It can be used to answer questions like: (1) Which club came up with the most logs, and (2) which club had the highest score *per entry*. . . . K6BWD took the L.A. award with 25 watts to an 807 modulated by 1614s. Who says you need power to get out on 'phone! . . . Personal note to the W7 and W9 who traded SS messages *four* times: How about using ARRL Operating Aid #6 to avoid duplicate contacts, fellows? . . . W2SKE had to do four TV shows over the two week ends, but averaged 22 QSOs per hour for 15 hours and earned the N. Y. C.-L. I. A3 certificate, nevertheless. Bill avows it was the best SS ever. . . . Clubs looking to the future are signing up Novices. Richmond Amateur Radio Club had 8 c.w. entries from the yearlings, El-Ray Radio Club, 5. . . . W1RWP (Vt.) enjoyed giving W5LGG and W5GEL their 73rd sections. . . . Call oddities: WØBAT, W8DOG, W3HOG and WØPIG were on, as were W1SAD, W2SOB, W2WOE and W8JOY. Also in there were W8BUM and W8OAF. . . . Section-hunting brasspounders included W1RY who got 'em all in just 154 contacts and WØDQL with 70 out of 78 QSOs. . . . Ohio Valley Amateur Radio Assn., with most members in Ohio, saw both its club awards go to Kentuckians W4KVX and W4KZF. W4s also spearheaded Potomac Valley Radio Club (scattered over Md.-Del.-D. C. and Virginia) with W4KFC and W4HQN getting the nod. . . . W8PCS says this was his 10th consecutive SS and looks forward to many more. . . . WØDSP, Advisor, Central High School Radio Club (Sioux City, Ia.), writes: "ARRL is doing a fine piece of work in sponsoring the several contests among the amateur fraternity. Participation is a great experience for the youngsters just getting into radio and a wonderful incentive toward better operating procedures." . . . W2NLI, 15 years old and in his first SS, liked the widespread use of break-in. . . . VE2CB found he could win the Quebec 'phone award without VFO, but has already added one to his gear for the next shindig. . . . W9IOP observes conditions were peculiar with long skip prevailing but signals extremely strong from parts of the country that were being heard. Larry also notes: "It appeared that a number of the regular contest men whom I had worked over many previous years were not active. I hope that only skip prevented me from hearing them and that they have not given up this extremely enjoyable competitive event." . . . W9ERU (Ill. c.w. winner, 134,010 points) recalls having grabbed the award for Illinois in the first SS (January, 1930) with a snazzy 52 QSOs in 26 sections. . . . W9NH likes the contest but hates the paperwork involved in the reporting. (Don't we all?) . . . WNØQMZ is a brand new ham who got lots of new states in his very first contest. Adds Ron: "If they're all as much fun as this one, I hope to be in plenty more." . . . K6AUZ got so many queries when abbreviating Santa Barbara section as "SBAR" that he ended up spelling it out for everyone. . . . VE2DR doffs his hat to the supermen who ran up the big scores despite the QRM and difficult band conditions. . . . W5SQI says his XYL didn't like the idea of being husbandless for two week ends. . . . Over 50 contestants wrote "Where was Vermont?" . . . With 7 watts to an 807 on 3.5 and 7 Mc., W8JWX made 206 A1 QSOs. . . . Check these for some rugged intrasectional battles: *'Phone* — W6BXA and W6IDY in East Bay; WØYMP, WØBWJ and WØRJN in Colo.; W4AYX and W4WHF in E. Fla.; W5YGL and W5UBN in So. Texas. *C.w.* — W2TPJ and W2HWH in N. N. J.; WØNCS and WØFZO in Iowa; WØLLU and WØFIN in Mo.; W6ZQD and W6RMP in Sac. Valley; W7QDJ and W7CCC in Utah; W5ONL/4 and W4USM in Ala. . . . All 48 states were worked at W3LEZ for the first time in any contest. . . . W7EYD has copped Washington section 'phone honors for 5 years running.

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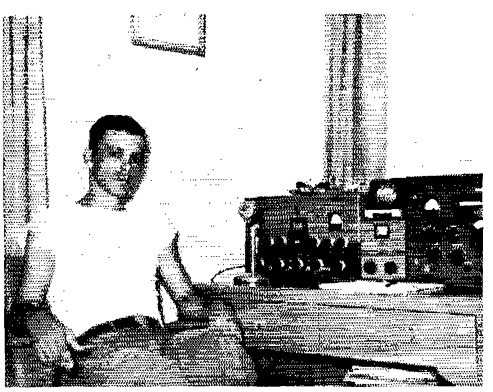
Twentieth Sweepstakes Contest Scores

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates power up to and including 100 watts (multiplier of 1.25, c.w.; 1.5, 'phone), B over 100 watts (multiplier of 1). . . . The total operating time to the nearest hour, when given for each station, is the last figure following the score. . . . Example of listings: W3BES 179,671–988–73–A–40, or, final score 179,671, number of stations 988, number of sections 73, power factor of 1.25, total operating time 40 hours. . . . An asterisk denotes Novice certificate winners in sections where at least 3 Novice logs were submitted. . . . Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation, with calls of participants in parentheses.



George Therkildsen, W5YGL, relaxes after becoming high 'phone man for the W5 licensing area and Southern Texas.

Liscum Diven, W7PGX, piled up 176,310 markers, the nation's third-highest c.w. total, grabbed the Arizona certificate, too.

C.W. SCORES

ATLANTIC DIVISION

Eastern Pennsylvania

W3BES...179,671- 988-73-A-40
W3DGM...157,620- 889-71-A-40
W3OCU...117,450- 655-72-A-40
W3ALB...116,161- 637-73-A-35
W3LVF...113,606- 625-73-A-29
W3EVW...108,314- 594-73-A-39
W3JBC...106,400- 609-70-A-37
W3EQA...104,563- 598-70-A-39
W3LEZ...104,212- 596-70-A-34
W3GHM...100,130- 594-68-A-34
W3DLR...94,500- 525-72-A-37
W3CHH...86,250- 575-60-A-40
W3KT....84,771- 465-73-A-31
W3CPS...77,568- 455-71-A-34
W3HTO...63,728- 441-58-A-37
W3BIP...62,764- 399-63-A-37
W3ARK...60,620- 434-70-B-35
W3EAN...51,336- 420-62-B-24
W3KDF...49,833- 322-62-A-28
W3ADZ...49,476- 435-57-B-27
W3IXN...48,160- 344-56-A- –
W3ISE....47,809- 337-57-A-26
W3GHD...45,979- 276-67-A-18
W3HER...45,960- 386-60-B-28
W3QLI...39,550- 283-56-A-13
W3MKA...39,220- 298-53-A-17
W3VDV...36,918- 295-63-B-30
W3CGS...36,150- 241-60-A-27
W3MWC...32,513- 289-45-A-26
W3MWL...29,854- 260-59-B-35
W3RYT...20,654- 268-31-A-32
W3KFK...19,700- 197-40-A-26
W3DFJ...19,168- 188-41-A-24
W3CLC...17,360- 156-56-B-12
W3ADE...17,044- 152-45-A-12
W4VWV/3
16,695- 159-42-A-19
W3JSA....16,200- 164-40-A-18

W3JTK...152,730- 849-72-A-40
W3JTC...117,895- 647-73-A-37
W3GRF...115,489- 672-69-A-40
W3KDP...115,375- 654-71-A-40
W3VAN...115,110- 641-72-A-36
W3FQB...112,901- 655-69-A-40
W3AEL...107,210- 605-71-A-38
W3QQO....83,318- 530-63-A-34
W3NOE....82,159- 492-67-A-32
W3DRD....73,980- 412-72-A-28
W3IKN....73,600- 461-64-A-39
W3DVO....71,610- 512-56-A-40
W3MFJ....70,653- 480-59-A-37
W3GAU....65,360- 415-64-A-17
W3SAL....65,208- 386-68-A-28
W4FF/3...56,325- 360-63-A-35
W3PTZ/3..56,000- 404-56-A-33
W3WV....53,125- 313-68-A-27
W3RNY....40,969- 290-57-A-30
W3GA....38,128- 332-46-A-26
W3GBB....37,125- 298-50-A-33
W3HVM....35,974- 274-53-A-35
W3FDJ....34,361- 281-49-A-31
W3CIQ....31,868- 257-62-B-30
W3HDV....28,635- 251-46-A-30
W3ZQ....25,488- 216-59-B-22
W3TMZ....23,148- 198-47-A-27
W3PQT²...21,009- 234-47-B-29
W3LVJ....19,799- 169-47-A-15
W3FPQ....19,505- 166-47-A-13
W3URV....18,900- 180-42-A-38
W4HZ/3....14,778- 129-46-A-23
W3PZW....14,175- 135-42-A- 8
W3UGF....12,920- 138-38-A-13
W3KLA....12,800- 165-40-B-27
W3HTK....12,773- 131-39-A-18
W3JO....10,453- 113-37-A-15
W3HXN....9214- 139-27-A-15
W3WU....9100- 104-35-A-14
W3AOO....8988- 107-42-B- 8
W3IBX....7840- 112-28-A-13

Ed Harrington's 62,112 points at W1JEL was Number One 'phone total from Eastern Massachusetts section as well as New England.

W3TPC...12,320- 155-32-A-37
W3QLZ...12,005- 172-28-A-15
W3NHX...10,463- 140-30-A-22
W3DYL....9462- 125-38-B-12
W3ENH....8750- 100-35-A-11
W3PST....8048- 111-29-A-19
W3DVC....7468- 103-29-A- 5
W3SOH....5628- 101-28-B-21
W3FQT....5578- 99-23-A- –
W3TDF....5348- 73-31-A-10
W3FUF....4070- 74-22-A 10
W3UZS....3500- 79-20-A-33
W3VOC....1659- 39-17-A- 4
W3LXO....1575- 44-15-A- 9
W3TMN....1523- 30-21-A-11
W3OY....1313- 38-14-A- 4
W3TNC....1290- 46-12-A- 5
W3TJW....1200- 32-15-A- 6
W3HOG....825- 34-10-A- 7
W3UGX....680- 23-17-B- 5
WN3WHJ....488- 22-10-A-18
W3CBF....425- 17-10-A- 3
W3ABZ....300- 15- 8-A- 2
W3VXQ....263- 16- 7-A-12
W3VXP....56- 8- 3-A- 7
W3VHZ....23- 3- 3-A- 1
W3CTJ (W3s CTJ NOH)
181,223- 998-73-A-39
W3HUS (W3s HUS ITZ)
70,363- 434-65-A-30

Md.-Del.-D.C.

W3EIS...160,326- 879-73-A-39

W3ROU....7156- 117-25-A- 7
W3PGA....6669- 125-27-B-11
W3QQS....6563- 105-25-A-29
W3RRT....6450- 111-24-A-11
W3DPA....5938- 96-25-A- 4
W3TXL....5635- 100-23-A-11
W3QZC....4410- 84-21-A- 5
W3VJV....3784- 92-22-B-20
W3WSE....3240- 73-18-A- 5
W1RWR/3..3150- 53-24-A- 8
W3NVOS...1705- 38-22-A-19
W3NHA....1050- 35-15-B- 3
W3BYV....881- 24-15-A- 6
W3PYZ....709- 32- 9-A- 4
W3AYS....40- 5- 4-B- –
W3FYS (W3s FYS HOH)
97,388- 559-70-A-40
W3GQF (W1RJN W2s EZZ HEI W3s QLN RJA SXN SZP TEN)
55,080- 411-54-A-40

Southern New Jersey

W2PAU...81,758- 498-66-A-34
W2FXN...74,023- 522-58-A-24
W2GND...73,886- 486-61-A-39
W2CAG...62,372- 504-62-B-33
K2CPR...58,140- 408-57-A-24
K2ERC...47,575- 346-55-A-26
W2ZVW...39,971- 314-51-A-21
W2QED...36,146- 293-62-B-37
K2BHQ...27,324- 254-54-B-35
W2DAJ...23,750- 313-38-A- –

W2LYL...19,744- 205-39-A- –
W2FYT....19,430- 170-58-B- –
W2LAY....18,920- 176-43-A-24
W2QDY....16,958- 200-34-A-22
K2EDL....15,840- 144-44-A- 6
K2BMX....15,540- 168-37-A-24
W2HDW...15,378- 209-30-A-26
W2QKJ....10,000- 101-40-A-24
W2TBD....8080- 101-32-A-14
W2HAZ....7816- 85-37-A- 7
W2NQU....6084- 80-31-A-15
K2CWJ....5468- 82-27-A-11
W2DMU....5400- 80-27-A-17
W2BWW....5250- 89-24-A-17
W2QKZ....2400- 40-24-A- 4
W2TM....2200- 40-22-A- –
W2SDB....1395- 31-18-A- 5
W2GVB....618- 19-13-A-11
W2SPV....320- 16- 8-A- –
W2EWN....193- 11- 7-A- –
W2BEI....160- 10- 8-B- –

Western New York

W2SSC...104,966- 611-69-A-34
W2RQH...96,169- 558-69-A-39
W2BXZ....76,570- 495-62-A-38
W2INH....74,100- 570-65-B-37
W2COU....59,796- 453-66-B-32
W2EMW...48,506- 305-65-A-37
W2FMF....40,096- 359-56-B-28
W2FXA....36,300- 265-55-A-28
W2KKZ....33,495- 309-44-A- –
W2SVF....30,688- 277-56-B-26
W2KEL....29,200- 292-50-B-30
W2NZA....22,919- 280-41-B-22
W2SVC....18,360- 230-32-A-16
W2VJO....14,625- 163-36-A-24
W2KEC....11,730- 139-34-A-11
W2SAW....5880- 85-28-A-12
W2CTA....5160- 65-32-A-11
K2EVP....4875- 75-26-A-10
W2OVP....4410- 85-21-A- 9
W2CIH....4165- 60-28-A- 9
W2KKT....4125- 67-25-A-17
K2CUE....3465- 72-21-A-15
W2WOE....3355- 61-22-A- 8
W2PYC....2258- 43-21-A- 5
K2DJD....765- 27-12-A-11
KN2EBO....114- 7- 7-A- 7
KN2GEK....40- 4- 4-A- 2
W2VIU....20- 5- 2-B- 2
W2GVJ (W2GVJ K2BUI)
1041- 25-17-A-10

Western Pennsylvania

W3NRE...78,120- 504-62-A-33
W3PWN...63,335- 478-53-A-32
W3SIJ....23,702- 252-38-A-38
W3NUG....19,136- 208-46-B-20
W3GEG....17,050- 155-44-A-11
W3WLM...11,840- 148-32-A-20
W3SDV....8120- 103-40-B-15
W3UHN....1645- 47-14-A- 5
WN3VKU...1220- 35-24-A-19
WN3VWJ....140- 9- 8-A-17
WN3NCD....100- 10- 4-A- 1
W3SYW....23- 3- 3-A- 1

CENTRAL DIVISION

Illinois

W9ERU...134,010- 747-72-A-40
W9YFV...127,203- 699-73-A-40
W9NII...111,475- 637-70-A-40
W9PNE...103,414- 603-69-A-32
W9AMU...96,840- 539-72-A-40
W9WJV....93,925- 553-68-A-40
W9WFS....84,498- 466-73-A-23
W9ZAB....69,550- 428-65-A-35
W9KLD....65,911- 401-67-A-38
W9OIJ....64,900- 440-59-A-39
W9WIO....61,750- 383-65-A-27
W6PAR/9..60,635- 368-67-A-31
W9WHF...46,980- 325-58-A-38
W9LIO....39,944- 309-53-A-29
W9WBI....35,840- 256-56-A-24
W9GNG....35,179- 270-53-A-30
W9POL....32,240- 248-52-A-35
W9ZSQ....30,240- 231-54-A-35
W9EET....24,900- 208-48-A-25
W9QXY....24,255- 200-49-A-25
W9AGM...24,180- 186-52-A-16
W9FKH...23,000- 200-46-A-32
W9NJZ....22,990- 209-44-A-34
W9TH....21,875- 151-58-A-15
W9MRQ...16,748- 203-33-A-17
W9TKR...15,640- 185-34-A-27
W9VOX...14,805- 141-42-A-29
W9RER...14,310- 163-36-A- –
W9JUV....13,653- 127-43-A-10
W9CKC....12,285- 127-39-A-12
W9OIN....12,119- 141-35-A-24
W9TPH....10,920- 112-39-A-21
W9DRU....10,725- 111-39-A-14
W9TRE/9..10,406- 113-37-A-29
W9DOQ....10,360- 130-32-B-13
W9QQX....9765- 109-36-A-22
W9YDQ....9364- 114-33-A-17
W9LTA....9073- 96-38-A-21
W9TZN....6888- 96-29-A-14
W9WYB....6720- 84-32-A- 8
W9WOC....6683- 101-27-A-24
W9UYD....4785- 69-29-A-12
WN9YDZ...3975- 61-30-A-34

W9BJN....3172- 63-26-B-12
W9REC....3025- 55-22-A-10
W9ZIS....2750- 52-22-A-17
W9UZP....2344- 38-25-A- 9
W9JTM....2250- 50-18-A-10
W9FDY....1520- 33-19-A-12
W9OKI/9....1425- 38-15-A- 7
W9TAL....1425- 30-19-A- 4
W9VBV....1260- 32-16-A- 9
W9PTI....1013- 27-15-A- 6
W9SEJ....1005- 36-12-A-12
W9YSR....900- 30-12-A- 4
WN9WJD....715- 26-11-A-24
W9WNT....375- 16-10-A- 9
W6CIW/9....336- 14-12-B- 4
W9FQ....193- 13- 7-A- 2
W9JMG....191- 9- 9-A- 2
W9CGC/9*...108- 14- 4-B- –
W9TVN....70- 7- 4-A- 3
W9IDO....45- 6- 3-A- 1
W9OHU....15- 6- 1-A- 1
W9UBW....3- 1- 1-A- 1
W9AVJ (W9s GVZ NZM PKW POP)
85,735- 665-65-B-40
W9OCB (W9s DDP DWD OCB)
81,413- 508-65-A-33
W9UVM (W9s UVM VBS)
80,385- 469-69-A-36
W9TGY (W9s RMH TGY)
69,469- 432-65-A-38
W9OKQ (W9s AQJ OKQ)
57,815- 373-62-A-40
W9KWN (W9s KWN NDK)
51,756- 319-65-A-31
W9AWE (W9s HQW QEI QFH VTI)
49,644- 402-63-B- –
W9INN (W9INN WN9YKV)
40,635- 301-54-A-25
W9QPI (W9s QGP QPI QQB VTB)
36,539- 305-61-B-37
W9PGW (W9s PGW TQL)
21,830- 185-59-B-19
W9WQE (W9s TRC WQE)
18,450- 167-45-A-32
W9ZSI (W9s TQL ZSI)
1870- 55-17-B- 4

Indiana

W9IOP...199,199-1103-73-A-40
W9QMI....69,221- 443-63-A- –
W9VQL....64,050- 420-61-A-24
W9NH....53,561- 311-69-A-30
W9UKG....47,025- 320-60-A-40
W9HLY....32,810- 194-69-A-35
W9UWU....15,645- 151-42-A-18
W9ZBK....15,400- 140-55-B-16
W8AVT/9..14,661- 159-37-A-18
W9UC....10,560- 110-48-B-10
W9TOF....9756- 113-35-A-28
W9POB....8150- 82-40-A-19
W9SWM....7100- 71-40-A- 6
W9SIQ....4568- 63-29-A-10
WN9YXX*..2200- 41-22-A-32
W9SFR....1995- 38-21-A- 4
WN9WLY...1640- 46-16-A-32
W9VNE....1500- 40-15-A-14
W9ZMN....1235- 33-19-B- 4
WN9ZSA....595- 18-14-A- 6
W9YDP....28- 4- 4-B- 1
W9SAL (W2GRH W8s AEB YEG W9PGO)
50,730- 357-57-A-40
W9PGO/9 (W9s PGO QAY)
3100- 63-20-A- 9

Wisconsin

W9RQM...136,142- 771-71-A-38
W9GWK...92,575- 529-70-A-39
W9GIL....75,780- 421-72-A-34
W9VOD....65,840- 415-64-A-34
W9LFP....54,194- 334-65-A-35
W9RKP....46,920- 276-68-A-33
W9VKR....34,583- 261-53-A-24
W9WAN....23,220- 222-43-A-39
W9BCC....19,135- 192-44-A-28
W9JQP....18,383- 172-43-A-30
W9SZR/9..18,330- 235-39-B-33
W9CFL....16,568- 141-47-A-19
W9DPN....7400- *80-37-A-14*
W9FDX....6311- 77-33-A-11
W9OPS....5868- 87-36-B-13
W9KKX....5280- 66-32-A-14
W9CXY....5040- 84-30-B-12
W9LSK....4275- 88-25-B- 6
W9VBZ....4128- *64-26-A- 9*
W9VZK....3964- 77-21-A-20
WN9YOX*..1995- 39-21-A-21
W9VYX....1870- 45-17-A- 9
W9KXK....1613- 27-15-A- 2
W9RTP....943- 29-13-A- 5
W9BCU....805- 23-14-A- 4
W9WUQ....510- 19-12-A-14
W9DR....509- 19-11-A- 2
W9MDG....480- *20-12-B- 5*
WN9ZAN....320- 19- 8-A-14
WN9YOS....245- 16- 7-A-13
W9VZL....112- 8- 7-B- 2
WN9ZHI....40- 5- 4-A- 5
WN9ZDU....25- 5- 2-A- 4
WN9WWN....3- 1- 1-A- –
WN9ZDH....3- 1- 1-A- –

DAKOTA DIVISION

North Dakota

WØEOZ...75,820- 448-68-A-26
WØARB...36,968- 287-53-A-29

South Dakota

WØPHR...106,080- 629-68-A-31
WØSMV...25,410- 184-56-A-23
WØAEN.....3173- 47-27-A-12

Minnesota

WØTKX..125,563- 718-70-A-40
WØYCR...107,450- 617-70-A-32
WØJNC...95,375- 547-70-A-39
WØBAT...50,150- 348-59-A-28
WØGHX...47,864- 397-62-B-39
WØHFY...22,191- 217-41-A-18
WØPIG....14,070- 137-42-A- 9
WØDQL...10,920- 78-70-B-26
WØWAB....9000- 160-36-A-16
WØFUX.....7549- 93-33-A-22
WØGSR.....2745- 50-20-A- 9
WNØQDP....153s- 46-15-A-22
WNØQQM....475- 19-10-A-10

DELTA DIVISION

Arkansas

W5MSH...48,128- 311-62-A-18
W5QKZ...26,895- 259-55-B- –
W5FMF....2185- 38-23-A- 7
W5YHT....2099- 37-23-A-11

Louisiana

W5KC...131,794- 748-71-A-34
W5MCT..119,970- 670-72-A-37
W5U8N[4]..112,613- 650-70-A-37
W5WG....94,690- 560-68-A-40
W5NDV...46,575- 311-60-A-37
W5TRQ...15,469- 138-45-A-18
W5BI.....13,125- 125-42-A-10
W5ZGP.....3290- 48-28-A- 9
WN5ZAK....450- 16-12-A-11

Mississippi

W5ZOC...15,840- 151-44-A-24
W5WMN..12,220- 136-47-B-18
W5WZ.....1898- 35-22-A- 4
W5TVI/5 (W5TVI W9QOM)
6640- 83-32-A- 8

Tennessee

W4CYR...96,950- 557-70-A-37
W4VOS...71,280- 532-54-A-36
W4TJI....51,789- 432-61-B-31
W4OGG...41,160- 296-56-A-20
W4UIO....35,000- 280-50-A-33
W4TPL....33,516- 296-57-B-25
W4OEZ....29,906- 220-55-A-30
W4UOA....27,000- 227-50-A-19
W4WXS....18,436- 175-43-A-27
W4ZJY....12,330- 142-36-A-22
W4FLW....10,340- 121-44-B-13
W4UVP.....6603- 71-38-A-18
W4UWA.....2805- 51-22-A- 5
W4HIH.....2310- 42-22-A- 6
W4SMZ.....1643- 38-18-A- 6
W4ZLU.....190- 11- 8-A- 2
W4TIE.....10- 2- 2-A- 1

GREAT LAKES DIVISION

Kentucky

W4KVX..166,050- 923-72-A-38
W3UVB/4.78,540- 464-68-A-33
W4OMW..57,275- 398-58-A-32
W4JBQ....45,873- 311-59-A-32
W4YDL....29,122- 286-52-B-34
W4FPA....25,090- 193-52-A-19
W4RHZ/4
21,465- 241-45-B- –
W4SUD.....4686- 72-33-B- 3
W4UTO.....2750- 50-22-A- 8
WN4AUC....2161- 49-19-A-37
W4WXL.....2126- 41-21-A- 9
W4YVV.....488- 15-13-A- 2
W4BRY.....10- 2- 2-A- 1
W4ANQ/4 (W4s ANQ YFA)
61,868- 340-73-A-29

Michigan

W8YIN...32,123- 521-71-A-30
W8DUS...80,990- 590-70-B-40
W8HJK...72,765- 447-66-A-38
W8LEP....66,525- 386-66-A-36
W8NSS....62,155- 401-62-A-28
W8EXZ....14,660- 321-56-A-30
W8GTI....39,092- 339-58-B-28
W8ARR...37,120- 291-64-B-40
W8GTM...33,523- 254-53-A-26
W8HRC...30,294- 232-66-B-34
W8TKW...17,893- 211-34-A-28
W8BGY...15,864- 130-49-A-10
W8GP.....14,250- 150-38-A-10
W8OAF...13,244- 152-44-B-13
W8FX.....11,868- 144-41-B-19
W8UMX...11,726- 143-41-B-19
W8LEL.....9805- 109-37-A-18
W8UM.....9800- 119-35-A-17
W8JUA....9688- 126-31-A-18
W8JKX....9435- 106-37-A-12
W8GEB....9316- 129-29-A-26
W8SCU....8568- 102-42-B-25
WN8NGK...8138- 127-30-A-39
W8ZZ[5]....8128- 127-32-B-25
W8SCW....8034- 103-39-B- 6
W8EGI.....6563- 75-35-A- 8
W8MGQ....6120- 96-34-B- 8
W8GB.....5775- 77-30-A-12
W4SAS/8...5400- 71-32-A-23
W8QIX.....4062- 63-26-A-18
W8KBE....3175- 64-20-A- 7
W8IXJ.....2800- 56-20-A- 6
W8MNL....2625- 54-20-A-18
W8FLL.....2280- 50-24-B-14
W8EZJ.....2100- 60-14-A-11
W8IBA.....1763- 47-15-A-13
WN8MSK...1615- 35-19-A-23
W8UGR....1400- 28-20-A- 3
W8NOH/8...980- 25-16-A- 1
W8MSB.....350- 14-10-A- 3
W8LOX.....270- 14- 8-A-12
W8MZC.....5- 2- 1-A- –
W8GLK (W8s GLK JBT OSG)
16,873- 183-47-B-19
W8KAU (W8s JGN KAU)
2998- 55-22-A- 5

Ohio

W8PBU...150,120- 834-72-A-40
W8LQA...120,971- 692-71-A-36
W8RSP....99,844- 572-71-A-31
W8BTI....93,420- 521-72-A-33
W8OYI....90,701- 542-67-A-38
W8KIT....88,648- 608-59-A-39
W8EV.....84,263- 482-70-A-34
W8ZCK....75,640- 488-62-A-40
W8FGX....73,830- 445-69-A-15
W8VTF....73,553- 467-63-A-34
W8ZJM....71,976- 409-71-A-24
W8NDU....62,453- 379-66-A-38
W8BOJ....59,704- 398-61-A-22
W8DQC....44,850- 299-60-A-15
W8TZO....44,800- 400-56-B-31
W8LPD....42,969- 314-55-A-19
W8LHV....41,055- 366-48-A-32
W8VQI....39,270- 309-51-A-37
W8PM.....38,618- 271-57-A-22
W8OPA....37,680- 236-64-A-22
W8LHK....34,583- 261-53-A-29
W8AMH....33,063- 165-50-A-26
W8ZAU....26,888- 239-45-A-25
W8AL.....26,460- 196-54-A-29
W8GXZ....26,263- 195-55-A-38
W8JGU....25,296- 208-49-A-13
W8NZI....24,000- 200-48-A-14
W8JAR....22,495- 209-44-A-17
W8QCU....22,294- 220-41-A-21
W8SDJ....21,280- 152-56-A-25
W8NYL....20,119- 218-37-A-13
W8R8W....19,028- 177-43-A-13
W8ZWX....18,200- 183-40-A-15
W8LOF....17,595- 139-51-A- 8
W8GQ.....17,400- 146-48-A-22
W8SIJ....17,053- 133-38-A-14
W8FRD....16,590- 161-37-A-21
W8JRB....16,450- 141-47-A-19
W8HFE....15,863- 135-47-A- 8
W8DAE....14,720- 160-46-B-11
W8CEG....14,400- 180-32-A- 7
W8RO.....13,650- 138-40-A-23
W8EAR....10,500- 150-35-B-22
W8JIA.....9498- 134-29-A-22
W8ILC.....7673- 152-33-A- –
W8DNC.....5968- 77-31-A- 8
W8BUM....5940- 66-36-A-12
W8MFQ....5808- 88-33-B- 7
W8MXO....5256- 73-36-B-12
W8HSM....4676- 65-29-A-16
W8SQU....3938- 75-21-A- 7
W8JSP....3406- 56-25-A- 7
W8ET.....3335- 58-23-A-11
WN8OXI*..3185- 51-26-A-15
W8KYZ....3023- 49-26-A-10
W8WYC....2925- 61-25-B-18
W8TTJ....2725- 55-20-A-10
W8MCF....2500- 50-20-A- 9
W8DWP....2070- 36-23-A- 8
W8HHF....1898- 33-23-A- 9
W8JWP....1806- 45-17-A-12
W8NGE....1663- 36-19-A-10
W8CTP....1073- 34-13-A- 7

A potent sig and snappy operating got the Southern Texas award for Leonard Parsons, W5LGG, whose 162,790-pointer was sixth in line among 1271 c.w. ops.

W8NPF.....975- 26-15-A- 2
W8VDF.....945- 22-18-A-10
W8OYV.....870- 29-12-A- 7
W8FU.....666- 21-13-A- –
WN8MVD...440- 16-11-A- 9
W8ZLH.....330- 12-11-A- 2
W8YFJ.....320- 16- 8-A- 1
W8YMB.....300- 15- 8-A- 3
W8YPT.....280- 14- 8-A- 3
W8KZM.....270- 14- 8-A- 2
WN8MQQ....263- 19- 7-A- 8
WN8OUD.....30- 4- 4-A-11
W8AJW.....3- 1- 1-A- –
W8JQJ.....3- 1- 1-A- –
W8LAX (W8s CEA LAX)
40,095- 305-54-A-30
W8CIA (W8s FIK JCA MUW)
16,188- 189-35-A-27
W8URD (W4YAU W8FJP)
8880- 114-40-B- 7
W3RJJ/8 (W3RJJ W8FJP)
3150- 53-24-A- 9
W8JOY (WN8s NGG NGS)
1069- 34-15-A-19

HUDSON DIVISION

Eastern New York

W21FP....67,500- 454-60-A-30
W2NRD...20,969- 153-55-A-16
W2MHE...18,975- 173-44-A-26
W2APH...16,740- 281-30-B-25
W2HSZ....14,029- 141-43-A-16
W2WSS...13,900- 143-40-A-17
W2KNR...10,413- 119-35-A-11
W2MRQ....9393- 149-26-A-20
K2BE.....9263- 98-38-A-24
W2HES....9125- 146-25-A-28
W2CJM....8663- 101-35-A-27
W2JKJ....6160- 112-22-A-11
W2OKI....5430- 91-24-A-15
W2FMA....3425- 69-20-A- 7
KN2EIU...3048- 59-23-A-31
K2DLJ....2699- 66-17-A-14
W2KXS....1530- 36-17-A- 8
K2ESM....1105- 35-13-A-14
K2BSD (K2BSD W2NZE)
16,320- 208-32-A-38
W2GSB (W2OKG K2s BZQ CYS)
2- 1- 1-B- –

N.Y.C.-L.I.

W2KTF...69,077- 519-67-B-36
W2RDK...65,093- 395-66-A-31
W2JBQ....61,070- 397-62-A-32
W2KGN...60,695- 398-61-A-33
W2VL.....50,325- 414-61-B-29
W2GXC....48,415- 422-46-A- –
W2IVS....47,275- 310-61-A-28
W2HQL....43,500- 302-58-A-30
K2CF.....42,053- 315-54-A-38
W2MUM...39,750- 300-53-A-29
W2LPJ....37,181- 332-45-A-32
W2OMG....32,288- 308-42-A-28
W2OPY....31,570- 290-44-A-31
W2KPA....30,780- 257-48-A-22
W2AOD....30,150- 269-45-A-31
W2QMO....29,760- 249-48-A-27
W2OWX....25,691- 264-39-A-32
W2HAQ....24,327- 230-53-B-26
K2EP.....23,312- 248-47-B-26
W2LGG....19,360- 176-44-A-31
W2GP.....19,120- 239-40-A-18
W2CWD....19,083- 225-34-A-27
W2CKQ....18,990- 211-37-A-25
W2RHN....17,864- 232-31-A-20
W2MDM...17,730- 197-45-B-18
K2BH.....17,380- 158-44-A-15
K2ANH....14,658- 145-41-A-38
K2CMV....13,005- 153-34-A-29
W2DUS....11,880- 198-30-B-21
W2UXY....11,790- 132-36-A- 8
W2NLI....11,400- 145-32-A-19
K2AJR....11,385- 138-33-A-24
W2IVU....11,310- 156-29-A-27
K2DGT....11,060- 158-28-A-30
K2ABW....10,728- 149-36-B-29
K2CHQ....10,430- 149-28-A-15
K2BSM....10,091- 104-39-A-21
W2EQG....10,019- 117-43-B- –
W2IWC.....9666- 106-37-A-12
W2LGS.....9653- 143-27-A-21
K2CFB.....8575- 124-28-A-27
W2TNI.....7130- 94-31-A-13
W2IIG.....7000- 100-28-A-13
W2QBU....6780- 113-24-A-12
W2YSL....6518- 119-22-A-10
W2DQN....6300- 84-30-A-16
W2UAL....5490- 92-24-A-12
K2DEB....5300- 106-20-A-26
W2DLO....5184- 96-27-B-15
W2WC.....4945- 46-43-A- 8
W2AEV....4843- 76-26-A-14
W2DBI....4585- 66-28-A-20
W2NCG....4200- 80-21-A- 7
W2CPA....3425- 69-20-A-21
W2LCS....3325- 97-14-A-19
W2ENW....3040- 76-16-A- 9

With a kw. to a pair of 250THs and a rhombic (315 feet per leg) on the U. S., Russell Fillinger, KH6AWM (ex-W7LXR), earned fifth place among A3 entrants. Transmitting gear is all home-brew.

K2CQP.....3020- 77-16-A- 6
W2BOT.....2760- 60-23-B-10
W2GUV.....2420- 61-16-A-17
K2DNL.....2060- 52-16-A-13
W2RZH.....2000- 40-20-A- 7
W2LRI.....1955- 46-17-A-10
W2FNG.....1908- 56-14-A-16
W2NUC.....1891- 46-17-A-13
W2KVL.....1838- 54-14-A-13
K2CRH.....1760- 44-16-A-15
W2IHE.....1420- 36-20-B-10
KN2DTC*..1215- 43-12-A-21
W2FCM.....1186- 37-13-A- 7
W2TUK/2...563- 25- 9-A- 1
W2CB.....500- 25- 8-A- 5
W2SOB.....416- 19- 9-A- 8
KN2DDU....338- 18- 9-A- 8
K2BKF.....150- 10- 6-A- 2
W2NJS.....49- 7- 3-A- 4
K2AED.....30- 4- 3-A- 1
K2AAO.....23- 6- 3-A- 1
W2NUF.....5- 2- 1-A- –
W2FNE (W2s FNE MJO)
17,663- 159-45-A-14
KN2DZE (KN2DZE W2NLI)
25- 5- 2-A- 6

Northern New Jersey

W2HWH*..62,754- 413-61-A-35
W2TPJ....62,558- 440-57-A-32
W2GBY....62,550- 418-60-A-38
W2CWK...44,820- 250-72-A-25
W2MPP...43,610- 361-49-A-40
W2TWC...42,675- 285-60-A-22
W2FEH...40,774- 354-58-B-38
K2BBY...36,956- 337-45-A- –
W2LSJ....33,056- 310-43-A-16
K2CRE...28,726- 238-49-A-32
W2CGJ...26,350- 213-62-B-28
K2BCK...21,928- 179-49-A-17
W2MNN..19,116- 188-41-A-18
W2GKE...18,881- 143-53-A-16
W2OM....18,458- 162-46-A-14
W2GIO...18,095- 165-44-A-20
W2CVW..15,551- 160-39-A-14
K2CBB...14,885- 241-26-A-20
W2OZU...13,943- 170-33-A-22
W2EBG...13,871- 211-27-A-33
W2JCO...13,855- 163-34-A-24
W2ABL...13,728- 162-34-A-13
W2LRO...11,340- 127-36-A-19
K2AFQ...10,530- 158-27-A-36
K2CLL....9894- 147-34-B-39
W2FZY....9690- 102-38-A-15
K2BJA....6545- 119-22-A-14
W2AZL....6320- 79-32-A- 5
W2NIN....5530- 79-28-A-15
W2NEP....4386- 61-29-A-15
K2DDB....3900- 79-20-A-10
W2IZC....3163- 59-22-A-12
K2BYE....3163- 60-22-A-15
W2LKH....2933- 51-23-A- 8
W2JME....2112- 44-24-B- 3
W2EHN....1843- 49-19-B- 7
KN2EFK*...845- 27-13-A-22
W2COG.....675- 23-12-A-26
W2HEG.....455- 14-13-A- 6
W2EQS.....440- 22-10-B- 3
K2DCT.....405- 18- 9-A- –
W2ESL.....400- 20- 8-A- 6
W2EWZ.....338- 14-10-A- 2
KN2EPM....280- 15- 8-A-17
K2DYF.....210- 14- 6-A- 3
KN2DPP.....156- 14- 5-A-14
KN2EUN....120- 8- 6-A- 4
W2JDH.....27- 6- 2-A- 4
W2LYO (W2s FXZ LYO MNN)
60,553- 459-53-A-37

MIDWEST DIVISION

Iowa

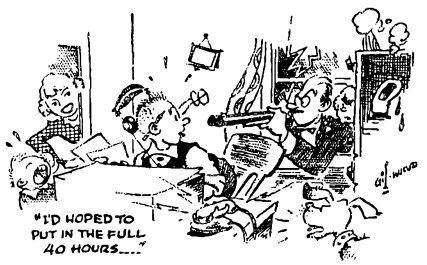
W0NCS...90,436- 511-71-A-35
W0FZO...88,375- 515-70-A-32
W0CXN...67,000- 400-67-A-27
W0RSL...25,515- 189-54-A-14
W0GVR...20,750- 221-50-B-19
W0WFP...16,819- 151-45-A-15
W0ATA...10,450- 106-40-A-11
W0AQV...10,100- 101-40-A-12
W0GVY....5550- 76-30-A-22
W0VFM....4556- 71-27-A-12
W0QEB....4241- 59-29-A-29
W0UJC....3850- 77-25-B-10
WN0PJY*...1451- 31-26-A- 9
W0DSP....1254- 38-17-A- 6
W0GVZ....1050- 30-15-A-15
WN0ONY....425- 20-10-A- 7
W0KYI.....113- 8- 8-A- 1
WN0PAN.....64- 10- 3-A- 5
WN0PPQ.....50- 8- 4-A- 6
W0BMY (W0s BMY FVO GKC LBK)
37,052- 323-59-B-33
W0USN (W0s DTB GXH GXM MGM MGU)
33,858- 321-57-B-40
WN0POQ (WN0s MKT POQ)
1373- 34-18-A-21
WN0OPB (WN0s NAH NAI ONX OPB)
959- 30-13-A-26

Kansas

W0BCI....91,539- 547-67-A-34
W0MUY..79,868- 469-69-A-36
W0IUB....54,649- 375-59-A-22
W0FRL...52,428- 313-67-A-25
W0AWB...38,491- 291-53-A-24
W0BYV...32,096- 272-59-B-27
W0YRN...29,250- 199-60-A-30
W0FKO...21,775- 168-52-A-25
W0BJX...16,618- 146-46-A-24
W0GAX...15,620- 142-44-A-24
W0FVD...13,865- 149-47-A-14
W0WMH...8741- 95-37-A-13
W0IPQ....4676- 69-29-A-11
W0RBO....1980- 34-24-A-12
W0GUP....1318- 32-17-A- –
W0OMX....250- 11-10-A- 5

Missouri

W0LLU...40,788- 254-65-A-35
W0FIN...40,320- 290-56-A-34
W0ETW...27,361- 209-53-A-26
W0ETV...24,780- 208-48-A-37
W0MCX...19,992- 204-49-B- 5
W0OAW...17,550- 157-45-A-23
W0GBJ....7832- 89-44-B- 7
W0ECE....2993- 59-21-A- 8
WN0OWS*..2801- 46-27-A-38
W0ACK....1425- 30-19-A- 6
W0BZK....1035- 23-18-A- 8



W0KIK....935- 22-17-A- 9
WN0QXN...180- 10- 8-A- 8
WN0QYJ....158- 11- 6-A-25
WN0QYM...124- 10- 9-A-10
WN0PXO....98- 7- 6-A- 5
W0TLC.....90- 7- 6-A- 4
W0GVI (W0s FBC GVD)
61,303- 399-62-A-36
W0BYF (W0s BYF GFF)
17,460- 197-45-B-31

Nebraska

W0URB...66,480- 423-64-A-32
W0HSO...47,124- 359-66-A-33
W0DW....29,798- 207-58-A-24
W0DDT...16,219- 164-49-B-37
W0QNF....8600- 100-43-B-10
WN0QMZ..3089- 61-26-A-33
W0MZF....2363- 45-21-A- 4
W0JJK....1100- 28-16-A- 4
WN0OFM....65- 9- 4-A- 7

NEW ENGLAND DIVISION

Connecticut

W1BIH...99,900- 558-72-A-36
W1FTX...70,788- 406-70-A-28
W1WPO?..69,000- 400-69-A-34
W1ODW...64,722- 469-69-B-35
W1QIS?..58,069- 408-57-A-35
W1VG?...56,430- 342-66-A- –
W1SVS...54,863- 401-55-A-35
W1ZDP?..51,073- 330-62-A-18
W1MHF...44,625- 366-50-A-32
W1UHP...37,564- 284-53-A- –
W1AW?,8.35,532- 284-63-B-14
W1RY....28,105- 154-73-A-15
W1TYQ...25,938- 200-50-A-19
W1EOB...23,856- 168-71-B- –
W1RFC...13,256- 152-35-A-24
W1MTR...12,215- 176-28-A-14
W1NLM....7123- 77-37-A-15
W1CUH....4228- 89-19-A- 8
W1EFW....3575- 66-22-A- 6
W1DX?....3278- 69-19-A- 6
W1LVQ?...3003- 73-21-B- 3
W1GVR....1920- 48-16-A- 2
WN1YWU...1256- 38-15-A-26
W1YYM?....325- 13-10-A- 1
W1RJ.....290- 15- 8-A- 1
W1BDI?....200- 10-10-B- 1
W1JEQ? (W1s JEQ TS)
36,168- 274-66-B-29
W1FTM (W1s FTM LHE)
30,240- 316-48-B-40
W1ORS (W1s ASO BEA BGP BRL FMU GVK RFJ RIO SYG TCW WML)
23, 348-290-33-A-27
W1TGS (W1s TGS VNX)
22,260- 195-48-A-37

Maine

W1IKE...70,395- 494-57-A-40
W1QCJ...10,023- 110-38-A-29
W1PDN/1..8120- 114-29-A-18
W1WTI....2351- 51-19-A-11
W1SRW....1160- 30-16-A- 9

Eastern Massachusetts

W1BOD...91,545- 539-68-A-40
W1CWX...72,100- 517-70-B-40
W1AQE...71,419- 440-65-A-37
W1IAP...69,000- 504-69-B-40
W1TW....58,625- 351-67-A-31
W1JBM...53,224- 375-57-A-29
W1PWK...51,513- 318-65-A-39
W1RND...51,510- 405-51-A-38
W1WLW...41,586- 301-56-A-36
W1ONP...39,158- 341-46-A-36
W1CMU...34,375- 275-50-A-35
W1SAD...31,444- 293-43-A-39
W1MQV...24,863- 195-51-A-26
W1WAI...16,150- 162-40-A-17
W1PLJ....16,088- 166-39-A-32
W1JYC....15,588- 149-43-A-22
W1OTN....14,754- 160-37-A-21
W1RSR....12,615- 176-29-A-17
W1JCE....12,556- 123-41-A-18
W1EIQ....12,303- 130-38-A-27
W1WTJ....12,071- 134-37-A-18
W1TVZ....11,586- 150-31-A-16
W1WMH..11,135- 132-34-A-20

W1OMI...10,350- 115-36-A-10
W1RZW..10,200- 255-32-A-23
W1TQS/1..9031- 145-25-A-15
W1PH....7475- 115-26-A-13
W1RXT....6038- 105-23-A-15
W1AGN....6018- 84-29-A-18
W1VVA....4540- 118-20-B-23
W1VWM...3964- 76-21-A-19
W1QIB....3416- 63-28-B-20
W1IKT....3083- 69-18-A-16
W1KMS....3050- 61-20-A-10
W9VJD/1..2990- 47-26-A- 7
W1VWQ....2970- 68-18-A- 8
W1QBT....2775- 56-25-B-12
W1YQF....2700- 60-21-A-14
W1W8N....2518- 55-19-A-20
W1NXY....2430- 55-18-A- 7
W1T8N....2120- 53-16-A-18
WN1YNI*..2114- 49-19-A-26
W1PYM....1860- 47-16-A- 7
W1UWI....1641- 51-13-A-20
W1BSG....1610- 46-14-A- 4
WN1YMA...1340- 34-16-A-25
W1LHT....1136- 36-16-B- 7
WN1ZCH...1073- 34-13-A-25
W1CMW....1018- 37-11-A- 9
W1IDU.....748- 23-13-A- 4
WN1YVT....600- 26-10-A-25
WN1WYX....380- 19- 8-A-15
WN1ZLG....278- 20- 6-A- 8
W1EMG.....50- 5- 4-A- 1
W1SFJ.....23- 3- 3-A- 4
W1VBT.....20- 4- 2-A- 5
W1JVZ.....15- 3- 2-A- 1
WN1YYE....15- 6- 1-A- 3
WN1WUY....8- 3- 1-A- 3
WN1YSY/1....5- 1- 1-A- 1
W1RWO.....2- 1- 1-B- –

Western Massachusetts

W1JYH...101,160- 562-72-A-26
W1SRM...43,768- 287-61-A-25
W1TVJ....25,327- 296-43-B-27
W1WEF...19,656- 213-37-A-34
W1HRV....13,005- 153-34-A-18
W1WDW...10,605- 153-28-A-26
W1NY.....3933- 72-22-A- 6
W1MVF....2779- 59-19-A- 4
W1RRX....2740- 60-16-A- 9
W1MNG....2700- 54-25-B-11
WN1WZR...2000- 50-20-A-14
W1ASU....1909- 42-23-B- 4
W1CJK.....735- 22-14-A- 5
WN1YXV....484- 23- 9-A-26
W1WEU.....450- 22- 9-A- 5
W1TTL.....55- 6- 4-A- 5
W1TFS.....5- 2- 1-A- 1
W1YK (W1s RAN UBC UGW)
56,120- 370-61-A-33

New Hampshire

W1BFT...107,010- 595-72-A-34
W1FZ....52,020- 306-68-A-30
W1NHJ...29,220- 246-60-B-20
W1TBS...13,580- 196-28-A-30

W1UJL.....504- 19-14-B- 7

Rhode Island

W1CJH...53,985- 367-59-A-29
W1AOP...11,285- 123-37-A-23
W1AIT...11,020- 153-29-A-25
W1VBR....9720- 110-36-A-29
W1UZE....3328- 61-22-A-14
W1TXG....2820- 48-24-A- 9
W1WPA....2416- 77-16-B-18

Vermont

W1RWP..10,170- 113 45-B-16
W1UWS.....158- 12- 6-A- 3

NORTHWESTERN DIVISION

Alaska

KL7EVR..20,670- 218-39-A-24
KL7WC...11,868- 138-43-B-20
KL7AWB...7946- 139-29-B- –
KL7AUP...6840- 115-30-B-25
KL7AOL...4300- 86-20-A-19

Idaho

W7HAH...69,345- 509-69-B-37
W7TYG....1906- 31-25-A- 7
W7ASA.....864- 27-16-B- 3

Montana

W7KVU...58,823- 384-62-A-14
W7PCZ...54,880- 351-64-A-32
W7OAZ....16,000- 129-50-A-11
W7TKB...13,184- 103-64-B- –
W7COH....3698- 51-29-A-19
W7EWR....1948- 42-19-A- 7

Oregon

W7JLU...51,345- 412-63-B-39
W7JHA...20,550- 206-50-B-40
W7LT....15,263- 165-37-A-36
W7ORE...13,200- 139-48-B-13
W7SBT....8500- 101-34-A-19
W7HCV....5616- 78-36-B-16
W7UHK....3254- 69-19-A- 5
W7SYF....2818- 51-23-A-30
W7UAB....2138- 50-18-A-15
W7QMK....1849- 44-17-A-12
WN7UOX/7 1349- 46-13-A-34
W7BVH.....175- 11- 7-A- 8

Washington

W7NLI...85,733- 497-69-A-33
W7SHQ...78,223- 473-67-A-38
W7LEV...66,400- 417-64-A-35
W7AJS...64,260- 476-68-B-37
W7PQE...62,997- 459-69-B-31
W7ICD...25,819- 203-51-A-30
W7JC....24,833- 232-43-A-36
W7AIB....19,975- 171-47-A- 4
W7PQP....19,635- 180-44-A-25
W7UMK...16,680- 142-48-A- –
W7SCZ....14,709- 148-41-A-27
W7TGO....13,920- 169-32-A- –
W7PDU....13,046- 109-49-A-22
W7ZU.....9690- 102-38-A-16
W7ETO.....8978- 116-38-B-17
W7SXN....7280- 112-26-A-25
W7HQO....6633- 101-33-B-23
W7EAU....3308- 64-21-A-11
W7PUA....3036- 71-22-B-20
WN7UBA...1015- 36-14-A-30
W7HVM.....718- 21-14-A- 6
W7LEC.....525- 21-10-A- –
W7EYQ.....315- 14- 9-A- 1
W7RHM.....120- 9- 8-B-10
W7SXM (W7s SXM SXQ)
5298- 86-26-A-20

PACIFIC DIVISION

Hawaii

KH6IJ....59,938- 447-66-B-39
KH6KR....7069- 103-39-A-19
KH6IB....5852- 106-28-B- –
KH6WW.....50- 5- 5-B- 5

Nevada

W7JU.....43,400- 280-62-A-31

Santa Clara Valley

W6EAE...103,660- 585-71-A-38
W6UTV...55,568- 359-62-A-35
W6NTQ....7744- 90-35-A-10
W6II.....6900- 102-24-A-15
W6MMG....2898- 61-19-A- 6
W4DGJ/6...2685- 41-26-A- 6
KN6BYR....666- 24-13-A-14
W6WLI.....32- 4- 4-B- 1
W6PBV.....3- 1- 1-A- –

East Bay

W6TT....80,784- 562-72-B-32
W6UZX...63,920- 473-68-B-39
W6NBX...35,420- 255-56-A-35
W6RRH...27,060- 227-48-A- –
W6JOH...26,650- 205-52-A-21
W6IPH....24,698- 233-53-B-23
W6WDR...10,313- 125-33-A-22

W6MFZ....7178- 100-37-B- 5
W6AW.....6090- 102-24-A-38
W6KEK....3900- 52-30-A- 3
KN6AUD...2875- 58-20-A-37
KN6CCQ....450- 24- 8-A-16
W6HFK.....55- 6- 5-B- –

San Francisco

W6BIP....71,208- 497-72-B-34
W6NKR...28,215- 209-54-A-21
W6TJA...23,704- 199-49-A-25
W6EYY...19,793- 206-39-A-19
W6UOM/6
18,216- 210-44-B-37
W6YC....11,428- 113-41-A-18
W6DWJ...10,488- 115-46-B-17
KN6AYB*..2826- 62-19-A-35
KN6ALJ....210- 12- 8-A- 6
KN6BBF....166- 12- 7-A- –

Sacramento Valley

W6ZQD...22,095- 253-45-B-37
W6RMP...21,863- 168-53-A-17
W6OPY...13,834- 181-31-A-36
W6MYT...13,781- 158-35-A-35

San Joaquin Valley

W6EGX...34,663- 235-59-A-34
W6KRO...20,100- 201-40-A-33
W6CIS/6..18,495- 147-54-A-18
W6PGP...18,095- 166-55-B-33
W6QXF...15,150- 101-60-A-30
W6SQN....3520- 66-22-A-16
K6BLL (W6s ARI BRP BVM
BYH EFV HYK UJZ WNX
ZEK ZVP)
101,653- 564-73-A-37
W6MYP (W6s KIG MYP)
39,390- 307-65-B-40

ROANOKE DIVISION

North Carolina

W4VHH...68,976- 488-57-A-36
W4LYV...45,540- 282-66-A-31
W4BDU...29,106- 299-49-B-28
W4YPY....5475- 75-30-A-23
W4WYA....1900- 40-19-A-15
W4TYR....1530- 34-18-A- 3
W4YWS.....193- 13- 7-A- 8

South Carolina

W4NZR...57,915- 355-66-A-32
W4TL....52,731- 327-65-A-27
W1IIB/4..24,976- 189-53-A-16

Virginia

W4KFC...171,988-1183-73-B-40
W4BZE...99,975- 648-62-A-39
W4VBX...93,853- 606-62-A-37
W4HQN...79,646- 483-67-A-27
W4PNK...67,933- 471-58-A-32
W4CC....60,314- 396-61-A-19
W4LK....59,885- 407-59-A-30
W4UD....58,940- 423-56-A-33
W4NH....48,633- 397-49-A-19
W4YEA...45,024- 404-56-B-33
W4TKR...38,403- 315-49-A-40
W4JAT...33,125- 267-50-A-28
W4SNH...31,500- 300-42-A-23
W4WRM..28,560- 275-42-A-37
W4JUJ...26,775- 213-51-A-23
W4WBC..22,770- 198-46-A-29
W4YZC...20,655- 162-51-A-11
W4KX....20,384- 196-52-B-10
W4AMZ...20,134- 207-39-A-38
W4YVO...15,173- 182-34-A-15
W4IF....15,065- 132-46-A-17
W4FJ....10,472- 154-34-A-23
W4JHK...10,406- 121-43-B- 6
W4NAD..10,369- 120-35-A-12
W4RTV....8100- 136-24-A-11
W4MK....7290- 81-36-A- 9
W4IPC....7128- 99-36-B- 5
W6LON/4..6380- 110-29-B-11
W4EV....5130- 100-27-B- 9
W4JWL...5025- 68-30-A- 8
W4BCI....3549- 65-22-A- 7
W4BMO...3508- 61-23-A- 6
W4JXN...3105- 54-23-A- 8
W4ZFV....2993- 63-19-A- 6
W4TYC....2703- 50-23-A- 9
WN4BLR*..2275- 47-20-A-25
WN4ZFE...1925- 40-22-A- –
WN4AJJ...1060- 27-16-A-18
W4JLV....1040- 26-16-A-11
W4PPI.....786- 22-17-A- 9
W4VOP.....753- 23-14-A- –
WN4BDW....633- 24-11-A-28
W4BMH.....600- 24-10-A- 3
W4TVX/4...396- 20-10-B- 3
W4RNQ.....383- 17- 9-A- 5
W2OJM/4....300- 15- 8-A- 3
WN4BVB....293- 13- 9-A-11
WN4BLO....230- 12- 8-A- 4
W4VRT.....203- 14- 6-A- 8
WN4BXI....144- 14- 5-A- 8
WN4ZIE.....35- 7- 2-A- 8
W4JRP.....8- 2- 2-A- 1
W4JQX.....5- 2- 1-A- 1
W4PYN.....3- 1- 1-A- –
WN4ZZS....3- 1- 1-A- –
W4YE (W4s YE YZC)
60,634- 502-61-B-38

W4VQZ (W4s VQY VQZ)
4656- 75-25-A- 7
WN4ZYV (WN4s ASJ ZYV)
439- 16-13-A-15
W4CRG (W4s CRG FJ)
20- 4- 2-A- 2

West Virginia

W8PQQ...55,062- 399-69-B-28
W8UMR...41,633- 275-61-A-23
W8TDG...30,622- 252-61-B-29
W8MBA...27,726- 273-41-A-20
W8JWX...18,090- 206-36-A-24
W8CCN....2284- 44-21-A- 9
W8I8B....1138- 33-14-A- 5

ROCKY MOUNTAIN DIVISION

Colorado

WØCDP...84,240- 472-72-A-37
WØANW...44,603- 316-57-A-38
WØIC....38,144- 299-64-H-20
WØSJT...36,903- 255-58-A-36
WØKBD...27,225- 200-55-A-25
WØROC...27,088- 198-55-A-27
WØHSQ...11,610- 110-43-A-34
WØKV.....3750- 50-30-A- 5
WNØOZE...2563- 49-25-A-23
WØEZW....1785- 37-21-A- 5
WØQPO.....144- 9- 8-B- 2

Utah

W7QDJ...57,815- 377-62-A-37
W7CCC...56,550- 352-65-A-24
W7QDM...27,820- 220-52-A-28
W7TMK....154- 13- 7-B-13

Wyoming

W7PKX...62,563- 358-70-A-27
W7HRM...50,344- 408-62-B-23
W7UFB....4088- 63-30-A-25
W7RVO....2074- 41-21-A- 6
W7LVU....378- 16-14-B- 3
W7PMA....114- 7- 7-A- 3

SOUTHEASTERN DIVISION

Alabama

W5ONL/4.30,745- 240-52-A-13
W4USM...29,288- 217-55-A-24
W4JKU...19,364- 209-47-B-18
W4EJZ...16,513- 169-49-B-14
W4WOG...10,716- 116-47-B-21
W4KAC...10,428- 100-43-A-16
W4GQE....9805- 75-53-A-20
WN4ZRZ....350- 14-10-A-13
W4FSZ.....260- 15- 3-A- 3
WN4ZFW....120- 8- 6-A-18
W4IKK.....2- 1- 1-B- –

Eastern Florida

W4BRB...124,440- 735-68-A-40
W4LVV...107,033- 646-67-A-39
W4VRS...61,732- 512-61-B-39
W4WHK...61,225- 395-62-A-40
W4RTX...58,590- 379-62-A-31
W4VTJ....11,745- 131-36-A-21
W4HGE....9075- 141-33-B-18
W4UJX.....6670- 100-29-A- 9
W4IYT.....1500- 30-20-A- 2
WN4ZUK....543- 18-14-A-14
W2JWJ/4....358- 14-11-A- 2

Western Florida

W4WKQ..109,796- 651-69-A-40
W4BIJ.....8560- 108-40-B-10
W4VZD.....4875- 66-30-A-13

Georgia

W4GGD...25,350- 195-52-A-14
W4OOA/4.22,980- 196-48-A-37
W4WBB...14,940- 125-48-A-19
W4BHG...11,875- 125-38-A-19
W4ZSC....3125- 52-25-A- 7
WN4BXV.....96- 7- 7-A-16
W4WRY.....26- 4- 3-A- 2
WN4BGH....23- 3- 3-A- 3

West Indies

KP4JE...42,210- 337-63-B-25
KP4RK....1675- 35-20-A- 8
CO7AH....240- 12-10-B- –

Canal Zone

KZ5EU...24,125- 197-50-A-16

SOUTHWESTERN DIVISION

Los Angeles

W6IXK...125,010- 696-72-A-40
K6CEF....96,600- 560-69-A-33
W6ULD...79,695- 463-69-A-40
W6PAL...48,824- 365-68-B-35
W6KPM...43,125- 290-60-A-33
W6VAQ...32,178- 211-61-A-33
W6NJU...30,536- 241-51-A-33
W6CCO...24,205- 207-47-A-25

W6ZOL...21,420- 153-56-A-13
W6KHS...21,360- 180-48-A-24
W6QHS...21,190- 164-52-A-13
W6KWF...20,213- 166-49-A-23
W6JKR...18,277- 187-49-B-20
W6KFV...15,631- 160-49-B-12
W6NWL...15,290- 145-44-A-17
W6LDR...14,963- 134-45-A-11
W6KUC...14,476- 166-44-B-23
W6MUR...12,600- 150-42-B- 5
W6UUC...11,960- 132-46-B-18
W6JQB....9512- 116-41-B-11
W6MUW....9068- 121-31-A-33
W6TJL....8680- 110-32-A-11
W6GK....8600- 100-43-B-37
W6HGK/6..8373- 102-34-A-21
K6CUX....5370- 63-24-A-14
K6AHF....1875- 39-20-A- 9
W6TPY....1169- 44-11-A-11
W6FEB....1050- 30-15-A- 7
K6BFK.....900- 46- 8-A-20
W6LVQ.....805- 23-14-A- 5
KN6CHQ....779- 21-13-A-13
W6WDH....748- 23-13-A- 3
KN6BFC....540- 25- 9-A-13
W6RNA/6...492- 23-12-B- 7
W6MYG.....315- 18- 7-A- 3
W6UBY.....68- 9- 4-B- 2
W6CDW.....46- 4- 4-A- 1
W6SQY (W6s HJK SQY)
15,663- 139-35-A-32

Arizona

W7PGX..176,310- 993-72-A-40
W7MID...50,176- 401-64-B-27
W7KUZ...44,515- 319-58-A-29
W7RUK...19,680- 168-48-A-14
W7ENA...12,810- 122-42-A- 9
W7RYU....1550- 43-20-A-28
W2ZEP/7....798- 29-11-A- 3
W7PUV.....371- 14-11-A- 3

San Diego

W6LUN/6.50,083- 300-67-A-40
W6KJR...43,798- 364-61-B-36
W6JVA...26,595- 202-54-A-36
W6GUP...25,625- 206-50-A-23
W6NLO...21,438- 177-49-A- –
K6AQO...17,100- 146-48-A-30
W6WSS...14,805- 126-47-A-17
W6JH.....5212- 77-35-B-15
W6SHY....1620- 44-20-B- 4
W6KXN....240- 12- 8-A- 5

Santa Barbara

W6ULS...68,340- 404-68-A-38
W6YK....53,025- 309-70-A-40
W6OHX...46,035- 279-66-A-31
K6AUZ...32,681- 208-63-A-24
W6MSG...19,040- 170-56-A-15
W6DTY...11,340- 127-36-A-17
W6NKT.....403- 16-13-B- 8
W6OXJ.....100- 8- 5-A- 1

WEST GULF DIVISION

Northern Texas

W5TFB..128,340- 718-72-A-37
W5UXP...65,120- 417-64-A-25
W5TFR...31,096- 327-52-B-33
W5LIU....25,175- 190-53-A-13
W5TVY...23,381- 179-55-A-32
W4MXU/5
21,340- 197-55-B-15
W5QF....18,422- 151-61-B-22
W5TGV...13,530- 135-41-A-14
W5OC....12,881- 116-45-A-17
W5VNW....4900- 75-35-B-11
W5IHM....2256- 47-24-B- 5
W5BLU....1463- 33-18-A- 3
W5ZIV.....455- 16-13-A- 8
W5AEV.....180- 10- 8-A- 1
W5YF (W5s ILK OWE
W6GHM)
79,378- 572-71-B-21

Oklahoma

W5OWG...68,586- 488-71-B-37
W5WZV...51,506- 308-67-A-31
W5YQO...10,150- 118-35-A-11
W5LPL....7480- 90-34-A-16

Southern Texas

W5LGG..162,790- 892-73-A-40
W5GEL..144,175- 996-73-B-40
W5RID..130,159- 901-73-B-38
W5BTS..102,151- 582-71-A-39
W5WQN...19,800- 184-55-B-20
W5WRW...13,169- 127-43-A-17
W5WPL...12,739- 121-23-A-22
W5BTL....9533- 95-41-A-12
W5VSL....8788- 102-37-A-12
W4TRY/5..3479- 62-23-A-12
WN5BPN.....5C- 6- 4-A- 3
W5YSC.....26- 4- 3-A- 2

New Mexico

W5DWB..134,280- 746-72-A-40
W5QNZ...110,250- 794-70-B-36
W5RFF...104,966- 609-69-A-40
W5VRP....64,170- 416-62-A-39
W5CA....31,500- 211-60-A-12
W5UTS....7703- 80-39-A- –
W5KF.....88- 7- 5-A- 9

CANADIAN DIVISION

Maritime

VE1AR...48,480- 410-48-A-31
VE1PA...41,100- 343-60-B-36
VE1WB...26,261- 224-47-A-34
VE1CU...25,752- 223-58-B-23
VE1EK...17,800- 185-40-A-23
VE1HO....8755- 105-34-A-18
VE1AEE...7688- 104-30-A-32
VE1DB....5468- 82-27-A-13
VE1ACC....208- 14- 8-B- 3

Quebec

VE2NI....91,040- 594-62-A-40
VE2OL...33,465- 583-46-A-26
VE2DR...32,066- 252-51-A-25
VE2CB...12,090- 159-31-A-17
VE2CP....10,106- 124-33-A-16

Ontario

VE3BBR..70,200- 436-65-A-39
VE3DBP..48,620- 376-52-A-35
VE3ASD..38,129- 325-47-A-28
VE3ACB..35,532- 233-61-A-26
VE3EAM.31,200- 261-48-A-30
VE3BXF..25,935- 273-38-A-33
VE3EU...24,528- 219-56-B-22
VE3YV...19,796- 203-49-B-25
VE3BJV..18,286- 199-36-A-26
VE3AGX..17,168- 165-42-A-15
VE3DRD.16,234- 181-37-A-24
VE3BUR..16,060- 146-44-A-12
VE3DQX.11,455- 159-39-A-21
VE3IZ...10,800- 120-36-A-13
VE3BPL....9353- 132-29-A-18
VE3BJI....6525- 90-29-A-19
VE3AYS....6320- 80-40-B-15
VE3DME....1980- 51-16-A-13
VE3DPG....1013- 37-15-A- 6
VE3UT.....938- 25-15-A- 7
VE3AUU....540- 20-12-A- 3
VE3PR.....173- 12- 6-A- 3
VE3AIK.....60- 8- 3-A- 2
VE3DSM.....25- 5- 2-A- 4
VE3DSG.....10- 4- 1-A- –
VE3BPD (VE3s AQO DPG
DPH)...11,069- 129-35-A-23

Manitoba

VE4MX...24,500- 209-49-A-33
VE4ER.....3444- 49-29-A- 9
VE4PK.....158- 9- 7-A- 5

Saskatchewan

VE5LV....18,813- 151-50-A-34
VE5DZ....4932- 73-36-B-26
VE5AJ....1876- 34-28-B- –

Alberta

VE6MA...37,194- 271-55-A-40
VE6ZR....19,845- 163-49-A-13
VE6VG....7200- 85-36-A-13

British Columbia

VE7RU.....350- 14-10-A- –

Yukon/N.W.T.

VE8OG.....6435- 78-33-A-13

[1] W3ULI, opr. [2] W3UXO, opr. [3] W9OHU, opr. [4] W5BGL, opr. [5] W8IVK, opr. [6] W2ANG, opr. [7] Hq. Staff, not eligible for award. [8] W1WPR, opr. [9] W6PYD, opr.

'PHONE SCORES

ATLANTIC DIVISION

Eastern Pennsylvania

W3MDE...31,680- 192-55-A-32
W3SEB/3.20,880- 233-45-B-30
W3MKA...18,960- 159-40-A-17
W3EXM...14,544- 152-48-B-21
W3NQH...13,395- 95-47-A-33
W3HFD....9720- 108-45-B-10
W3ULR....4284- 60-24-A-17

W3LAP.....1283- 29-15-A- 6
W3VOC.....276- 12- 8-A- 3
W3VZI.....168- 8- 7-A- 9

Md.-Del.-D.C.

W3KDD...48,972- 371-66-B-30
W3MSK...42,281- 200-71-A-27
W3JNN...32,660- 232-71-B-24
W3AYS...13,500- 100-45-A- 9
W3UKO....7490- 107-35-B- –

(*Continued on page 152*)

Strays

W7s SXM and SXQ are looking for checkers competition on 3.5-Mc. c.w.

—···—

W7NA finds that discarded sewing-machine tables, often available from merchandisers on a gratis take-'em-away basis, make handy pieces of hamshack furniture.

—···—

Ed Collins of *QST*'s advertising department received correspondence on MARS stationery from W3LAT, whose mail QTH is Mars Theatre Bldg., Mars, Penna.

—···—

W9s QAY and HKA are among those who report interesting results with Heathkit grid-dip oscillator stations on two meters. Tiny loop antennas are used and the g.d.o. units are "shock-modulated" by vigorous vocalizing.

—···—

Anyone interested in working a railroad mobile-in-motion can contact W8LER. He operates aboard an Indianapolis-Bellefontaine (Ind.-Ohio) train during late evening and early morning hours on 3966 kc. — *W8LDU and W1WPR*

—···—

Even "sticks" locations can be overrun by man-made QRN. In addition to high-tension line power leaks there is the hazard of leaky a.c.-charged livestock fencing. W4KX poked around his local countryside for days before he ran down one such offending strip.

—···—

A church organist in Newport, Ark., was startled by a sepulchral voice every time she pressed a certain stop. The unwitting culprit was near-by ham W5VAE, encountering his first case of OAI (organ amplifier interference).

— *W5RWJ*

—···—

National Scientific Laboratories, Inc., reports a favorable response to their newly-instituted *Transistor Research Bulletin*. The subscription rate is now $5.00 per year, and individual copies are available at one dollar per copy from NSL, 2010 Massachusetts Avenue, NW, Washington 6, D. C.

—···—

Science News Letter for March 20th features a report on new developments and devices which guide the blind along busy thoroughfares. Prof. Thomas A. Benham of Haverford College, Haverford, Penna., himself sightless, is one of those who are at work recording impressive progress in the perfecting of lightweight low-cost "step-down indicators." You may have worked him as W3DD.

25 Years Ago this month

May 1929

. . . The editorial pronounces ARRL's Technical Development Program successfully concluded, a year-long effort to bring amateur technique abreast of 1929 requirements.

. . . A message from ARRL President Maxim, W1AW, points a remonstrative finger at those who view our new amateur regulations with unreasoning alarm.

. . . The first of a series, "W8ARO" titles a complete description of the successful "1929-type" station of Ross Moorhead located near Findlay, Ohio.

. . . "Another '1929' Receiver," by P. S. Hendricks, gives constructional details for a three-tube set using Types 222 and 201-A tubes in a regenerative circuit.

. . . "Wired Wireless," by J. E. Smith, reports on technical developments which enable several simultaneous channels of communication to utilize a single carrier.

. . . J. M. Grigg varies the configuration of variable-condenser plates in an attack on the vexing problem of "Single Control for the High-Beat Superheterodyne."

. . . C. L. Loudon, W2ALW, in "Keying the Oscillator-Amplifier," calls attention to his variation of the W9EK negative-voltage keying circuit now gaining popularity.

. . . J. C. "Felix" Johnson, W5LS, contributes another of his stories, "The Glutton," wherein much grief befalls the hero on his first trip to sea as a commercial op.

. . . "The Governors-to-President Relay," a March activity held in conjunction with President Hoover's inauguration, is a subject for William M. Smith, W3GP.

. . . It is announced that Ross Hull, associated with ARRL's technical staff and prolific contributor to *QST* since 1926, is returning to Australia.

. . . *QST* also announces appointment of James J. Lamb, W1CEI, as assistant technical editor, and the arrival of new technical staff member Beverly Dudley, W9BR.

Silent Keys

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

W1HQH, Harold H. Bellinger, West Falmouth, Mass.
K2BKT, William C. Voisey, Rochester, N. Y.
K2BUY, Lawrence V. Skully, Union, N. J.
W2GPD, Nicholas J. Egbert, Bronx, N. Y., N. Y.
W2ITL, Salvatore R. Patremio, New Milford, N. J.
W2PE, Lawrence D. Geno, Cheektowaga, N. Y.
W4EWN, James F. Farrell, Madera, Calif.
W4HBG, William C. Cartwright, Atlanta, Ga.
W4QO, Dewey R. Ellis, Greenville, N. C.
W6AV, Paul T. Nesbit, Lodi, Calif.
W6AYZ, Roy D. Mayes, Walnut Grove, Calif.
W6HKN, Capt. E. C. Ecker, USA (ret.), Sharp Park, Calif.
W6JZE, Ralph E. Francisco, Ventura, Calif.
W8FNR, Frederick J. Wilson, Sault Ste. Marie, Mich.
ex-W8FWU, Bernard Fitzgerald, Detroit, Mich.
W8INV, James R. Holsapple, Dayton, Ohio
W9CWZ, William P. Wichmann, Stevens Point, Wis.
W9KAC, Luther L. Cruea, Portland, Ind.
W9OYB, William C. Harris, Valparaiso, Ind.
WØSWR, Albert J. Meyer, Topeka, Kans.
WØUBN, Herman F. Wagner, North Platte, Nebr.
KL7AZ, Lloyd W. Peterson, Kotzebue, Alaska
VE2FP, Frederick J. Pratt, Valois, Que.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

For many years a dream of v.h.f enthusiasts has been a transcontinental relay. The subject has popped up regularly in our correspondence, and there have been a few passes made at it over the years. The necessary detailed organizational work has never been done, however. Routes as long as Connecticut to Texas have been covered on 144 Mc. on occasion, but a real transcon has been a long way from reality up to now.

Means for successful 2-meter relaying from the East to at least Ft. Worth are available almost any time, but westward beyond there will take some doing. To Amarillo, possibly via Oklahoma points, is practical, and even El Paso may not be beyond the realm of possibility, but where do we go from there? It's only 260 miles from Amarillo to Albuquerque, but how often has that hop been negotiated on 144 Mc.? And who can be worked west of Albuquerque?

W5CVW, Ft. Worth, is keen to try the westward push, and he feels that W5HAA, Little Rock, Ark. (with 750 watts and a high antenna), provides a good link to the northeast. W5CVW has the contacts in Oklahoma to provide the Amarillo link.

Planning from the western end is being talked up by W6RLB, W6GQK and other veterans of 2-meter expeditions. The June V.H.F. Party comes too early for these boys, as sad experiences in previous years with late-melting snows have demonstrated, but they are cooking up a combination of expeditions for some time in July. High spots in California, and probably Mt. Rose in Nevada, will be manned with high-powered portable set-ups, and W6RLB is hoping to make Pikes Peak. Even if all these plans come off, there is still a vast expanse of country between Pikes Peak and Mt. Rose. It takes more than 14,000-foot peaks to cover 600 miles reliably on 144 Mc.

The Pikes Peak expedition should be great stuff for the fellows to the east, however, and we hope that all hands will keep us informed as the details are worked out. Remember, please, that the deadline for making up copy for July *QST* is about May 25th. We can take news for up to two weeks after that date and still squeeze it into July *QST*, but that sort of thing is inserted at the expense of copy already prepared.

While we are on the subject of deadlines perhaps it would be well to stress the need of prompt reporting of news that has a date on it. Practically everything in the *QST* you are now reading was set in type before the end of March. Dated copy such as this department is the last to go to the printer, but these pages leave your conductor's hands by the 25th to the 29th, depending on the production schedule for the issue in question. This means that preparation of the copy starts a week or so earlier.

Suppose you made some unusual contacts on March 20th. The work was something other v.h.f. men would like to read about in *QST*, so you intend to write about it. But you're busy, so you let it go for a week or so. You mail a letter reporting the work the next week end. Result: It lands on your conductor's desk one day to a week *after* v.h.f. copy for the May issue has been sent to the printer. If it's really hot news, we lift out a section of the already prepared copy and insert your story, but if it is of no more than ordinary interest we just have to skip it. When copy time rolls around next month, your story has lost much of its appeal; it will look plenty old by the time it reaches the reader, so we put it aside in favor of more recent news.

The production of a publication like *QST* is a time-consuming process, so you don't get hot-off-the-wire news at best. Won't you help us, then, to keep the dated copy as fresh as possible by reporting newsworthy events when they happen, not a week or a month later?

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

Several good firsts appear in our reports this month. All would have been called impossible a few years ago, at any season, let alone February and March. Returning

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

♦

One of the outstanding Technician stations in the East is W3VIR, Willow Grove, Penna. In the rack at the left are separate rigs for 144 (all set for the General Class ticket), 220 and 435 Mc., each with a 9903 in the final stage. On the shelf above the SX-71 are crystal-controlled converters for 220 and 432 Mc. Operator Bill Pawson has worked 9 states on 435 Mc. All equipment except the receiver is homebuilt.

WØZJB	48	W5VY	48	W8OJN	39
WØBJV	48	W5MJD	47	W8LPD	37
WØCJS	48	W5GNQ	46		
W5AJG	48	W5ONS	45	W9ZHB	48
W9ZHL	48	W5JTI	44	W9QUV	48
W9OCA	48	W5ML	44	W9HGE	47
W6OB	48	W5JLY	43	W9PK	47
WØINI	48	W5JMR	43	W9VZP	47
W1HDQ	48	W5SIW	44	W9RQM	47
		W5VY	42	W9ALU	47
W1CLS	46	W5FAL	41	W9QKM	46
W1CGY	46	W5FSC	41	W9UIA	45
W1LLL	46	W5HLD	40	W9UNS	45
W1LSN	44	W5HEZ	38		
W1HMS	43	W5LIU	37	WØQIN	47
W1DJ	41	W5FXN	37	WØDZM	47
				WØNFM	47
W2AMJ	46	W6WNN	48	WØTKX	47
W2MEU	46	W6ANN	45	WØKYF	47
W2RLV	45	W6TMI	45	WØHVW	45
W2IDZ	45	W6IWS	41	WØMVG	44
W2FHJ	44	W6OVK	40	WØJOL	44
W2GYV	40	W6GCG	35	WØTJF	44
W2QVH	38	W6BWG	29	WØWKB	43
W2ZUW	35			WØJHS	43
		W7HEA	47	WØPKD	43
W3OJU	46	W7ERA	47	WØIPI	41
W3NKM	41	W7BQX	47		
W3MQU	39	W7FDJ	46	VE3ANY	42
W3RUE	37	W7DYD	45	VE3AET	41
W3OTC	37	W7JRG	44	VE1QZ	34
W3FPH	35	W7BOC	42	VE1QY	31
		W7JPA	42	XE1GE	25
W4FBH	46	W7FIV	41	CO6WW	21
W4EQM	44	W7CAM	40		
W4QN	44	W7ACD	40		
W4FWH	42				
W4CPZ	42	W8NSS	46		
W4FLW	42	W8NQD	45		
W4OXC	41	W8UZ	45		
W4MS	40	W8CMS	43		
W4ENR	39	W8BFQ	42		
W4IUJ	38	W8YLS	41		
W4BEN	35	W8RFW	41		

Calls in **boldface** are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.

home on the evening of the 13th, after a Florida vacation. W8BFQ wasted no time in getting on the air. Within a few minutes, aurora signals began to appear, and Margaret's first CQ raised VE2AOK, near Montreal, for the first W8-VE3 144-Mc. QSO we've heard about.

The first West Coast QSO on 144 Mc. by a Nevada home station was made on February 28th by W7JU, Boulder City, Nev., and W6NLZ, Los Angeles. This is a distance of just under 250 miles over probably as rough terrain as has ever been spanned at this distance. The two fellows had heard one another at various times for several months, but this was their first two-way contact. W6NLZ runs a kilowatt input feeding a 32-element array. W7JU has about 100 watts to an 829B and a 6-over-6 array, both horizontal. The contact was made on c.w. with signals reported by W6NLZ as varying rapidly between 359 and 589 in strength. Schedules are going to be maintained to see whether there is an improvement in signal level this spring.

We have a new American record for two-way work on 10,000 Mc. W7PPQ, Portland, Ore., reports a 22.5-mile QSO between W7OKV and W7JIP on March 13th. We will have details of equipment and pictures for a subsequent issue of *QST*. This new mark is not a world record for 10,000 Mc., however. It has only recently come to our attention that the American record was surpassed twice in 1950 by British workers. G3APY/P and G8UZ worked over a 12-mile path, and this was extended to 27 miles in work with G3ENS/P on October 22, 1950. Our thanks to G2UJ, V.H.F. Editor of the *RSGB Bulletin*, for pointing this out, and our apologies to the parties involved for our long-delayed recognition of their work.

Three v.h.f. contests a year are not enough for the Dayton Amateur Radio Association. They're running one of their own over the week end of May 8th and 9th, 1500 EST Saturday to 2200 EST Sunday. Scoring will be on the basis of number of contacts, power input and Ohio counties worked. Up to 20 watts input entitles the entrant to a multiplier of 3, and 20 to 70 watts a multiplier of 2. The contest log submitted to DARA Contest, Box 44, Dayton, Ohio, or W8LUZ, Spring Valley, Ohio, should include time and date of contact, station worked, your contact number, contact number of station worked, your power input, county of station worked and the band. The same station can be worked for credit on any number of v.h.f. bands, but the county multiplier is the number of counties worked regardless of band. Awards will be made to both members and nonmembers, and anyone holding an amateur license is eligible to compete.

Probably everyone has wondered at one time or another if his rig and antenna system were "putting out" as they should. You hear nobody on, and you call a couple of CQs with no response. You get that haunting feeling that, even though the meters all look right, perhaps the antenna is not doing its stuff. W9OVL, Hammond, Ind., solves this problem on 220 Mc. by leaving a remote-indicating field-strength meter hooked up at all times. The pick-up portion is installed in another building about 30 feet from the antenna, where it is protected from the weather and consequently requires no special construction. The line to the indicating device near the operating position can be any two-wire conductor (coax, Twin-Lead, lamp cord, etc.) of any length. The meter can be made plug-in, so that it can be detached readily for other uses. With a gadget like this hooked up and ready to go, you don't need to rely on answers or no answers to tell whether your gear is working, and it's fine for all manner of peaking adjustments that affect output.

Use of the 220-Mc. band is increasing in many quarters, with the bulk of the new growth resulting from Technician interest. Contacts are now being made nightly in eastern Pennsylvania, New Jersey and up through the New York area, and Sunday mornings there is always plenty doing. Equipment in use ranges all the way from the simplest modulated oscillators to high-powered c.w.

W3LZD, Dunmore, Pa., is now on 220.45 Mc. with up to 500 watts to a pair of 4-54As on c.w. Ted is keeping schedules with W3VIR, Willow Grove, Pa., and W2SPU, Moravia, N. Y., Sunday through Thursday at 2000 and 2100. He finds that signals seem as good as 144 Mc. over the same paths, with the higher frequency having the advantage when conditions are above average. W3LZD is particularly interested in the possibility of aurora DX on 220-Mc. c.w., as is W8BFQ and your conductor. Anyone else willing to give aurora c.w. a whirl on 220? Let's have frequencies of interested parties.

Just too late to make last month's copy, a fine inversion spread over much of the South in the latter part of February, making possible some 2-meter contacts that would have been rare DX in any season a few years ago. Early on the morning of February 27th, W4HHK, Collierville, Tenn., heard W5RCI and W5JTI in Mississippi working into Texas. Swinging his 32-element array around that way, Paul worked W5QIO, Beaumont, and W5BDT, Austin, Texas, the latter about 600 miles. W4UDQ (Mrs. W4HHK)

RECORDS

Two-Way Work

50 Mc.: CE1AH — J9AAO
10,500 Miles — October 17, 1947

144 Mc.: W6ZL — W5QNL
1400 Miles — June 10, 1951

220 Mc.: W5AXY, W5BDT — W5RCI
520 Miles — October 5, 1952

420 Mc.: W1RFU — W4TLM
410 Miles — July 26, 1953

1215 Mc.: G3QC/P — G8DD/P
100 Miles — July 26, 1953

2300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947

3300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947

5250 Mc.: W2LGF/2 — W7FOF/2
31 Miles — December 2, 1945

10,000 Mc.: G3APY/P — G3ENS/P
27 Miles — October 22, 1950

21,000 Mc.: W1NVL/2 — W9SAD/2
800 Feet — May 18, 1946

then took over and worked W5TYI, Alice, Texas, a haul of more than 700 miles.

The daily schedules of W2UK and W4HHK continue, with Paul hearing something of the W2UK transmission just about every time. There have been intervals of solid signals up to about two minutes' duration, but reception is mostly a matter of meteor pings or parts of words. One gets the feeling from listening to some of W4HHK's hours of tape recordings that the signal is never very far below audibility, however, and all hands hope that the big cotton-field rhombic now under construction at W4HHK will put them in business over this 940-mile path.

We have borrowed some of Paul's tapes and playing them for ham clubs and other groups we visit never fails to amaze the listeners, the vast majority of whom have never heard a 2-meter signal from more than 200 miles away at the most.

OES Notes

With near-zero occupancy, we are already worrying about what part of the band we're going to use when we move to 1215 Mc. Some months ago we published the recommendations of W3LZD and others regarding the use of the high end. The reason here was that if you triple from 144 to 432 and then triple again, you land on 1296 Mc. But W3OTC says that this leaves the 6-meter man out in the cold. Bob plans to travel the 51 × 24 route to 1224 Mc. He has a crystal-controlled converter practically completed and is working on the transmitter. He will be able to tune the high end, however, by appointment.

What to do about the radiation of energy on 144 Mc. when tripling to 432 has bothered many of the gang. Even when a straight-through amplifier follows the tripler, there is still an appreciable signal on 144 Mc. in most cases. W3UQJ shielded his tripler and inserted 144-Mc. traps in the feed line to the antenna. This did not eliminate the 144-Mc. signal entirely, but it is far below the previous level. Why worry, so long as the radiation is in another ham band, you say? Well, it's a legal problem for the Technician, at least. He's not supposed to be on 144 Mc. or any lower band.

W3UQJ also reports that he is hearing 220-Mc. signals from over Philadelphia way occasionally, and he feels sure that if the fellows to the east would aim in his direction more often he could do much better with them.

W6CFL, Los Angeles, has been on 1215 Mc. using a surplus TPS-1 cavity. (Don't write us for information on this one — we don't have any!) Tuck also works W6NLZ crossband, 2400 to 420 Mc., a combination you'll not find in use in too many other places. W6NLZ retransmits the 2400-Mc. signal on 144 and 420, and relays replies via 420 Mc., thus allowing W6CFL to get some use out of his 2400-Mc. gear. The 2400-Mc. receiver at W6NLZ is an APR-5.

W6ZDO, Canoga Park, Calif., says that our condemnation of the modulated-oscillator broadband-receiver approach to 420-Mc. operation has helped to depopulate the band in southern California. Carle insists that contacts, and good ones, can be made over distances out to 100 miles or more with converted surplus gear that costs a fraction of the investment needed to employ more advanced techniques. Proof of his contention lies in the 262-mile work by W6s that stood as the 420-Mc. world record for many years. It was set with the most elementary kind of gear.

Nothing we have ever run in *QST* was intended to discourage the use of the simple stuff. In fact, we have devoted many pages to the means by which surplus gear could be put to use in 420-Mc. work, and the *Handbook* has carried a bibliography of these and descriptions of simple low-cost gear in all recent editions. But we must be careful not to oversell the possibilities of such equipment, or otherwise we will find many inexperienced hams trying it and finding out, to their sorrow, that it just won't do what they expect of it.

For operation from high elevations, or in localities like the coastal regions of southern California, where propagation conditions are frequently favorable to a phenomenal degree, the simplest kind of equipment is good for plenty of fun on 420. But for the fellows who must make their contacts the hard way (and they are in the vast majority) the best is none too good. If 420 is to pay off over appreciable distances as 144 has, it must be largely by the same means: standardization on high transmitter stability and narrowband reception techniques. Going to crystal-controlled c.w., and crystal-filter reception with a communications receiver is entirely practical and not too difficult. Until you've tried it, you just have no idea how good 420 can be. We agree with W6ZDO *100* per cent in one thing, however — activity on 420, with whatever kind of gear, should be the first objective. We never make much progress on a dead band!

From Dayton, Ohio, W8DPW reports that more than 40 crystals for the 146.52-Mc. net frequency have already been sold, and more are on order. Activity in connection with Dayton c.d. planning has boosted 2-meter interest to an all-time high. The Dayton RACES group showed its wares at the big Dayton Hamvention, which should result in still more business.

Quite a few of us have been rediscovering 2-meter mobile lately. In the heyday of the modulated oscillator and the vertical dipole, 2-meter mobile was fun, but it didn't carry over much distance. Now, with good beams, a fair amount of power and high-performance converters at most home stations, the 2-meter mobile enthusiast enjoys a degree of coverage that his 75-meter counterpart may well envy. W9DSP, Chippewa Falls, Wis., mentions wowing the boys around Eau Claire recently with a demonstration of 2-meter mobile staged in coöperation with W9LEE. Copying signals at distances up to 60 miles indicated that here was something worth more investigation.

Your conductor has been enjoying similar experiences, using equipment and antennas soon to be described in *QST*. Where 2-meter mobile was little more than a neighborhood proposition when we last gave it a try some seven

(*Continued on page 124*)

2-METER STANDINGS

	Call States	Areas	Miles
W1HDQ	18	6	850
W1IZY	16	6	750
W1RFU	15	7	1150
W1MNF	14	5	600
W1BCN	14	5	580
W1DJK	13	5	520
W1MMN	10	5	520
W2UK	23	7	1075
W2NLY	22	7	1050
W2ORI	21	8	1000
W2AZL	20	7	1050
W2QED	19	7	1020
W2PAU	16	6	740
W2AMJ	14	5	550
W2BLV	14	5	450
W2QNZ	14	5	400
W2UTH	13	7	880
W2SFK	13	6	—
W2AOC	13	5	400
W2DFV	13	5	350
W2CET	13	5	405
W3QKI	22	8	820
W3RUE	22	8	760
W3NKM	19	7	660
W3KWL	16	7	720
W3LNA	16	7	720
W3FPH	16	7	—
W3GKP	15	6	800
W3IBH	13	5	570
W4HHK	23	7	850
W4AO	21	7	950
W4JFV	18	7	830
W4MKJ	16	7	665
W4OXC	14	7	500
W4JHC	14	5	720
W4IKZ	13	5	720
W4JFU	13	5	720
W4UMF	13	5	600
W4UDQ	9	4	850
W4WCB	9	4	650
W4TLA	7	4	850
W5RCI	20	7	925
W5JTI	14	5	670
W5QNL	10	5	1400
W5CVW	10	5	1180
W5AJG	10	4	1260
W5MWW	9	4	570
W5ML	9	3	700
W5ABN	9	3	780
W5ERD	8	3	570
W5VX	7	4	—
W5VY	7	3	1200
W5FEK	7	2	580
W5ONS	7	2	950
W6ZL	3	3	1400
W6PJA	3	3	1390
W6WSQ	3	3	1390
W6BAZ	3	2	320
W6NLZ	3	2	247
W6GCG	2	2	210
W6QAC	2	2	200
W6EXH	2	2	193
W7JU	3	2	247
W7LEE	3	2	240
W7YZU	3	2	240
W7JUO	2	2	140
W7RAP	2	1	165
W8BFQ	24	8	775
W8WJC	24	8	775
W8WXV	21	8	1200
W8WRN	20	8	670
W8DX	19	7	675
W8BAX	19	7	655
W8UKS	18	7	720
W8RMH	18	7	690
W8RWW	17	7	630
W8EP	17	7	—
W8WSE	16	7	830
W9EHX	23	7	725
W9FVJ	22	8	850
W9EQC	21	8	820
W9BPV	20	7	1000
W9UCH	20	7	750
W9LF	19	7	—
W9ALU	17	7	800
W9WOK	17	6	600
W9ZHL	17	6	—
W9MBI	16	7	660
W9KLR	16	7	—
W9BOV	15	6	—
W9LEE	14	6	780
W9DDG	14	6	700
W9PAN	13	7	680
W9UIA	12	7	540
W9GTA	11	7	540
W9JBF	10	5	760
W9DSP	10	4	700
WØEMS	24	8	1175
WØGUD	22	7	1065
WØIHD	19	7	725
WØONQ	17	6	1090
WØIN1	14	6	830
WØZJB	12	7	1097
WØOAC	12	5	725
WØWGZ	11	5	760
VE3AIB	20	8	890
VE3DIR	17	7	790
VE3BQN	14	7	790
VE3BPB	12	6	715
VE3AQG	11	7	800
VE1QY	11	4	900
VE3DER	10	6	800
VE2AOK	7	3	440

Armed Forces Day—May 15th

THE Army, Navy and Air Force invite all U. S. amateur radio operators to participate in the Armed Forces Day program for 1954. The amateur radio activities are co-sponsored by the Military Affiliate Radio System (MARS) representing the Army Signal Corps and Air Force Directorate of Communications, and the Naval Communications Division.

A receiving contest is open to any short-wave listener who can copy International Morse Code at 25 words per minute. A listener who submits a perfect copy of the transmission will receive a Certificate of Merit, attesting to his code-copying proficiency, from the Secretary of Defense.

A military-to-amateur transmitting and receiving test will be conducted for all holders of valid U. S. amateur radio station licenses. Headquarters stations of the Army, Navy and Air Force will establish radio contact with amateur stations and will acknowledge these contacts with special QSL cards. Each Service headquarters station will QSL separately so amateurs will have an opportunity to qualify for three different QSL cards.

A radioteletype (RTTY) transmission will be sent from MARS and official Navy stations. Any amateur station capable of receiving radioteletype transmissions is invited to copy the special message. A special letter of acknowledgment will be awarded to each amateur who so participates.

C. W. Receiving Competition

The c.w. receiving competition will feature a message from the Secretary of Defense. All individuals, amateur operators and others, are eligible to participate. A Certificate of Merit will be issued to each participant who makes a perfect copy.

Transmissions will be at 25 words per minute on the following schedules:

Time, May 15, 1954	*Call Sign*	*Frequencies (kc.)*
1900 EST.....	WAR	14,405, 20,994
1900 EST.....	NSS	121.95, 4390, 9425, 12,804, 17,050.4, 22,491
1900 EST.....	AIR	3497.5, 6997.5
0100 EST (*May 16th*)	WAR	14,405, 20,994
2200 PST.....	NPG	114.95, 6428.5, 9277.5, 12,996, 17,055.2
0100 EST (*May 16th*)	AIR	3497.5, 6997.5

Each transmission will commence with a five-minute CQ call. It is not necessary to copy more than one station, and no extra credit will be given for doing so. Transmissions should be submitted "as received." Do not correct possible transmission errors. Copies should be mailed to Armed Forces Day Contest, Room BE-1000, The Pentagon, Washington 25, D. C. Time, frequency, and call sign of the station copied should be indicated.

Military-to-Amateur Test

Military stations WAR, NSS and AIR will be on the air between 1800 and 2400 EST on May 15, 1954, to contact and test with amateur radio stations. The military stations will operate on spot kilocycle frequencies outside the amateur bands as follows:

WAR (Army Radio Washington), 4025 (A3), 6997.5 (A1)

NSS (Navy Radio Washington), 4015 (A1), 7375 (A1), 14,385 (A1)

AIR (Air Force Radio Washington), 3497.5 (A1), 7635 (A3), 14,405 (A3)

Contacts will consist of brief exchanges of location and signal report. The military stations will not be permitted to handle traffic or exchange messages.

Warning! In previous exercises, a few amateurs operated on the military frequencies rather than in the amateur bands. No authority exists for amateur operation outside the amateur bands during this test. Similarly, amateurs affiliated with MARS or USNR networks which drill on military frequencies are not authorized to use the military frequencies for purposes of these Armed Forces Day exercises. WAR, AIR and NSS will limit contacts to amateur stations in the amateur frequency bands.

Each CQ by WAR, AIR or NSS will indicate the frequencies on which each will listen for replies. These frequencies normally will be in 50-kc. blocks. For example: "CQ CQ CQ DE NSS NSS NSS ANS 3550 TO 3600 KC." Novice frequencies will be accorded the same attention given the remainder of the amateur bands. It is hoped that more Novices will participate this year than did in 1953.

Radioteletype Receiving Competition

The radioteletypewriter receiving competition will feature a special joint message from the Chief Signal Officer (Army), the Director, Naval Communications (Navy), and the Director of Communications (Air Force). A letter of acknowledgement will be sent to each amateur participant who submits a copy made from the radioteletype transmission of this message. Transmission will be

(Continued on page 124)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W1VMW

RE 1954 DX TEST CLAIMED SCORES

Round-ups of high claimed scores for the recently concluded 20th ARRL International DX Competition are scheduled for appearance in the June and July issues of *QST* —'phone and c.w., respectively.

How:

Ahh-h-h — *spring* again. And May brings not only better (?) 20-meter propagation conditions but inspires our annual meeting of the DXHPDS (DX Hoggery and Poetry Depreciation Society). This weird assortment of ersatz Whiffenpoofs wasted little time in getting down to cases. Shoving things off to a crawling start, Square-Wave Squoggins smashed his glass of Old Haywire on the floor and broke the ice with this elegy:

A rare-DX op in the bush
At first enjoyed getting the rush;
He encouraged the hogs
To behave like mad dogs —
In the rush he got crushed into mush.

Ten-Meters Tennyson, our next volunteer, looked up from his collection of discouraging CRPL reports and donated this thing:

A rabid DXer named Pawl
Really wins all the prizes for gall:
Ten kc. he'll shift,
Under pretense of drift,
With his VFO-swish type of call.

Never to be outdone, Skippy Short dealt a blow to the "lend me your kilowatt" boors:

The crumb who should curl up and die
Is the piggy-back species of guy;
"Have him listen for me!"
Is his usual plea
While twenty-six others stand by.

Shorty Skipp delivered on an even more disgusting theme:

Two-gallon DX men, 'tis true,
Are mentally somewhat askew;
With morals corrupt,
They try to make up
In db. what they lack in I.Q.

Then our most avid collector of war surplus, I. M. Gearhappy, succinctly plunked all DX hogs into one nutshell:

No scruples had Sloppy O'Squee
While rolling up two-twenty-three;
Now he vows he's reformed,
But a rep so deformed
Remains that way permanent-ly.

As we were thus just warming up to our subject some squealer stuck his head in the door and hollered, "Fifteen is open to Asia!" The hall cleared in ten seconds flat. But when Jeeves & Co. got home a half minute later, 21 Mc. was closed again and dead as a doornail.

What:

In the text to follow, frequencies (given in number of kc. above the lower band-limit) appear in parentheses, times without. E.g., (9) = 14,009 kc., if the paragraph deals with 20-meter work. Times are 24-hour time, zone or GCT specified, using the nearest whole-hour figure such as 7 for 0720 or 0650, 0 for 0015 or 2349.

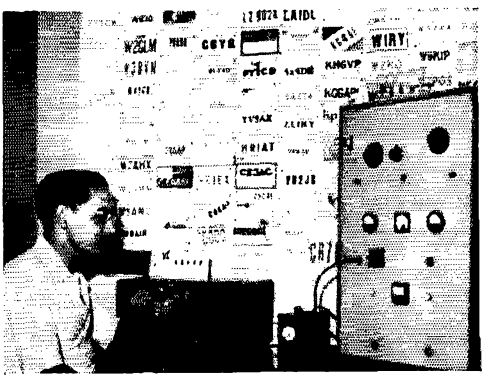
Twenty c.w. demonstrates occasional late-1940s form as northern hemisphere periods of daylight expand. More sun-up permits a little decent after-supper DXing for a change and even wee-hours VK/ZL openings are on the docket. An 813 at 500 watts, an HRO-50T receiver and a 40-foot-high 3-el. squirter raised CRs 6AI 14 *EST*, 6CJ 17, 6CS 16, 6CZ 15, 7IZ 13, CX5CO 17, EA9BC 11, EL2P 18, ET2s WW 13, PA 18, FF8s AC 11, BB 15, FP8AP 16, FQ8AT 14, GC4LI 13, GD3IBQ 10, HC1KD 16, HH2OT 15, HK1TH 16–17, Trieste IIs BLF 18, BNU 13, I5LV 15, KG6FAA 19, KR6AA 19, OA4AQ 19, TF3MB 16, VPs 4LZ 19, 6GT 18, 7NM 18, 8AW 20 of So. Shetlands, VQs 2GW 15, 2W 17, 3EO 16, 4RF 15, VSs 1CZ 20, 9AS 12, ZB1KA 12, ZC4RX 11, ZEs 3JO 16, 5JE 14–15, ZS3E 16 and 3V8AN 22 for W8HEV. New DXCC, WBE, KZ-25 and WAVE diplomas decorate Tom's shack . _ . _ . _ W2LYO lassoed CR6AI (68), CR7LU (42), FM7WP (38), GD3IBQ (34), OX3s HK (80) and RD (76), then joined the USAF . _ . _ . _ HA5KBP (62) with a YL at the key, LB8YB (37) of Jan Mayen, SVØWE (35), YO3ZR (57) and some LUs brought W1SPK to the 71st rung . _ . _ . _ W6UJ encounters VR3A (ex-VR3D) around 14,054 kc., while W6KZL recommends VP8AZ (70) 16 *PST* who radiates from Grahamland (goes as Antarctica on the DXCC Countries List) . _ . _ . _ ET2AB (5) 20–21 *GCT* and OQ5GU (105) 22 were happy to grab YV5FL . _ . _ . _ WØPRM put his 40 watts and 66-foot Zepp to work on DL1EQ/YV (28) t7, EA9AZ (92), TF3MB, VQ2AB and others . _ . _ . _ ZE3JP (67) came back to W4SXS, and K2BSM caught up with HR1AA, SP2KAC and ZP5AY . _ . _ . _ MP4QAH on Halul Island (Qatar) and one YA3AA (60) 15 *GCT* interested G4ZU . _ . _ . _ W4QCW, also due for a call from Uncle Sam, reached 93 worked through the coöperation of EAs 8BF 8BK 9AP

* DX Editor, *QST*.

ØAB, FQ8AF, KA2RC, KT1UX, LU6ZE in Antarctica, OD5AX, OQ5VN, TA3AA, VP2MD, YN1AA, YS1O, ZB1BU and ZS3K. "A new 3-element beam has been a big help." . . . . CR5AD, HZ1HZ, VQs 2IM and 4EG chatted with W3RXM . . . . W5VIR had luck with new Easter Island actives CEØs AA and AD, as well as CS3AC, JA3s AB BB, KAs 2GU 3AF 9DR, KR6LP, KX6BU and other nifties . . . . When not the pile-up target of W/VEs, VK9YY manages to collar people like ET2s NC NG, OD5AB, VK1AC of Macquarie and 4X4FW. Recent QSLs received at VK9YY include JZØKF, KJ6AZ, ZC5VS, ZS7H and XZ2OM. OD5AB was Alan's 100th country worked . . . . West Gulf DX Club's *DX Bulletin*, W5FXN editing, specifies CR6CS (40) 21 *GCT* t9c, FM7WD (ex-FM8AD) (132) 20–21 t8, FO8AC (60) 2, IS1CXF 15, IT1TAI (82) 23 t8, JAs 3AF (63) 23, 4AF (64) 23, KG4AT (50) 0, OY2Z (140) 21–24 on week ends, VPs 2AD (32) 21, 8AJ (51) 1, VQ2DT (71) 23, one YA2LO and ZS7D (27) 21 . . . . VK1EG, operated by ex-VK1BS-VK2EG in MacRobertson Land, will go as Antarctica on the List.

Twenty 'phone is a live issue at YV5FL. Corny cornered CR5SP (155) 21 *GCT*, EA8BG (185) 20, FF8AY (13) 22–23, VQ3EO (105) 21, ZD2RRW (132) 18–19 and reached a 111/80 total . . . . W2KJG continues his 14-Mc. A3 offensive by way of CN8s FK FR MM, CR4AD, CS3AC, HR1JM, KT1DD, OQ5CX, PJ2AF, TI2FG, VP2KB, several VP9s, YN4CB, YV4AA, ZB1CM, 5As 3TC 4TJ and miscellaneous ZSs . . . . CX5AF. HK1DZ, HP3FL, HR1KS, OA4V and Galapagos-exclusive HC8GI vocalized with all-bander W5VIR . . . . VR2CG finds AC4NC's 25 W. and dipole still available on 14,125 kc. . . . . 4X4BO labels W1s CPI FH JCX MCW QV, W2s AFQ DYR GIC JDE KR MDQ MI NJZ TEX TXI, W3s BES DGC EA ECR JNN KDD WUH, W4s GXY ITM, W8s BHW CLR EWB HRV UAS YGP and W9JJF as having consistently fine 20-meter 'phone signals down his way . . . . YN1AFM (250) and ZB2A (130) entered the right portion of W1SPK's log . . . . Dominican Republicans, rarely ever available on c.w., are mentioned by SWL Bob Yates: HIs 6EC and 8WF . . . . WGDXC sharpshooters put the head on FM7WD (132) 20, OY2Z (140) 12–14, VP8AQ (125) 0 in the So. Orkneys and ZS9G (171) 21 . . . . W9LMC ran across FM7WN (152), HR1s GM (198), KS (183), KG4AT (248) and YN1WR (153).

Forty c.w., teetering between summer noise levels and long-skip winter mein, is still patronized by the faithful. YV5FL dropped in on AP2K (40) 3–4 *GCT*, CR4AG (47) 1–2, MF2AE (10) 3–4 and 4X4DK (10) 3 . . . . EL2X (22), KC6AA (22) of Yap, VQ2AB (17), VS9AS (15), 3V8AN (22) and a bunch of Oceanians answered W4YZC . . . . W2KMZ, W3MFW, W4GCW, W5s FFW KTD LX VIR VRP, W6s AM EEK KEV LDD MUR NEQ SYG VBY VUP, K6AAJ, W7GHU, W8LKH and W9DUY are among the stronger 7-Mc. c.w. signals noticed by VK9YY . . . . W6ZZ raised JAIs CB CR, while W2LYO was busy with several ZSs and HR1KS (5) . . . . A mere 25 watts gaid JA1BU (40) and DU7SV (40) for W6AHX . . . . W6BCT regularly hears UAØKFA (72) 6 *PST* t7 and UI8KAA but, of course, no bites . . . . Other U.S.S.R. stations — UA3KWA, UB5s AF KBT and KCF — are heard by KZ5CI around 7040 kc. Buck knocked off CX6AD. FA3OA (32), FM7WP (20) and JA3BP to reach the 7-Mc. 42-country mark . . . . HH2OT, HR1AA, KG4AE, TI2TG, VK9YY, VPs 3YG, 5BH of the Caymans, 7NM, YN1AA, YV5s DE FH and YU3ABC contacted W5VIR . . . . Texas must be good 40-meter country. W5WZQ raised power to 75 watts and collected HH3RC, HR1FM, JAs 1FA 7AB (25), KL7ACK/KG6, OQ5GU, OX3AY (5), VPs 2AD and 8AZ (9) . . . . W1ORP was the first DX station contacted by the ½-watt rig of VP8AX, So. Shetlands. The VP8 normally runs 150 watts. W1ORP sports eight tuned 100-kc. circuits as a "Q5-er." . . . . Fifty watts and a full-wave wire earned PJ2AJ (46), TI2WR, VPs 4LZ 6GT (8) and a VK5 for K2DCJ . . . . EA9DE, VR3A and KX6BU brought W4VNE close to the 100-mark; W4LVV advises that FG7XA is once again workable on 40 . . . . W1MX, with W4YHD in the cockpit, got away with CR6AI, EA8BF, KT1UX, LU6ZE, OD5AX, VP8AW of So. Shetlands, VQ3EO, ZE2JS and ZS3K, all good 7-Mc. catches . . . . W4SXS has TI2PZ (10), and W1VMW tripped over HC1ES (5–30) . . . . WGDXC 40-meter goodies: DU1s AQ (30) 10 t8, DO (20) 10, FK8AO (49) 10 t8, KH6AGX/KG6 (25) 10, KX6BC (3) 11–12, VK9s OK (5) 5–11 and RH (5) 5–7, the latter two on Norfolk . . . . Other 7-Mc. specimens reported active: CE3DZ (35) 1 *EST*, EA8s BF (30) 20, BK (20) 19, FP8AP (35) 19, HZ1HZ (15) 20, JA1CJ (15) 3–4,



CR6CZ provides a fresh spurt of enthusiastic Angola activity with this Lobito layout. Fernando has a 6AG7-6L6-807s r.f. section modulated by a 6C5-6SN7-6L6s line-up. CR6CZ uses vertical antennae and his receiver is an S-77. (*Photo via W8IV*).

KB6AY (7) 3, KG4AT (18) 23, KT1UX (20) 20, OQ5CP (12) 20, PJ2AI (30) 0, TA3AA, VP2SH (28) 19, VR2AS (34) 4, ZB2A (12) 18, ZE5JA (30) 17–18 and ZS3K (18) 20.

Even *forty 'phone* has been DXish. W8VHY's 300-watt 813 and 40-foot vertical connected with HP3FL, HR1AA, KG4AO, KS4AV, LUs 1FAE 3FAQ, PY7VB, VP9s BDA BU, XE2KA and YN4CB. These were encountered around 7–8 and 22–0 *EST* . . . . KH6s ANK AWM AYG and MG are specified by W6ZZ . . . . W4AWO needed only 18 watts on 7-Mc. 'phone to do away with HH3RC, HP3DA, KG4AE, TI2VJ and VP9BK . . . . Swan Island's KS4AV QSOd W5VIR, W3LEZ and W4QCW. W3LEZ also bagged LU6KE.

Eighty c.w., after falling short of cold-weather expectations earlier this season, now enjoys a lull before its usual deluge of warm-weather atmospherics. Miscellaneous results here and there, at *W1MX:* EL2X. *W1TVJ:* SP3AN. *W4YZC:* VP7NM, VK2HZ 7 *EST*, ZL1CI and several Europeans. *W5VIR:* EL2X, TI2TG. *W8NOH:* TA2EX. *W9UDK:*

♦

The shack of KA2HQ (MARS A11AA) recently became the scene of a Far Eastern Amateur Radio League hamfest when Captain Kurt Carlsen, W2ZXM/MM, docked *Flying Enterprise II* at Yokohama. *Front, l. to r.*, are KA2CK, KA2HP, W2ZXM and WØUTF; *rear*, KA2JR (W5UKM), John Piasta of KA2HQ, KA2RS, Rich Joppa of KA2HQ, and KA2ON. After this picture was taken the gang adjourned to a steak dinner followed by a tour of the *Enterprise*. "Captain Stay-Put" also made March news in New England when he and 465-foot *Flying Enterprise II* participated in ceremonies that opened New Haven, Conn., as a full-fledged deep-water port of call.

***QST* for**

Rio de Oro EA9s DE and DF (EAs 2CA and 8BI, respectively) were mighty popular *aficionados* during the month of March. DXpeditioner EA9DE (seated on table) rang up 1075 'phone QSOs and 375 c.w. contacts in 12 days of operation on five bands, 10 through 80 meters. These QSOs included 70 'phone and 110 c.w. contacts with U. S. amateurs. Juan's work covered all continents; he logged 110 countries, 102 on 'phone. EA9DF (arm on rig), who took over at the end of EA9DE's stint, is a Spanish Air Force Lt.-Col. and will strive to keep Rio de Oro consistently workable hereafter. That transmitter is a British Panda PR-120. Concerning the picture at left, EA9DE writes: "This coast being a paradise for fishing and hunting, I did not hesitate to devote some hours to fishing and a whole day to hunting. . . . We came in with five gazelles and an antelope." Juan expresses sincere thanks to all amateurs, especially the Canary Island gang, for coöperation that assured his venture marked success. EA2CA-EA9DE looks forward to the possibility of an early Ifni DXcursion.

CT1DJ, FA8BQ. *WØPRM:* KH6MG, heard EA9AP and YU3CAB . _ . _ . _ Other 80-meter activity reported: CT1s SX (25) 22, TT (10), EA8BF (30) 23, FP8AP (10) 20, GD3UB (3) 19, KG4AT (12) 18, KT1UX (25) 19, KV4AQ (21) 17–18, OK1MB (5) 22, ship station PI1LS (45) 21, PYs 3QX (10), 7WS (20) 21, TA3AA (35) 22, YU1s AD (13), FC (45) and ZS3K (25) 22, times *EST*.

Fifteen's ardent supporter, W6ZZ, worked 21-Mc. 'phones CEs 2GW 3MJ 6AR, CP5s AB EK, DU7SV, HR1AA, KG4AT, KG6AEX, KH6s ALM AR ARN ART IB MG PM, KL7RZ, KZ5s AL CF CP CS DG FL WZ, LUs 3DD 3FAQ 4PA 7DAD 8DB, PYs 3AGP 4HD, VKs 2ID 4HD, VR2CG, XE1OE, ZLs 1BY 1GW 2GB 2LV 3LE, ZS6s AEW CV and EG. Then, switching to radiotelegraphy, Miles landed DU7SV, KG6AEX, KH6s IJ MG PM, KJ6BA, KZ5s DE IL, LUs 3EL 3EX 5CK 8AE 9DAI, TI2TG, VK3s AHH XK, ZLs 1BY 1MQ 2GS 2LB 3GQ 3JA and ZS3K . _ . _ . _ W2LYO reports 21-Mc. Africans VQs 3EO 4CF, ZE3JJ, plus 4X4CW.

Ten gave the 'phone gang a small break during the DX Test and W4NQM captured the following 28-Mc. A3ers: CXs 1GG 2BC 2CL 2CO 3BH 4CS, HK4AM, HPs 1TS 3FL, KZ5s AL BD, LUs 1DCE 1DCH 1EQ 2DZH 3FL 3BQ 4DZI 4PA 6AAL 6AB 7DJZ 7DX 8DAF 8DB 8DDI 8DJB 9AW, PY4DK, TI2MAR, XE1s DQ QB, YVs 1AA 4AA and a few KP4s . _ . _ . _ W3MO adds LU6AB, and W4WVM donates HR1UA and LU8FAH. Ws 3BYI ØBJP and ØEQW also worked into South America during March.

Connoisseurs of *one-sixty* are busy auditing the past season's DX developments and some 1.8-Mc. specialists are turning their attention to the possibilities of summer transequatorial work. Just about a year ago — beginning May 3rd, to be exact — great persistence and a set of hardy static-defying ears netted a neat string of ZL QSOs for W2WWP . _ . _ . _ W1BB's Transatlantic Tests statistics reveal that over 120 stations in all U. S. call areas participated in the affair. Amateurs in some 30 countries on all continents pitched in; these included more than 50 Gs . _ . _ . _ Late-season activities were featured by the 160-meter appearance of KH6MG's 814s, 113-foot vertical and 75A-2 inhaler. Leo worked a batch of Ws as far east as W1BB and W3RGQ. KH6MG uses 1901- and 1993.5-kc. crystals and peaks best on the East Coast between 7 and 9 *EST* . _ . _ . _ VP4LZ passed out a flock of 160-meter South American QSOs that included contacts with EI9J, KP4s KD TF, Ws 1BB 1ZL 2EQS 2GGL 3PA 8KIA 9TVD ØIFH and VE1EA. He uses a Collins rig, a BC-348 and a 300-foot 38-foot-high skywire . _ . _ . _ W9FIM, with a 93-foot vertical, 150 watts and an RME-69, scratched off CN2 G KH6 KZ5 VP7 VP9 ZL1 and ZL3, the latter a 2-way A3 masterpiece with ZL3RB . _ . _ . _ Other results hither and yon follow. *VE1EA:* EI9J, GW3ZV, KP4s KD UE, VPs 4LZ 9BDA 9BF and Gs galore. *W1BB:* KP4s KD UE, VP9s BDA BF, ZL1WW. *W9PNE:* KH6s IJ MG, KP4UE, KV4AQ, KZ5DE, VPs 7NM 9BDA 9BF, ZLs 1WW 2ABB 3RB. *WØHNV:* KH6MG, ZL3RB (two-way A3) . _ . _ . _ W1ZL's "versatile vertical" is only a one-sixteenth wave on 1.8 Mc. but Carl managed EI9J, Gs 3PU 5RI 6BQ 6GM, VPs 4LZ and 7NM . _ . _ . _ LU6EF personally verified that LU4DM does *not* work 160 and has been off the air for two years. Scratch one . _ . _ . _ OT KP4KD had much fun this season and lost quite a bit of sleep over 12 countries, three continents and many eager Ws. EI G GD KP4 KZ5 VP4 VP6 VP7 and VP9 prefixes are checked off in Ev's 160-meter log. KP4KD worked W1s BB QJM, W2s EQS GGL PP, W3RGQ, W4s BRB VNE, W6NDI, W8s ANO BNJ KIA NSF, W9s KGL NH and PNE on c.w. this season; W2QHH, W3EIS and W8GDQ worked Ev's 'phone. Recently heard but not worked by KP4KD: (c.w.) W1s ACR WPO, K2ANR, W2s DOD JIL UKS WC, W3s HL OKU PA, W4s BAZ KFC LRN POB, W8s ANW KHW ZZC, W9s CZT DKH FIM and WØHNV; ('phone) W2RYJ and W5WEH . _ . _ . _ A report via W1VG, that EL2X is available on 1812 kc. around 0500 GCT on Sundays, closes this month's panoramic megacycle tour.

Where:

At least once yearly we caution W/K/VE/VO amateurs to patronize foreign-society QSL bureaus *only* when instructed to do so by the contacted stations concerned. Unlike your ARRL QSL Bureau, which accepts QSLs for ARRL members and nonmembers alike, many foreign societies accept and relay cards on a members-only basis. QSLs they receive for nonmembers may be returned, pigeonholed or even destroyed . _ . _ . _ DL1KV points out that pasteboards bound for DM2 stations can go via DARC (West Germany) but that DJ/DL-destined QSLs should *not* be sent to the DM2 bureau . _ . _ . _ W6LYG, dispenser of KM6AO confirmations for some time, thinks he has taken care of everybody but stands by for further inquiries on the subject . _ . _ . _ QSLs for HB1 Swiss portables can be sent via USKA or directly to the addresses of their HB9 home-station-call counterparts . _ . _ . _ VS2DB, who handles the outbound section of the VS2 bureau, offers assistance to any amateur who is shy a deserved VS2 QSL . _ . _ . _ FO8AD regrets that circumstances force him to ship out all cards only via bureaus. Roland makes every effort to keep ahead of the backlog . _ . _ . _ "I am still handling QSLs for JZØKF in Dutch New Guinea for chaps outside the U. S. A., and my friend W2KMZ is handling QSLs for W/VE amateurs." — *VK9YY* . _ . _ . _ W7UKW kindly offers to assist a deserving rare-DX station with W/VE QSL chores. Candidates may drop Lee a line at his *Call Book* QTH . _ . _ . _ These individual items spilled out of the month's mailsack:

Ex-CP1BK, Henry J. Smith (W5DAI), 1035 Circle Dr., Las Cruces, N. Mex. _ . _ . _ . _ CR5SP, A. Pereira da S., Correos, Telegrafos y Telefonos, Sao Thome, Portuguese Guinea _ . _ . _ ex-DL4EF, Capt. A. L. Hamel, 5207 26th Avenue, Washington 21, D. C. _ . _ . _ DL4MY, Sgt. D. S. Strock, 332nd C/R Co., APO 139, c/o Postmaster, New York, N. Y. _ . _ . _ EA8BG, F. Hernandez, P.O. Box 215,

Santa Cruz de Tenerife, Canary Islands — **EA9DE**, (QSL to EA2CA) — **EA9DF**, (QSL to EA8BI) — **EL2X**, c/o PAA, Roberts Field, Liberia — **EL3A**, R. A. Lloyd, jr., American Consulate, Monrovia, Liberia — **FK8AH**, Robert Garbe, Hydrobase, Noumea, New Caledonia — **FK8AL**, Jean Garbe, Hydrobase, Noumea, New Caledonia — **FO8AJ/MM** (QSL via Hallicrafters, 4401 W. 5th Ave., Chicago 24, Ill.) — **HC2OW**, Eduardo Cruz Granda, Apartado 1053, Guayaquil, Ecuador — **HH2OT**, Box 1027, Port-au-Prince, Haiti — **HK4DP**, P.O. Box 708, Medellin, Colombia — ex-**KG6SA**, Leonard A. Westbo, jr., W7MCU, Route 2, Box 14, Auburn, Wash. — **KR6LP**, (QSL via ARRL) — **KR6OS**, J. L. Levine, OARC, Staff Signal Office, APO 331, c/o Postmaster, San Francisco, Calif. — **KS4AV**, Swan Island, c/o Postmaster, Tampa, Fla. — **LUØBS**, (QSL to LU7BQ) — **MD5DD**, (QSL via RSGB) — **OQ5BI**, G. Capelle, c/o Utexleo, Boite Postale 3085, Leopoldville-Kalina, Belgian Congo — **OQ5VN**, Box 757, Stanleyville, Belgian Congo — **ST2HK**, Des Alimundo, P.O. Box 516, Khartoum, Sudan (or via RSGB) — ex-**SVØAB**, (QSL to W2SUC) — **TI2WR**, Box 1345, San Jose, Costa Rica — **VK1HM/ZC2**, Cocos-Keeling, via GPO, Singapore, Malaya (use air mail only) — ex-**VK9GM**, G. E. Meaton, 165 Bayview Avenue, Earlwood, Sydney, NSW, Australia — **VP6WR**, Woody Richardson, Waterworks Dept., Barbados, B.W.I. — **VP7NX**, (QSL to W8RVM) — **VP8AZ**, (QSL via RSGB) — **VQ1CRS**, (QSL via W6NZK) — **VQ1JRC**, (QSL via W6NZK) — **VR3A**, Ray Baty, ex-VK2ANB-VR3D, c/o Cable & Wireless, Fanning Island — **XE1JG**, Juan Pichardo, Serapio Rendon 98-28, Mexico, D. F. — **ZC3AB**, Christmas Island via GPO, Singapore, Malaya.

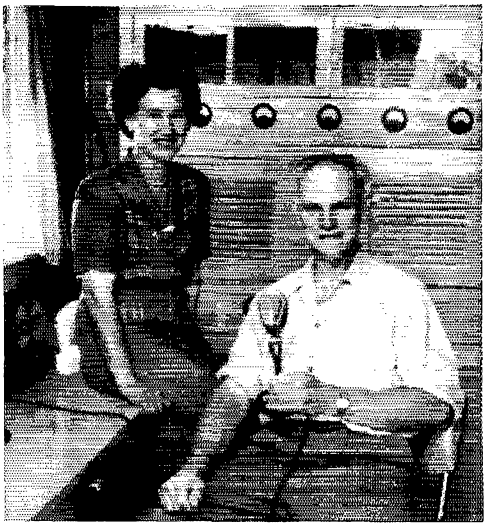
W1s HDQ JEL JOJ VG WPO WPR ZDP, K2s BZC DCJ, W2MUM, W3LEZ, W4QCW, W6s DZZ KZL UJ, W8NOH, W9s CFT KA, VS2DB, YV5FL, ZS4GK and the WGDXC *DX Bulletin* deserve your thanks for these.

Whence:

Asia — 4X4BO appraises Israeli DX goings-on: "There are about 65 licensed hams in Israel, the majority of which are not very active on the bands. Active stations . . . are 4X4s AB AD AE AH BA BD BL BN BO BR BT BX CW DX DF DK DR FK FQ FS and GB. Except for very few of these, most of us have low-power rigs (25–60 watts). 250 watts being the highest allowed. Antennas in most cases are simple (too simple!) dipoles. I run 30 watts to a beam — a 'ZL Special.' We are very short of radio parts and receivers here in Israel . . . and with monetary restrictions prevailing we are unable to purchase any of the new stuff that is available to you lucky fellows over there." Arthur tips us off that 4X4*RE* joined benedict ranks and consequently is no longer, temporarily at least, among the more workable 4X4s; 4X4BO is an Israeli Army captain — According to W6AM, MP4BBD is scheduling a California visit in September — Erstwhile Stateside v.h.f. man KR6LP (W1ZAC) now can be found pushing an Okinawa BC-610 rig around on 20. Ralph reports: "Conditions have been poor and I do not have reliable contacts with the east coast [U. S. A.]. Europe has been poor also but I enjoy contacts with boys in this part of the world who are hard to get from back there." — From KR6OS (W9CDK): "Due to difficulties in receiving mail . . . I will QSL 100 per cent, all cards received, by air mail through bureaus or to individuals if requested." W2ZXM/MM told W1RDV of a recent visit to Saudi Arabia's ham royalty when Kurt took *Flying Enterprise II* into Arabian waters. One of the princes, an ardent ham, reciprocated by enjoying a royal tour of the *Enterprise*. Amateur radio is high-level stuff in the Near East — there are six (6) Saudi Arabian princes bearing HZ1 call signs — K2BZC finds that ex-VS6HR is now active as VP6AM — Asiatic tidbits from VS2DB: VS1s CZ ES FH FJ FK and FP are numbered among present Singapore actives. VS2s available include BD CP DB DG DQ DV DW DY EA EB and UW, all mostly on 'phone.

Africa — EL2*X*, who is ex-DL4EA-OE13EG, had himself a ball during the '54 ARRL DX Test. Ray, knocking off all U. S. call areas on 7 and 3.5 Mc., furnished first Liberian contacts for numerous W/VEs — Bloemfontein's Central Agricultural Show, May 4th-8th, will have ZS4CAS, a special exhibition station, cooking on 15 through 80 meters, 'phone and c.w., daily from 0900 to 2200 local time. ZS4GK assures that a special QSL designed for the occasion will be received by each station contacted — A couple of "whos" from W1YYM: CN8MM is prewar ex-HAF3B, while CN8CS is former FQ8SN-F8SN — "I hope to resume amateur activity within a few months with my newly-built 6146 transmitter, beam antennas for 14, 21 and 28 Mc., and a recently-bought French receiver." This from OQ5BI, due back in the Congo from ON4 — W1WPR heard that VQ3EO leaves Tanganyika this month and heads back to the United Kingdom — W4UAJ, ex-W9IAI, writes from Ethiopia: "I have taken a position with the Imperial Telecommunications Board as assistant chief engineer and am now living in Addis. There are several hams from different countries working for the Board and it may be possible to get permission for some of us to get on the air. Addis seems to be good for receiving . . . for I have been hearing several hams from the States — some W1s, W2s and a lot of W8s. For a fellow who enjoys ham radio like I do it certainly is torture to listen to good signals coming in and not be able to do anything about trying to establish contact." Best wishes to these EITB fellows in their efforts to get fired up — ET3s are as scarce as hen's teeth right now and a "new generation" of DXers is in need of Ethiopia.

Oceania — As assisted by maritime-mobiles 8M8s BWO and LS, W6LVN fills us in on news from Pitcairn. VR6AY, inactive since the war, states that there has been no recent Pitcairn ham activity, late reported VR6 calls notwithstanding. Pitcairn's shore-to-ship station, ZBP, holds forth on 500 kc. and provided the 8M8s an over-the-air interview with Andrew Young, descendant of *Bounty* survivors, at W6LVN's behest. VR6AY may become workable once more when new or repaired gear is available — W3LEZ bumped into clubmate W3MSK at the key of KX6BU one morning. *Small* world — VS2DB reports VK1HM/ZC2 as active several days per week, and observes that ZC3AB, Christmas, has no air-mail delivery facilities. North Borneo ZC5s VR and VS regularly are heard, the latter on week ends only; ZC5VM is no more — VR2CG gets out well with his mobile gear on 20, 40 and 80 meters. Wyn used this set-up to assist in the 1953 Fiji royal tour by Queen Elizabeth — From ex-VK9GM: "My time at Norfolk Island having expired, I have returned to the mainland and expect to be operating under a VK2 call sign. Whilst operating as



ZL2JB is 'phone DXCC's most recent New Zealand awardee. Operator Stan French, shown above with wife Ria, maintains a productive fruit orchard near Hastings. The impressive transmitter installed in the background has a separate 6V6-807-HK54s line-up on each of four bands, 10 through 40 meters. Twenty 'phone is Stan's standard fare. (*Photo via WØAJL*)

VK9GM I had the pleasure of working a large number of Ws and, although I used up a lot of QSLs, I feel that there are some contacts I may have missed. . . . In closing, may I express my appreciation of the kindness and courtesy I have always received from Ws in the best traditions of amateur radio." Use the "Where" address listed if you are still in need of a VK9GM QSL; full QSO data required . . . . . VK9YY really puts Lae, T.N.G., on the DX map. Alan is up to 103 countries worked and 83 confirmed. He runs the maximum ham power permitted in the Territory, 100 watts, to parallel 807s feeding groundplanes on 20 and 40; a BC-348 receives. VK9YY sticks strictly to c.w. "Many Ws may think I rush away very fast after each QSO but the intentions are not exactly bad. The idea is to give all an even chance when Ws are coming through out here as I know that a lot of chaps are still short New Guinea QSLs for their DXCCs." A point well taken . . . . . From KG6SA (W7MCU) on Saipan in the Marianas: "Have succeeded in stirring up interest . . . on the island and it appears we will have a few more amateurs. . . . F. R. Hauer, in the Navy here, has just received his amateur operator's license and is awaiting assignment of a station call by the local authorities. He will be on the air as soon as the call is issued. It appears to be the next in line, KG6SB. [He will use] a 3-stage VFO-813 rig on 20 and 40, 'phone and c.w. Receivers are an AR-88 and a Super Pro. A 3-element beam is contemplated for 20 meters and a long-wire for 40. Operating times will be approximately 0800 to 1100 GCT week days, and 2300 to 1100 GCT on week ends." With other candidates taking their exams it appears that Saipan will become quite radio-active. A club station is planned and a *BC-610 transmitter* is already lined up for it.

Europe — HB9CZ, USKA traffic manager, supplies info that may be of value to those hot on the trail of Helvetia-22 awards. Rare cantons active during the March H-22 test were Uri (HB1KB), Glarus (HB1NL), Nidwalden (HB1OT), Appenzell (HB1PE), Tessin (HB1GJ), Schwyz (HB9JZ), Wallis (HB9EJ) and Zug (HB9EU). The HB boys certainly took over the DX bands during that activity . . . . . *W1JOJ heard from ex-DL4CM-SVØAB who is* back home at W2SUC . . . . . From G6LX: "SM5ARP (3A2AW) will be visiting Monaco during May and I hope to be down in that area during June or July." Ron goes on to say that a 3A2 permit remains easy to obtain if one can present a valid ham ticket issued in one's home country. Native Monacans need display no telegraphic or technical proficiency to obtain licenses . . . . . West Germany data from the mill of *DL1KV*: "Licensing in West Germany continues at a steady rate. . . . DLØ calls are stations of club groups, bulletin-stations or exhibition-stations." Otfried states that 40- and 80-meter bands in Europe are all but completely overrun by commercials and the military. Perhaps the present state of the solar cycle accounts for much of this — many circuits have been forced downward in frequency in order to effect communications. DARC's bureau recently unleashed a large load of *DI9AA* QSLs Statesward . . . . . Upon unification of Italian ham societies ARI and RCA, ARI assumes sponsorship of the WAIP (Worked All Italian Provinces) award. Affiliated with the International Amateur Radio Union since 1927, ARI welcomes requests for full award details at Via San Paolo 10, Milano, Italy.

South America — LU3BAC, during a visit to ARRL Hq., made it clear that the numerals in Argentine call signs are of no consequence in determining station locations. It's the letter immediately following the number that tells the tale. For instance, the letter "Z" following the numeral indicates that the station operates in the Argentine antarctic area. LUØ calls, however, represent Argentine mobiles-in-motion — land, sea, air or what have you. Uruguay employs a similar letter-indicator system and PYs have combination alphabetical-numerical indicators . . . . . W1FWH finds that OA4BN formerly operated as HL1CD, HC1KW, OA4AY and W1PDD . . . . . LCRA (Colombia) president HK3CZ tips us off that several HK bams — a "DXpedition en masse" — are scheduling to put San Andres Island, Colombian possession in the Caribbean off Nicaragua, on the air this month. The present prefix for the area is HK1 and the spot will receive consideration as a possible addition to the DXCC Countries List.

Hereabouts — The fact that Clipperton Island QSOs failed to materialize during the 1954 ARRL DX Test wasn't for lack of effort on the parts of WØs NWX NUC and VDQ. After cutting all the tedious red tape necessary for licensing by French authorities and gathering the 1001 equipment items necessary for the venture, WØNWX and crew came within an ace of putting Clipperton on the air during the week end of March 26th-29th. Difficulties with navigational gear and fuel supply aboard especially-chartered motorship *Searider* necessitated a heartbreaking about-face with the goal almost in sight. FO8AJ/MM worked many stations on several bands during the voyage — QSL as recommended in "Where." WØNWX is no tenderfoot at these undertakings; see "Expedition 'Gon-Waki'," p. 80, July '48 *QST*. Undaunted by initial disappointment, the boys early last month rolled up their sleeves for another try . . . . . W6s OCP and MHB were all set to distribute another flock of Cocos Island (TI9) QSOs during March. The deal, at least temporarily, had to be QTAd . . . . . W2CTO can use QSL assistance concerning FB8BE and LB6XD, both worked in 1952. At the same time Bob, a 100 per cent QSL man, stands ready to replace strayed cards due any stations he has worked during the past 23 years . . . . . From FG7XA, now back on the air, relayed by W4LVV: "Two of my friends have applied for licenses and it is just a matter of time until paperwork is cleared with Paris. So there will soon be two more stations on in Gaudeloupe." Good news — FG7-land always was a toughie.

DX CENTURY CLUB AWARDS

HONOR ROLL

W8HGW...253	W6VFR.....246	W2AGW.....241
W1FH.....252	W2BXA.....244	W3KT.....241
W3BES.....250	G6ZO.....244	LU6DJX.....241
G2PL.....250	W3GHD.....243	PAØUN.....241
WØYXO....248	W6AM.....243	W6MEK.....240
W6ENV....246	G6RH.....243	W6SN.....240
	W3JTC.....242	

RADIOTELEPHONE

PY2CK.....231	XE1AC.....215	SM5KP.....207
W1FH.....224	ZS6BW.....212	W1MCW.....206
VQ4ERR...222	W1NWO.....210	W8HGW.....205
	W1JCX.....209	

From February 15 to March 15, 1954, 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.

W2AEB....149	TA3AA.....104	W3EEB.....101
CX4CZ.....117	W8SDD.....102	OE8FK.....101
EA6AF.....105	G8FC.....102	W3EWR.....100

ENDORSEMENTS

W6QJU.....221	G3HLS.....170	W5KTD.....125
W8DX.....200	LA6U.....165	PAØZL.....121
G5RV.....200	G6BS.....162	W4HYW.....120
G3YF.....190	IS1AHK.....160	VE3TB.....120
W1AB.....182	GI4RY.....154	F9DW.....119
W5CKY....182	W1ZW.....152	W3AS.....118
GM3CSM..181	DL1DX.....141	W4PHJ.....112
VE2WW....172	F9AH.....140	WØIDI.....110
	CR6AI.....130	

RADIOTELEPHONE

G5RV.....162	W6NIG.....133	PY4CB.....131
CN8MM...160		I1CTE.....111

CALL AREA LEADERS

W4BPD....238	W7AMX....234	W9RBI.....225
W5ASG....233		VE4RO.....210

RADIOTELEPHONE

W2APU....202	W5BGP.....197	W9RBI.....200
W3BES.....191	W6DI.....195	WØNCG.....145
W4EWY....172	W7HIA.....170	VE3KF.....163

Note: The attention of U. S. and Canadian DXCC members is invited to the new listings shown at the bottom of the box above. These are added so that totals can be compared with the top member in each call area.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
R. L. WHITE, W1WPO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, W1ZDP, Communications Asst.

GEORGE HART, W1NJM, Natl. Emerg. Coördinator
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, W1ZJE, Administrative Aide

Identifying Station a Requirement. FCC regulations 12.159, 12.160 and 12.82, explaining when and how to identify by use of one's call sign, are well worth careful rereading every so often. *Order* of calls is prescribed. The call sign of the station transmitting always *follows*. The FCC rules provide that no operator shall transmit *unidentified* radio signals . . . or willfully cause interference. In addition, sheer needs of efficiency in establishing communications (in addition to operating courtesy) require one to *listen on a frequency before transmitting*. This is in order to give ourselves free channels, as well as to comply with the FCC requirement to avoid giving unnecessary interference to others.

Some practical difficulties were reported by amateurs recently in copying W6JZ-W6OWP code runs as well as during the February frequency-measuring exercise, and give special point to these remarks. Conditions cited by W7HUV are as important to correct in our everyday operations as when he experienced them in the FMT: "There's the long-winded bird who camps on or near the frequency sent for measurement (or bulletins or traffic or code practice) and calls CQ for some minutes. My second gripe is the equally troublesome fellow who holds down his key for long intervals and tunes his transmitter. When it continues *without identification* for more than 30 seconds I know I must look elsewhere for the proper measurement signal. I ran into no less than three of the same!" Points in summary: (1) all operators can better their batting averages in communications exchanged by always listening before transmitting; (2) always identify your station at frequent intervals, as required by FCC.

Code-Practice Station Possibilities. We expect to continue listing the schedules of stations rendering a regular amateur service in sending over-the-air practice, just as we have this last season. A lithographed list of stations participating in such work is available to interested newcomers on request. For a listing of your station we need call, full name and address, anticipated schedule (frequency, days, hours, speeds). Also ask for our suggestions on *sending* practice.

Tape-sent transmissions are the best for practice. While Klein equipment is good to use, its scarcity should not be a limiting factor. Hal McCracken, W7WJ, writes: "Much inked tape (surplus) is now currently in circulation and is highly acceptable practice material. It is permissible to use this when interspersed with proper identification at appropriate intervals. Home or group study of code is practical, too, but admittedly there is greatest need for more on-the-air code-practice runs. There should be a widespread increase in code-practice service now, since it is very simple to modify, without internal changes, either the TG-34A or TG-10. These units are capable of properly keying any good c.w. transmitter. The possessor of a reasonable stock of inked tape and one of these keyers can easily augment the services rendered at present by all too few amateurs." Once a simple 6J5-6H6-6V6 or other set-up to work a relay is operative, one's transmitter can be worked from the TG surplus keyers or even wire and tape recorders.

Keeping QSL Records. Some amateurs merely show a check mark in their log, at left of station QSOs, recorded to indicate that a QSL (card, not a message receipt!) was sent immediately on conclusion of the QSO. Others have set up elaborate tabulations to show returns by districts and countries, 'phone or c.w. The results of such records are often of general interest. All readers will be familiar with that well-stated slogan: "The QSL is the final courtesy of a QSO."

To further fraternal compliance with this traditional obligation, WN4DGH reports his system of keeping track. To keep up with QSL cards sent and received at his station he found it convenient to rule two vertical lines at the extreme right side of each log page to make two columns ½" to ⅜" wide. He notes the number of the month and day for "QSLs sent" in the left hand column and "QSLs received" in the right. This gives him an accurate check and requires small space in any logbook.

Observer Cites Harmonic Trouble Sources. The following from W1TVZ: "I have listened around, especially Sundays, in the region 7400–7500 kc. . . . In the several letters I have gotten from hams heard and reported, their difficulties are reportedly due to excessive final grid drive, low-*Q* tank circuits, wrong adjustment of the antenna coupler and tank, tuning up on 40 with 80-meter crystals, etc. The *Handbook* of course covers this subject of harmonic reduction well."

Ready for the FD? June 19th–20th is getting closer. Plan to put the finishing touches on any new equipment now being built for emergency-portable or car-mobile work. Test equipment suited to FD or your summer vacationing plans now. Plan to get in the fun *this year* in the ARRL Field Day, largest of all ARRL operating activities. Log forms for FD participation will be available on request approximately four weeks before the FD. June *QST* will have full rules.

— *F. E. H.*

FIRST ANNIVERSARY RADIOTELETYPE SS

This activity was sponsored Feb. 19–21, 1954. The following *claimed scores* are reported by the RTTY Society of Southern California for all logs received up to March 9th (contacts, sections, score):

W1AW	36	9	324	W7HJC	20	6	120
W1BGW	55	10	550	W7HLU	16	2	32
W2JAV	82	19	1558	W7LPM	32	6	192
W2TKO	16	6	96	W8AV	2	1	2
W2TLY	6	3	18	W8BL	34	10	340
W3LMC	18	7	126	W8BYB	44	15	660
W3PYW	57	11	626	W8IJV	20	5	100
W6AEE	56	12	672	W8ZM	50	16	800
W6CND	18	5	90	W9GRW	21	6	128
W6LDF	46	8	366	W9TCJ	44	12	528
W6NCO	31	9	279	WØCIH	8	2	16
W6OWP	59	12	708	WØNME	10	5	50
W6UPY	25	6	150				

Other stations known to have been active in the test were: W1FGL, W2s BDI BFD PAT PAU, K2GQH, W3s ODF UWM VRI, W4s RKD ZC/2. W5s ENH RJG, W6s AAQ CG CGN DEO DMK DOU DRL FDJ FGS LGO NYF PNW SCQ SEW WYH, K6FCT, W7s AXJ CO KWB LU, W8s DVL GWA HP SPN, W9s CNN SPT THE UAU, WØs BP FKK HKF, KØWAW, VE2ATC, KL7CK.

Twenty-seven ARRL sections were represented. All Pacific Coast states, Alaska, Quebec, Atlantic Coast states from Va. to Mass., and most Gulf and centrally located sections were active. Conditions were not the best but 235 contacts were reported made on frequencies near 7.14 Mc., 147 on 3.62 Mc., six on 14.15 Mc., two on 21.15 Mc. and 12 on 2 meters.

BRIEF

A net has been formed for blind amateurs in order to pass along information on operating procedures that may be helpful. The net meets on 3870 kc. at 9:00 P.M. CST each Wednesday. Interested blind amateurs should write John M. Stovall, jr., Route 3, Box 119, West Point, Miss.

FEBRUARY FMT RESULTS

The February 9th ARRL Frequency Measuring Test brought 161 entries, divided about equally between Official Observers and amateurs interested in frequency measurement work but not holding the SCM appointment. Note the honor positions of W4JUI, W1MUN, W8HB and W8CUJ in the tabulation below. The standing of the top measurers is presented in terms of the "parts per million" deviation from commercial frequency measuring laboratory readings. Decimal fractions are shown only to establish an order of listing, inasmuch as the "umpire" has an accredited accuracy of 4 parts in ten million, or 2 parts in 10 million plus or minus 2 c.p.s. In keeping with the rules, no entry of a single measurement was deemed eligible in the competition.

Observers	*Parts/ Million*	*Non-Observers*	*Parts/ Million*
W4JUI	0.3	W8HB	0.0
W1MUN	0.4	W8CUJ	0.1
W1VW	0.4	W1BSY	0.3
W2FE	1.4	W5QHK	0.4
W6YVJ	1.4	W1ILF	0.5
W8PM	1.5	W3LOX	0.9
WØOTR	1.5	W3PYW	3.1
W6GQA	3.3	W8OEY	3.5
W2ZT	3.7	KP4UY	3.5
W4PWX	5.7	W1HRC	5.5
W1RLQ	6.0	W3MCQ	5.5
WØTKX	6.2	W8APL	6.1
W4IU	7.2	WØLVW	6.3
W3LUL	9.0	W1QQO	7.5
VE6MJ	10.0	W7HCV	7.5

The following ratings are based on a single measurement: OOs — W9PFK 0.3, W4FR 0.8, W4KL 7.1. Non-OOs — WØDRB 3.7, W3NOE 5.6, W8HPR 5.6.

It is to be expected that poor conditions during an FMT may affect the accuracy of participants' results. This serves to point up the fact that the FMT is a practical exercise, because Official Observers have to work with on-the-air conditions of every sort in carrying out their missions of observation and assistance to amateurs in keeping on frequency.

A-1 OPERATOR CLUB

We are pleased to announce the following additions to the ARRL A-1 Operator Club roster: W1AEW, AZW, BIH, BIL, BKG, BSY, CUH, EFW, EIO, HYF, IT, JMT, JYH, QJM. W2AOW, K2BG, BU, BZT, W2CVF, K2DYN, W2EC, EQS, GP, ITK, JOA, MUM, QMO, RPI, SSK, WZQ, YJF. W3NOE, ONB, PZW, QCB, RFK, TVA, WV. W4ANK, BFM, EJC, FF, FID, FOE, IMH, KBE, KRR, KV, MTS, MWH, MWX, OMW, OZC, PHJ, RLG, SHJ, TAV, TJS, UHG, VOV, YIP, ZD, ZUF. W5FFW, GF, IOP, KTD, KUC, MIS, NZE, RIH, TEB, TOU, UTW, WI, WRS. W6DLR, HC, IPW, JOH, UTV, YHM. W7JYZ. W8BTI, HRC, HZA. W9HQF, MQV, PGW, RIL, RKP, RQM. WØAUL, BDR, BVE, BWY, GBJ, KHQ, KXL/NIY, NYX, OHJ, SCA, TKX. VE1OM, VE2CK, VE3AJR, EU, GI, EA1AB, G3ESY, HZ1MY, KG4AF, KG6FAA/W9LHB, KH6ES, KP4DJ, KV4BB, KZ5ML, OK1MB, OQ5LL, OQ5RA, OZ4KT, SP3AN, VP5BF, ZK1BC, ZL1RD.

The A-1 Operator Club was designed to recognize and promote good operating in the amateur bands. To become a member one must be nominated for membership by at least two operators who already belong.

In choosing operators for the "A-1 Operator Club" the following points are considered by members: (1) *General keying.* Well formed characters and good spacing will be considered before "speed." Similarly, good voice operating technique, clearness, brevity, coöperation with other operators, careful choice of words, etc., may be used as criteria in nominating 'phone operators. (Credit is given for use of standard word-lists in identifying calls and unusual expressions.) (2) *Procedure.* Use of correct procedure is a natural qualification. Long CQs, unnecessary testing, long calls without signing, too much repetition when not requested, and all other such poor practices are grounds for disqualification. (3) *Copying ability.* This is to be judged by proficiency in copying through QRM, QRN and other difficulties, and accuracy of copy, as well as speed. (4) *Judgment and courtesy.* The "CUL 73" type operator can never make the grade. An operator should be courteous and willing to consider the other fellow's viewpoint. He should QRS or QSZ without "crabbing" when requested. He should embrace every opportunity to assist beginners.

These four points to be considered by A-1 operators in weighing candidates are applicable to all phases of amateur operating. Each counts a possible 25 points (of 100 total). No nominee should rate less than 15 on any qualification.

The operator primarily interested in DX should be weighed on his compliance with the recommendations of the ARRL DX Operating Code, his ability to work DX under difficult conditions, and his courtesy in waiting for a station to complete a contact before calling him. Other phases of operating, similarly should be judged on the four basic points, with the appropriate considerations applied to 'phone, traffic, v.h.f., etc., operating.

Voice Procedure Tips:

CALL-SIGNING PROCEDURES

The easy way to comply with FCC signing requirements is to use your own call last, whether in two-way communication or in a round table. W2ABC would be perfectly correct if he said "W4ABC *this is* (or *from*) W2ABC, go

THAT KIND OF PROCEDURE IS AS OLD AS NOAH

ahead." While not legally incorrect to use "K" on 'phone frequencies, saying it with words (*go ahead* or *over*) increases intelligibility. On our c.w. bands good procedure is evidenced by many points, one in particular being the use of each c.w. ending-signal by itself, never in pairs!

One thing that has always bothered active ECs is how to keep up interest in an organization without an emergency once in a while. The answer is easy: You can't. One naturally gets tired of drills and "make believe" after a certain length of time. The best an EC can do is to prolong as much as possible the individual AREC member's interest in emergency work without emergencies and depend on two things to renew it or replace it: (1) new blood in the organization to replace the old that dribbles off; (2) an occasional emergency or other means of rendering a real public service.

Okay, let's take up one thing at a time: how to prolong interest in emergency work. Many ECs have beaten their brains out on this one and used up so many ideas that they are just about out of them. The members start drifting away, becoming less enthusiastic about the control-center station, about the emergency potential of their mobile rigs. Their attendance at drills becomes less frequent. Let's enumerate a few methods we have seen work to keep up the interest:

(1) Introduce the social aspect; have a picnic or two every summer, maybe a banquet during the winter months. A dance or two is often attractive.

(2) Have a regular net drill once a week or more. Encourage new members to use it to run tests of new equipment (especially emergency equipment) they have built. Besides using it to learn procedure, let part of it be informal to discuss local problems.

(3) Make the Field Day one of your big yearly events, and go out on it as a group if possible. The SET, of course, is a "must."

(4) Have regular in-person meetings like a club, with something on the program each time, such as a demonstration or a speaker. Keep these meetings open for all community amateurs.

(5) Whenever a big civic function is to be held, offer the use of your organized facilities for communications purposes. Groups have participated successfully in parades, auto and other kinds of races, fairs, community drives of various kinds, exhibitions and expositions, athletic events — practically anything that is held out of doors and a good many things held indoors can have communications angles if worked on.

(6) Offer prizes or some other kind of inducement to regular attendance at drills. This can usually be done without costing any individual too much and still be worth while.

(7) Set up a "production line" for needed equipment for your AREC gang. This has many desirable effects, and quite often one or more local suppliers or manufacturers, as anxious as you are to get in the local public's good graces, will give you a "break" on components and workshop facilities. Try the high school for the latter.

(8) Hidden-transmitter hunts are a lot of fun and a good exercise for mobile units. Don't overdo them, though.

(9) Let the press in on your activities. Get all the publicity you can, but keep it down to earth.

(10) Sponsor a little competition among members of your group. For example, the best mobile rig, the best hand-carried portable, the home station best-equipped for emergency operation, the best procedure in drills (or other operating criteria).

No doubt ECs and AREC members reading this will think of a lot more. Send them in and we'll enumerate another list one of these days, with full credit to every originator.

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And while we're on the subject of sending things in, we again wish to enter a plea for information on all emergency work by amateurs. You don't have to be a journalist; just send us the facts, but write them yourself and be sure they're accurate. Newspaper clippings are fine, but such accounts are often garbled and over-sensational. We want the dope from *you*, not some newspaper editor's version. See April 1952 *QST*, page 72, and August 1952 *QST*, page 72. Seems we have gone from a feast to a famine; at one time we had so much dope from the field we had to omit some of the nonemergency items until they were obsolete. Now we need more material for this column. Let's have another feast, fellows — but by *all* means send in your emergency items for the reasons enumerated in August, 1952, *QST*.

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On February sixth there was a very disastrous fire in Zion, Ill. One entire block of buildings burned to the ground in the business district. The Lake County Radio Amateurs Club and the Midway Radio Club worked together in setting up a net control station at fire and police headquarters, and dispersing mobile units throughout the area to handle emergency communications. One of the greatest hazards was the stream of thrill-seekers who blocked roads into Zion for five miles. Fifteen stations and operators participated in the operation, including the following: W9s CGY LYJ OUD PPV WKD TKR FVS VGJ HOQ VOM JBH WN NRC YCD and UXS.

— *W9QKP, Pres., Lake Co. Radio Club.*

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Some Oregon amateurs helped in handling some press dispatches during a January siege of snow and rain, principally W7WL in Glasgow and W7HDN in Portland. On the morning of January 25th, W7HDN got a call from W7APF asking for assistance in getting news for one of the broadcast stations. Later W7LXW, who is chief engineer at station KOOS, called using W7WL's transmitter, and arrangements were made for a United Press man to come to W7HDN where they took news dispatches on tape from Coos Bay via W7WL.

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During the extensive tornadoes in March of 1953, W9CTZ, W9PEK and W9VOA were instrumental in providing emergency communications with the stricken tornado area in southwestern Illinois. This was a long time ago and all we have are some newspaper clippings, but the Illinois SCM wanted to make sure these fellows got credit for the hard work they did.

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At 0618 on February 12th the Kansas 75-Meter 'Phone Net was called into action due to loss of communications resulting from a snow, ice and dust storm. The net handled traffic for Western Electric, Rural Electrification Agency, Western Union, Bell Telephone, and the Missouri Pacific, Rock Island and Santa Fe railroads. Operation continued

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State Representative Mabel Ellis looks on as members of the Arizona Amateur Radio Club demonstrate the value of an amateur radio emergency network. Station was set up on the floor of the Arizona House of Representatives where Mrs. Ellis has introduced a bill to provide call-letter license plates for amateurs. That's W7JYH at the mike. The W8YGM plate shown is a sample. (*Photo by Arizona Republic*)

♦

QST for

At Lynn, Mass., W1MAN, RACES Region Four Director, W1AWA, Net Control Officer for Region Four, W1QQL, EC for Lynn, and W1CTD, Saugus Civil Defense Director, map future c.d. activities. (*Photo by W1VRK*)

until 1930, when the situation was termed under control. Those participating: WØs HS CSV BET TNA FEO MI ALD WMQ YOS NAS/M MJD/M JDU QJC NLV NHT QNJ TSH REP MAE GPZ NJS NLV DSM AER FSE SIG FPY YLO FHU and FHC. WØREP and WØTSH are particularly to be commended for acting as control stations on relief. — *WØFNS, PAM, Kansas.*

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Starting with a clean slate for 1954 our SEC report record shows ten SEC reports received for January. They represent 3394 AREC members. SECs prying the lid off for 1954 were those for West Va., E. Bay, Los Angeles, Western N. Y., Nevada, N.Y.C.-L.I., New Mexico, Eastern Fla., Wisconsin and South Dakota. How about the other 63 SECs? Any activity worth reporting?

W1AW OPERATING NOTE

Until June 1st, when the complete W1AW Summer Schedule detailed elsewhere on these pages goes into effect, W1AW will conduct general operation as shown on the chart on page 73, October 1953 *QST*, *except that EDST instead of EST will be used.* Other operation will follow the pattern set down on page 59, February 1954 *QST*, also in EDST instead of EST. *Exceptions:* (1) On May 11th, W1AW will transmit a Code-Proficiency Qualifying Run instead of the regular code practice. (2) On May 21st, W1AW will make a special transmission for frequency measurement instead of the regular code practice. (3) W1AW will be closed from 2230 EDST May 30th, until 1500 EDST June 1st, in observance of Memorial Day.

A.R.R.L. ACTIVITIES CALENDAR

May 1st: CP Qualifying Run — W6OWP
May 11th: CP Qualifying Run — W1AW
June 5th-6th: V.H.F. QSO Party
June 6th: CP Qualifying Run — W6OWP
June 16th: CP Qualifying Run — W1AW
June 19th-20th: ARRL Field Day
July 2nd: CP Qualifying Run — W6OWP
July 15th: CP Qualifying Run — W1AW
July 17th-18th: CD QSO Party (c.w.)
July 24th-25th: CD QSO Party ('phone)
Aug. 7th: CP Qualifying Run — W6OWP
Aug. 13th: CP Qualifying Run — W1AW
Sept. 5th: CP Qualifying Run — W6OWP
Sept. 13th: CP Qualifying Run — W1AW
Sept. 18th-19th: V.H.F. QSO Party

W1AW SUMMER SCHEDULE

(June 1 through September 27, 1954)

(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.

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, 21,020, 52,000, 145,600 kc.

'Phone: 1885, 3950, 7255, 14,280, 21,350 kc.; 52, 145.6 Mc.

Times:

Sunday, 1530 by c.w., 1600 by 'phone.

Sunday through Friday, 2000 by c.w., 2100 by 'phone.

Monday through Saturday, 2330 by 'phone, 2400 by c.w.

General Operation: Use the chart below for determining times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0100 each day will fall in the evening of the previous day in western time zones.

Code-Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and at 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies. Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On June 16th instead of the regular code practice, W1AW will transmit a certificate qualifying run.

W1AW GENERAL-CONTACT SCHEDULE

(In Effect June 1 to Sept. 26, 1954)

W1AW welcomes calls from *any* amateur station. Starting June 1st, W1AW will listen for calls in accordance with the following time-frequency chart.

Time (EDST)	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000-0100[1]	.....	.....	3555[3]	.....	3950	7125[3]	.....
1300-1400[2]	.....	21 Mc.	21 Mc.	21 Mc.	21 Mc.	21 Mc.	.....
1500-1600	.....	7125	14,100	7255	14,100	7125	.....
1600-1700	.....	14,280	7125	14,100	14,280	14,100	.....
1800-1900	.....	14,280	14,280	14,280	14,100	7255	.....
1900-1930	.....	3950	.....	3555	.....	14,280	.....
1930-2000	.....	14,100	.....	3555	.....	14,280	.....
2000-2030[1]	14,280	3555[3]	14,100	14,100	7125[3]	14,100	.....
2030-2100	14,280	3555	14,100	14,100	7125	.....	.....
2100-2130[1]	145.6 Mc.	52 Mc.	145.6 Mc.	52 Mc.	52 Mc.	.....	.....
2230-2300	.....	.....	1885	.....	1885	.....	.....
2300-2330	.....	.....	3555	.....	3950	.....	.....
2330-2400[1]	.....	3950	7255	3950	7255	3950	.....

[1] Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on c.w. at 0000 and 2000, on 'phone at 2100 and 2330.

[2] Operation will be on 21,020 or 21,350 kc., whichever shows the greater activity.

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

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for February traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
KG6FAA	295	3358	3297	61	7011
W3CUL	296	2968	2191	763	6218
KA7LJ	272	2633	2485	148	5538
WØTQD	8	1664	1654	10	3336
KA3AC	1439	1517	131	21	3108
W4LDM	21	1451	1437	14	2923
W7JEF	56	1351	1244	107	2758
W6IAB	104	1162	1058	73	2397
W9JUJ	21	1111	987	84	2203
WØBDR	6	1088	1075	10	2179
W4PJU	46	988	807	181	2022
W4PL	15	1007	895	77	1994
KØAIR	19	954	932	37	1942
KA8AB	273	788	648	140	1849
WØSCA	1	882	878	3	1764
K6FDG	479	514	450	38	1481
W3WIQ	13	695	701	29	1438
K4WAR	142	617	508	117	1384
W5MN	50	651	350	288	1339
W7PGY	13	646	588	58	1305
W4YIP	12	630	599	20	1261
W4DVR	15	573	566	7	1161
W7BA	17	553	529	22	1121
W4USA	38	510	13	536	1097
WØKHQ	5	527	521	5	1058
KA7RC	118	443	422	21	1004
W7NOW	43	20	919	20	1002
W4OGG	13	486	461	23	983
KH6FAA	64	433	362	66	925
W6ELQ	5	426	413	21	865
W9VBZ	57	367	302	63	789
WØSDW/Ø	27	387	353	8	775
W9TT	12	437	292	19	760
W6LYG	29	362	280	82	753
W2JOA	27	348	243	99	717
WØCOI	8	351	323	28	710
W7QYN	4	327	339	38	708
W8SWP	25	344	278	57	704
W8EYO	1	352	296	51	700
W4KZT	0	348	318	30	696
W7FRU	3	344	340	4	691
K6FAE	11	323	336	13	683
W2RUF	26	345	248	60	679
W2LPJ	28	320	302	18	668
W7HAK	1	314	307	8	630
K5FEF	11	319	283	14	627
W4RMY	12	303	297	6	618
W8RJC	9	304	268	33	614
W6IZG	26	259	282	39	606
W2KFV	19	291	218	73	601
W4OZC	0	300	300	0	600
W7SFK	3	286	286	0	575
K2CQP	14	271	258	18	561
W6QJH	11	254	270	5	540
W2KEB	22	254	182	72	530
W4ANK	33	249	211	37	530
W7MM	6	258	246	12	522
W6IEO	5	0	496	8	509
WØGAR	15	239	247	7	508
W2VNJ	17	253	169	62	501
W2BO	15	250	155	80	500
Late Reports:					
KG6FAA (Jan.)	288	2380	2140	240	5048
KA8AB (Jan.)	396	506	429	77	1408

BPL for 100 more *origination-plus-deliveries:*

W3CVE	311	K6WAY	152	WØNIY	102
W9NZZ	218	WØRTA	127	W6PHT	101
W7KT	206	W2AEE	110		
W9OIN	195	W3MWL	103		

The BPL is open to all operators who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month.

TRAFFIC TOPICS

If there are ten people, all of whom have different ideas about a given subject, and you are asked to "settle" the argument — brother, you're in a spot! If you don't happen to agree with any of them, you're 100 per cent wrong. The very best you can do is to agree with one of them, and then you're still 90 per cent "wrong." You can stay popular, but you'll never accomplish any collective good (quite the contrary), by hypocritically and surreptitiously agreeing with all of them.

Your League has been put in the position of "settling" a controversy many, many times. In no operating group is there such a wide divergence of opinions and practices as among the traffic handlers. The struggle for standardization has been a wild one, through the years. We have imitated commercial procedures, adopted military procedures, and set up our own. At first the objective was to train operators for future commercial or military experience. In our present-day MARS set-up, the latter is still the primary objective; but among us amateurs the objective has become twofold, neither one more important than the other: (1) to get traffic from its point of origin to its point of destination in the least practicable time, while still (2) providing the maximum in training facilities for *all* categories of operators. By *all* categories, we mean just that — big ones and small ones, fat ones and skinny ones, old ones and young ones, 'phone and c.w. (yes, even 'teletype, facsimile, television or what have you, where interest is shown), experienced and inexperienced, high power and low power, work horses and occasionals. It's a large assignment, and your ARRL (who else?) is tackling the project.

How? By the formation and sponsorship of a nationally integrated system in which there is room for thousands of operators of all categories. In setting up such a system, everybody (well, almost everybody) agreed to the integration principle, but almost every experienced operator had a different idea how to go about it. Many philosophies were advanced. Nostalgic old timers preferred the old trunk lines, resisted any changed concepts from the "good old days." Newer traffic men wanted nets; some of them wanted directed nets, some free nets. Some operators who handled thousands of messages per month wanted nets set up to serve them alone. It was the same old story — *whatever* we did, we would be at least 90 per cent "wrong."

The ARRL Communications Manager's 1948 annual report stated: "Trunk Line workers currently create special problems where they want to bring in new stations outside their normal territory and to imitate net operation. Studies in progress concerning such tendencies and regional-empire building may point the way to some new steps in over-all coördination to extend our section-net operations to meet national objectives." Thus, in the fall of 1949, the National Traffic System was born. There was no immediate stampede to abandon existing nets to participate. Like all births, the initial struggle for existence was a rugged one. Factions in disagreement, either with general principles or operating details, were troublesome. Skeptics agreed that "it's a good idea, but it won't work," and then set out to prove their contention that "it won't work" by not participating, instead of implementing their contention that "it's a good idea" by trying it.

Today the National Traffic System is a pretty-generally accepted institution among amateur traffic men. True, it does not always handle the traffic as fast as daily long-haul schedules between two crack operators; it's not the only traffic system, and not even always the best so far as speed is concerned. But it *is* the only nationally-integrated system with a solid framework providing for universal participation by all traffic amateurs, and it is the only traffic system sponsored by ARRL for the betterment of amateur radio by enhancement of its traffic-handling service. It has no quarrels with other traffic networks; in fact a local distribution system is provided for any who need it. Anyone reporting into an NTS net with traffic is welcome, provided his traffic can be handled by that net and provided he can maintain its operating pace. In its long-haul aspects, the NTS does not abhor competition; in these aspects as well as in local work, NTS tries to accomplish its objectives in an organized, systematic fashion. The framework cannot (or should not) be bent, twisted, distorted to accommodate the idiosyncrasies of individuals or individual nets. Rather, nets should be set up that will fit into the framework and accomplish one of the many jobs to be done, at section, regional, area or transcontinental level. If you are interested in traffic work, your best fulfillment of that interest lies in participating in a nation-wide system — the National Traffic System — which needs your support.

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For February, the Mission Trail Net's 'phone section reports a traffic total of 888 in 28 sessions, an average of 32 per session; the c.w. section handled 53 in 23 sessions. The Early Bird Net reports a 998 traffic total for February in 28 sessions, an average of 36 per session.

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North Texas-Oklahoma Traffic net handled 381 in February, 844 check-ins, eleven net controls reporting. Second Regional 'Phone Net handled 729 in 24 sessions, with an average check-in of 26. The Interstate 'Phone Net handled 441 in 24 sessions, with an average check-in of 22.9.

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National Traffic System. By the time you read this, much of the nation will have reverted to "Daylight Saving" Time and, as usual, the NTS nets will be pretty much snarled up

as a result. The NTS Manual, by the way, designates *standard* time for all NTS nets, whether or not local time changes. However, where the law requires everyone to kid himself into thinking he's arising at the same time when he's arising an hour earlier it's quite difficult not to adjust traffic net schedules the same way. Many NTS nets *will* change their time, just the same. Just don't forget, fellows, that if you change your net time you may come into conflict with a net in some less-enlightened part of the country where they don't tamper with their clocks every spring, so better check the Net Directory before you make any change that you might think is *not* a change. If possible, we ought all to stay on good old standard time so we won't mess up the NTS time schedule. But if you *must* change over, please try to make some arrangement so that it won't throw NTS net continuity out of kilter.

Personally, we get up an hour earlier and go home an hour earlier and *know* we're doing it. Screwy, ain't we?

February reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	18	230	0.41	12.7	92
3RN	38	323	0.62	8.5	86.8
4RN	40	1237		31	84.5
RN5	40	400		10	
RN6	42	530	0.78	13	37.5
8RN	18	107		6	87
9RN (TLJ)	28	3369	1.26	120.3	92.9
TRN	48	74	0.45	1.5	60.4
EAN	20	718	1.26	36	97.5
CAN	20	434		21.7	91.7
PAN	22	949		43.1	97.7
QIN (Ind.)	40	722	0.66	18	
LSN (Los. A.)	24	219	0.21	9.1	
TLCN (Ia.)	20	383	0.83	19.1	
AENP (Ala.)	26	114		4.3	
W. Va. Phone	20	78	0.17	4	
WVN (W. Va.)	20	128	0.28	6.4	
QKS (Kans.)	20	250		12.5	
QKS SS	8	72		9	
WIN (Wis.)	28	206		7.4	
WSN (Wash.)	20	127		6.5	
Summary	560	10,670	1.26	19.1	97.7 (PAN)
Record	568	10,670	1.26	19.1	100

Eastern Mass., R. I. and Western Mass. made perfect attendance on 1RN. This month's RN5 report was by W4OGG, who held the fort until a new RN5 manager was found. The new RN5 manager is W5KRX. Certificates for 9RN have been issued to W9s LSR DO UQP and W4WXL. TLJ and 9RN will henceforth operate as separate nets, starting as soon as a suitable 9RN manager can be appointed. TRN is still having trouble with representation from the Maritimes, mostly due to propagation conditions. CAN is now operating a Saturday night session. PAN operates a Saturday night "voluntary" session.

SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listings on page 70, November *QST;* page 67, January *QST;* and page 63, March *QST*. This listing brings the record up to date as of March 22, 1954, and may be used to correct the cross-indexed ARRL Master Net Directory.

An asterisk (*) indicates correction from previous listing in November, January or March *QST*. This is the final *QST* net supplement until net re-registering in the fall.

Name of Net	*Freq.*	*Time*	*Days*
Arizona Net	3865	0730 MST	Daily
		1630 MST	
		1900 MST	
Arizona CW Net (AZN)	3515	2000 MST	M., W., F.
Ariz. Emerg. Net (AEN)	3865	1900 MST	Tue.,-Thu.
Bristol (Tenn.-Va.) Amateur	1815	1930 EST	Mon., Wed.,
Red Cross Emerg. Net	3815		Fri.
Coast Guard Auxiliary First	1815.3	1000 EST	Sun., Tue.
District Net	3525	2100 EST	
	3990		
	29,640		
	145,800		
Danvers (Mass.) Emerg. Net	145,350	1930 EST	First Mon.
Du Page Co. (Ill.)			
Civil Emerg. Net	29,600	2000 CST	Mon.
East Coast Net	7080	1730 EST	Daily
Iowa 160 Meter Net *	1815	1830 CST	Daily
Lynn CD Net (Mass.)	28,610	1930 EST	First Mon.
		1845 EST	Tue.
Manitoba CW Net (MAN)	3700	1900 CST	Daily
Montana State Phone Net	3700	1900 CST	M., W., F.
Nebraska CW Net (NEB) *	3520	1845 CST	Daily
New Hampshire Emerg. Net	3850	1300 EST	Sun.
N. Y. State Slow Speed Net *	3595	1630 EST	Sat.
		1900 EST	Mon., Tue., Wed., Fri.
Nine Jacks and Queen Net (SD)	3870	1210 CST	Mon.-Sat.
N. Texas CW Net (NTX) *	3760	1900 CST	Mon.-Fri.
Northeast Traffic Net (NETN)	3746	1600 EST	Mon.-Sat.
Region V Sector III C.D. Net	29,460	1930 EST	First Mon.
R. I. Novice Net (RINN)	3743	1830 EST	Mon.-Fri.
S. Dak. 160 Meter Phone Net	1905	2000 CST	Daily
West Gulf Emerg. Net	144,600	1900 CST	Tue.
Westside Amateur Radio Club	28,900	2000 CST	Wed.
Emerg. Net (La.) *			
Windjammer's Net (Cal.)	3948	1000 PST	Daily
Wis. Educator's Phone Net	3850	1000 CST	Sat.

CODE-PROFICIENCY PROGRAM

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from W1AW will be made on May 11th at 2130 *Eastern Daylight Saving Time*. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,020, 52,000 and 145,600 kc. The next qualifying run *from W6OWP only* will be transmitted on May 1st 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. 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 is reversed during certain of the slow-speed transmissions.

Date	Subject of Practice Text from March *QST*
May 3rd:	*Delay-Line Phase Shift*, p. 12
May 4th:	*FCC Visits ARRL Hq.*, p. 10
May 6th:	*Selectivity and 'Phone Reception*, p. 20
May 13th:	*Dressing Up the Antenna Coupler*, p. 26
May 17th:	*A Simple 8-Element Beam for 20*, p. 24
May 20th:	*What's with Your Log?*, p. 32
May 26th:	*Break-In with One Antenna*, p. 35
May 28th:	*A Crystal-Controlled Converter . . .*, p. 29

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C. W.	*'PHONE*
3550 kc. 14,050 kc.	3875 kc. 14,225 kc.
7100 kc. 21,050 kc.	7250 kc. 21,400 kc.
28,100 kc.	29,640 kc.

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.*

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.

• 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. E.Pa. Nets: 3610, 3850 kc. The Phil-Mont Mobile RC gained five more new members: CNO, GRY, HEK, QZO, YJM. The Club plans to participate in Field Day for the first time. UVL will be chairman in charge. The Feb. 21st transmitter hunt was won by QQH in fifty minutes. Second place went to HYU in one hour and forty-five minutes, while DSG again had the honor of hiding the transmitter. The Reading RC has scheduled interesting talks and demonstrations covering such subjects as transistors, RTT, and s.s.b. for future meetings. The Pottstown ARA, with ARK as activities manager, will show a different film each month on varied subjects pertaining to ham radio as supplied by ARRL. The last program was a showing of slides on the basic principles of vacuum tubes. The DX Club was entertained with the showing of ARRL's TVI film and a number of color slides made by GHS featuring several members and *their rigs, along with scenic beauty shots of the Appalachian* Trail. UQJ reports hearing S2/5 signals on the 220-Mc. band from the Philadelphia Area and suggests that the boys in that Area swing their beams toward York more often. UQJ's 435.6-Mc. operating schedule is 8 to 10 P.M. Mon., Wed., Fri., Sat., Sun. CUL was kept busy during February handling traffic from two fairs. Mae reports having a new Viking rig for better QSY. UOE has worked 13 countries on 80 meters with less than 100 watts input but needs Asia for WAC on that band. VDE reports 99 per cent of his activities are on s.s.b. QGI's son-in-law adds another active ham to the family with his new Novice call, WN3YJN. EAN has a new 20-meter beam to hunt for that rare DX. He has real good luck with these awards, having won a grid-dip meter at the Annual FRC/PVRC banquet and a Sonar Low-Pass filter at the last FRC meeting. Traffic reports were plentiful as usual but news items fell below average. May I remind you again that this is your column. Your support is necessary if you wish to see a full and interesting report of your section's activities. Traffic: (Feb.) W3CUL 6218, BFF 343, MWL 111, AXA 98, BIP 98, AEQ 97, GES 82, NOK 81, RSC 71, ONA 50, UOE 27, PYF 26, KAG 24, TEJ 24, PVY 22, DUI 20, ELI 9, VN 6, VDE 5, UCY 3, GIY 2. (Jan.) W3GES 72, ONA 70, ELI 4.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — Arthur W. Plummer, W3EQK — On Feb. 8th the following officers of the Chesapeake Amateur Radio Club were elected: AYS, pres.; BYG, vice-pres.; FLG, secy.; URZ, treas.; and DWX, sgt. at arms. A most interesting talk on color television was given by TDB. GBB was the first and only mobiler to locate PSG portable in the BARC hidden transmitter hunt, operating on 27,100 kc. Feb. 21st. The rig was located at Bert Compton's QTH. Jo Kiefer, ex-DL7CU, now living in Baltimore, visited BARCS at the Feb. 15th meeting. Our deepest sympathy to QCB, operator at USA, whose father passed away Feb. 13th. COK exults in the fact he worked his first Asian in January, OD5AV to be exact. WV reports working 221 stations in 54 sections for a score of 59,670 on c.w. in the last CD Party. NOE and his XYL report a wonderful 4-day ski trip in Vermont with 2OPD and his XYL. PZW now is attending radio school at Fort Monmouth and has not much time for operating. LDD reports the Harford County Net is doing fine except for a few losses in personnel. Paul Seward, of Harford County CDRO, was very much impressed by what he saw and heard while a passenger in one of the mobile units during the last drill. Just a reminder that a telephone call or telegram collect or a radio message to CVE will serve to activate the Trans-Continental Relay Net for national or overseas service on a 24-hour basis. A report of activity in the Feb. LO Party shows only one out of 25 eligibles took part in the affair. Let's try to get more LOs on next time! PRL and EQK attended the Washington Radio Club meeting Mar. 5th at which Lt. V. D. Maggiore spoke on "U. S. Naval Reserve Program" and DL1FH showed color movies of the 6th Fleet in action as well as members of WRC during the last Field Day contest. The meeting also was attended by KH6ABR. PTZ finally is back on the air but alerted for overseas duty. G. W. Univ. is keeping QZC tied up. CVE was under the weather at the time of the last OO Test. WV checked in MDD, 3RN, VN, EAN2, 4RN1, and VSN2 nets during the month of February. NOE has been moving to a new office. COK finished the kw. rig for the DX Contest. ONB reports improved conditions for 80-meter traffic and says 3RN lost only 2 out of 40 sked sessions because of long skip. QCB has received A-1 Operator certificate. ARA now holds meetings the 1st and 3rd Tues. of each month at 2000 hours at Hagerstown YMCA. VAM, CIQ, and RAH may team up on the V.H.F. Contest. EHA now is 75-meter mobile. TJV has a new Elmac installed in his car. RAH and OXL are operating with 813s in the final and both have new cars but no mobile installation as yet. It is rumored that CSX can be heard 8 miles away, in Hagerstown, with his new Sonar 120-P. EEB failed to receive the new 75A-3 in time for the DX Contest. During the DX Test EEB got 2 new ones for a total of 120 worked and 104 verified. WKB will join MEPN soon. JE reports Maryland c.d. station W3WBP/AAF3WBP will be on 2, 10, and 75 meters soon. The section welcomes the newly-formed Carroll County Radio Club whose officers are FVK, pres.; PWW, vice-pres.; and WVN, secy.-treas. With nine members attending the first meeting, six of whom are members of the League, three who do not hold licenses as yet, and at least five others in the County coming in I'd say they're off to a good start. Traffic: (Feb.) W3USA 424, CVE 336, WV 251, PKC 209, JE 155, JZY 113, COK 84, ONB 68, WSE 36, HK8 22, EEB 20, NNX 14, HC 12, RMD 7, CQS 6, OYX 5, NOE 4, EQK 2, QQS 2. (Jan.) W3COK 50, WSE 30, NOE 8.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — SEC: UCV. PAM: ZI. I acknowledge with appreciation the help given me by the various clubs in the section in keeping me posted. CEH has that old 522 fired up again and is doing a swell job on 2 meters. LSS has a new sky wire working on 40 and 20 meters. Congratulations to KN2DSL, a 12-year-old YL in Trenton, and to her brother, K2ART, for his part in helping his sister get her ticket. There is plenty of activity up Trenton way from the information received via *scuttlebut* and *DVRA News*. CCO has been adding new countries to his list, getting very close to DXCC. The Jersey-Penn Net is active on 10 meters every Sunday at 1100 hours. GTN, ex-3GKH, recently received his WAC certificate, using less than 65 watts input and an indoor antenna. FB, Fred. EWN has been receiving color TV transmissions from MGZ. We believe this to be a first in this section. They are to be congratulated for their accomplishment. LS, Pleasantville, has been appointed Official Observer Class I. With Field Day getting close it is hoped that everyone will have made plans to turn out and do an even better job than in 1953. Traffic: K2BG 96, W2ZI 31, HAZ 4.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH RM: RUF. PAMs: DSS, NAI. NYS meets on 3615 kc. at 6:30 P.M. and on 3925 kc. at 6 P.M. daily; NYSS on 3595 kc. at 7 P.M.; Mon., Tues., Wed., Fri., on 3595 kc. at 4:30 P.M. Sat.; NYS C.D. on 3509.5 and 3907 kc. at 9 A.M. Sun. Note — KBT, *mgr. of* NYSS reports Slow Speed Net changes as follows: On 3595 kc. at 1900 EST, Mon., Tue., Wed., and Fri., no Thurs. net. FGL, NCS for Thurs. night, will conduct the net on Sat. on 3595 kc. at 1630 EST. We appeal to those wishing to enter traffic work to QNI this important training net. NAI, mgr. of SRPN and IPN, is new PAM. Appointments renewed: FE as OO; BLO, COU, NAI, OE, and WZQ as ORS; CFY, FAN, OZR, QLI, QNA, UYG, VEP, and YFZ as OPS; PHT, SFW, UTH, and UXP as OES; IPC and UYG as OBS; ABC EC Cattaraugus Co., CFY EC Franklin Co., DEX EC Chemung Co., GHU EC Jefferson Co., QBZ EC Tomkins Co., QY EC Monroe Co., SB EC Northern Chautauqua Co., SBK EC Southern Chautauqua Co., TEP EC Lewis Co., WQO EC Warren Co. The City of Dunkirk has leased a building at the municipal airport to the Northern Chautauqua ARC for meetings and a club station, K2AVI. The W.N.Y. and S. Ont. v.h.f. "do" will be held in Lockport June 12th. Tune 2 meters for information. KN2BFP is editor of *The News Rag*, new publication of the Corning ARC. RYJ, PSG, and CVC are on 160 meters. EZS has an 813 on 75 meters. VEP has a Viking II. RRK now is 5FUT at Houston, Texas. SFW has a 2K25 putting out on 10,000 Mc. Sorry to report the passing of PE. ECF is back on 80 meters. Broome County acquired 8 Communicators for 2-meter amateur work. Ithaca, Binghamton, and Scranton v.h.f. hams and XYLs held their

annual get-together at Whitney Point, Feb. 13th. KEL is on 7100 kc. with OBS, Mon., Wed., Fri. at 1900 EST. RUF has compiled a procedure and information bulletin for members of the NYS C.W. Net. ZOL and BTB spoke on amateur radio at Delta U. New officers of the Oswego Co. ARC are YFZ, pres.; QVQ, vice-pres.; WZN, secy.; ICM, treas. TEX, on 20 meters, keeps in touch with his son in the armed forces in Germany. Net certificates have been issued to K2s BZC, BVE, BYO, and DYN. K2BFX has been appointed ORS. V.h.f. night at RARA had OWF talk on antennas, QY on DX, UTH on converters, and ALL on transmitters. Back on 2 meters are ELX, VBH, SFA, VZV, and K2APS. K2AOH has a Viking II. UPH is making a trip through Central America, Chile, and Peru, working 20 meters. When power and communications lines were down in the Clayton Area QBG, operating on emergency power, was the only outlet for communications from the stricken area for two days. K2ADG is the new president of the Malone ARC. KN2EEC is a new call in Malone. B. Greatbach spoke at the KBT meeting on "Computors, Machines that Think." K2DYB worked KV4AA on 80 meters. ICE is on 2 meters. The RARA Mobile Club toured WHEC-TV and WVET-TV. K2ACA has an Elmac Transciter. K2CUQ built VFO to QSY to various nets. Traffic: (Feb.) W2RUF 679, BNC 158, HKA 137, K2DYB 127, ACA 113, W2OE 77, DSS 62, ZRC 54, K2BZC 40, W2RUT 23, JMT 20, EMW 16, PZC 16, RJJ 12, YFZ 10, K2DG 9, W2DVE 5, CFY 4, K2CUQ 2, BFX 1. (Jan.) W2OE 73, ZRC 62, IPC 17, FGL 7, CPN 6, RJJ 6.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC: CA. RMs: UHN, GEG, NUG. OPS: LXE, AER. Western Pennsylvania Traffic Net: 3585 kc. Mon. through Fri. To all in Western Pennsylvania who wish to join the AREC, please route your applications to the SEC, Ken Speer, jr., Lowber, Pa. The Washington County Amateur Radio Club reports activity and improvement in operating practices. The Club has joined the Western Pennsylvania Amateur Radio Club Council and has named IDO and SUK as delegates. Participating in the Sun. 3700-kc. 2000 EST net are IDO, NRE, OEO, ONX, VEM, VFN, WJF, OTL, and UHN. From Emporium we find KUN, NMJ, and WHO aiding in dolling up the club station, which has a transmitter putting out 50 watts on the 75- and 80-meter bands. Active in 2-meter experiments are TCP, IIX, TMA, and SUL. NMJ is new ORS with new antenna. Antenna installation assistants were RVS, KUN, VEE, and WII. VEF has a shiny new General Class ticket. LEL is on 80 meters. PTU and RMX are mobile on 40 and 75 meters. KUN handles traffic and participates in CD Parties. RVS is the new Cameron County EC. The SCARC is in the process of making changes in the club transmitter. NDH is on 10-meter 'phone. UUH is on all bands. NRQ is rebuilding. Up in Erie someone donated the club a 30-foot portable tower mounted on a trailer for emergency work and QPC presented a dynamotor. LKJ has recovered from an illness. Carl Pequeen, serving in the Air Force in Germany, is DL4WZ, near the high and low edges of 20 meters, and is eager for contacts in or near Randolph, N. Y. TMK is enthusiastic about his s.s.b. VNB now is General Class and is on 10 meters. A new call is WN3YKE. UHN advises that the Western Pennsylvania Traffic Net is showing greater activity than usual with a QNI of 211 and a traffic total of 126 in February. Watch for the WPEN Hamfest to be held Sun., May 23rd, at the Lodge in North Park, Pittsburgh, Pa. Traffic: W3WIQ 1438, QPQ 144, UHN 75, LXQ 62, LMM 43, KUN 26, SIJ 25, OEZ 24, NCD 14, LSS 13, KNQ 6, LOD 4, NMJ 4, VKD/LXE 2.

CENTRAL DIVISION

ILLINOIS — SCM, George T. Schreiber, W9YIX — Section Nets: IEN, 'phone, (3940 kc.); ILN, c.w., (3515 kc.). SEC: HOA. EC Cook County: HPG. PAM: UQT. RM: BUK. New OOs are PDH and ZUJ, both operators for the Illinois State Police. Add father and son combinations: AQJ and OKQ. AND has been making the rounds of the clubs sounding out the feeling in the Central Division. He would like to get your opinions on things by mail or on the air. 6CIW/9 renewed his ORS appointment right on time. What's the date on your certificates? ACH is back on the air, having retired from the railroad. He was assisted by DVL, HNL, CHQ, and SBK. CQR is a new ham at the Fifth Army Hq., where he pounds brass for a living. WQH built a rig with a 40- and 80-meter transmitter and receiver in one box and with provisions for d.c. or a.c. supply. MO is heard daily on single sideband. ONT enjoys 40-meter 'phone, but is itching to get back on 10 meters. PTZ is a Signal Corps man in Korea and his dad, STZ, fills his place on ILN. PTZ would like to hear from some of his old friends. VQA, VQN, and UHD got their General Class tickets. WFS keeps skeds with OA8B in Peru. NN seems to have given up DX and has been heard lurking on 80 meters. He is one of the State's most active OOs. TGN provides some QRM to his neighbor's electric stove and really allows the neighbor to cook on the front burner. PHE spends his spare time tracing down TVI laid mistakenly to hams. BPU has a new Elmac and CEO a Viking II. MRH's XYL is home from a South American trip. LMC can't break into the ILN because of the skip, but relays his traffic to the Nebraska Net which returns it to Northern Illinois. SKR gives TVI to his landlord so he is laying low and making changes. The Cenois Amateur Radio Assn. elected the following: MZU, pres.; QGY, vice-pres.; TLE, secy.-treas.; and MUD, in charge of activities. UQT, vice-director, was a guest at a recent meeting. IBN, HTR, and QGY are mobile club members and are trying to get the others interested. CTZ and TLE are active on 80-meter c.w. PQS and MZU speak for the 75-meter 'phone men and check into IEN. YFB uses a five-element beam on 2 meters and gets out. ZEN puts out an FB bulletin for the membership of the Starved Rock Radio Club. The club members recently held a meeting to talk over details of their now famous annual picnic and hamfest. FRP has a 600-watt a.c. generator independent from city mains. Novice BQC spends time on 2 meters and also on 40-meter c.w. boning up for his General Class exam. We are asking all members of the Illinois section to examine the dates on issued certificates and if not current to mail them to the SCM for up-dating, or indicate that a cancellation is desired. News for inclusion in the Illinois report should reach us not later than the 6th of the month. ILN certificates have been issued to SME, DO, MRQ, STZ, LRV, OKQ, and RLX on the recommendation of BUK. IEN members may apply through UQT. Traffic: (Feb.) W9OIN 387, DO 292, WHF 203, SME 180, USA 125, OR 107, W6CIW/9, 73, W9 CEE 70, MRQ 62, DUA 56, STZ 44, YIX 44, IMN 39, LXD 22, FRP 19, LXJ 12, WOC 9, BPU 8, VBV 8, WFS 7, LMC 3, PHE 3, KA 2, TGN 2. (Jan.) W9DUA 40.

INDIANA — SCM, George H. Graue, W9BKJ — SEC: LZI. RMs: JUJ, JBQ, WWT, YWE, QLW. PAMs: DOK, NTA. REC: TT. Lake County Amateur Radio Club had its first Club Banquet with over 150 attending. Guest speakers were NZZ, recent winner of the Edison Award, and ex-Director GPI. Our own Director, AND, also had a very interesting story. CWB is operating a trading post for ham gear. A new Viking II is heard at MIF. MVZ and his XYL attended the recent banquet of the FWRC. A new SS kw. rig is under construction at CWO. PVQ, recently out of the Navy, is sporting a Viking II. GNR has two 45-ft. masts up. More volunteers are being sought by GUX for CAP Aircraft Liaison Committee. The TVI committee of LCARC is headed by CWB. EGQ was heard in the c.w. portion of the DX Contest. MUR reports the Wayne County amateurs RACES plan has been approved by FCC. DLI is 144-Mc. mobile. DGA is new program chairman of TARS. KDV has a pair of 813s on the air now. JUJ's mobile and fixed station on 147.3 Mc. is working to perfection. DED is new president of the DARA. DOK worked as NCS at the club station during the fair. LQE is a very consistent OBS. DPL has a 32V-3 and works all bands, mostly c.w. TT is rebuilding. DRJ reports that CAEN now is two years old and 26 stations QNI regularly. FYQ, FZW, and IBZ had a race to be first in the State to possess call letter license plates. IEZ claims this distinction. N9YJJ and N9YJM are father-and-son teams at Speedway. N9ZTD has a new NC-125. N9WHU made over 500 contacts in the year he operated there. CTA, CYE, DIR, and DIS are new Novices in Evansville. MAM is heard regularly on IEN. PQO, WCA, ACV, and VDC are on s.s.b. in South Bend. NXU is active on 147.4 Mc. Mobile Amateur Radio Club of South Bend had a hidden transmitter hunt with LVS the winner and OGZ, RKE, and YRF getting honorable mention. FJI is on 20-meter 'phone. SWM has 100 watts on 40-meter 'phone. DKR is experimenting with 6-watt portable rig. The FWRC mobile group furnished communication for the distribution of crime prevention leaflets, sponsored by the Lions Club and distributed by the Boy Scouts of Ft. Wayne. NTA reports for IEN with a traffic total of 246. Traffic: W9JUJ 2203, TT 760, NZZ 311, STC 163, LZI 81, YWE 76, SWM 66, NTA 53, KDV 51, DOK 47, DHJ 36, WBA 31, PPS 29, OLX 21, SAA 20, FYM 17, QR 16, CMT 13, DKR 13, ERB 9, NYK 8, DBP 7, EQO 6, DGA 4, NXU 4.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAM: ESJ. RMs: MQV, UNJ. Nets: WIN, 3625 kc. daily; BEN, 3950 kc. 6 P.M. daily; Wis. State 'Phone Net, 3950 kc. 1215 P.M. Mon.–Fri., 9 A.M. Sun. State mobile and c.d. frequency: 29,620 kc. Congrats to VBZ, who now has made BPL for 5 consecutive months! UNJ has a new Johnson Signal Sentry monitor. LSR is learning to use new Eldico electronic keyer. LUE is active in CAN. RTP is modifying his Eldico transmitter. LSK has a new p.p. 807 s.s.b. final. UIM operated portable at Bear Paw Lake Scout Camp and handled considerable traffic. The Green Bay AREC was furnished 2 gas-driven generator sets by the Brown County C.D. RKP is a member of the Al-Operators Club. With NUW as control station, Wausau AREC members and mobiles JBF, LED, PGF, RLB, RQM, VHA, and ZHE provided communication for Red Cross Pay or Play operation. Eau Claire Radio Club's new officers are WN9-SLT, pres.; REQ, vice-pres.; NLE, secy.; QXE, treas.; DSP and GDW, act. mgrs. The NWRC will award annually a citation for public service and technical development to qualifying members. We regret to report as a Silent Key, CWZ, former RM and WIN Net member. VCH has joined MARS. DSP is enthusiastic about 144-Mc. mobile after using LEE's gear for trial. REQ is on 144 Mc. with an 829B final. Net Certificates issued: WIN — QOQ; BEN —

YLE and YNO. The Mancorad Club now has its own club house. DKH is on 160 meters. Active on 4-Mc. 'phone are RKT, BZU, TRG, TQV, OVE, JAW, RYV, HPC, QNO, ZKB, and ZJW. KQB spends his time on 80- and 40-meter c.w. New appointments: UIM and LSR as ORS, GUE as OBS, UNJ as OO. Appointment renewals: GJY as EC, UNJ as ORS. Will see you all in person at the Wausau Hamfest May 8th. Transmitters on 3950 and 29,620 kc. will be on the lookout for incoming mobiles. Traffic: W9VBZ 789, UNJ 262, SAA 180, WWJ 123, LSR 105, LUE 96, RTP 76, UIM/9 73, IXA 61, CXY 55, GMY 44, LSK 30, CWS 28, KWJ 25, UTV 22, IBQ 17, UIM 13, RQM 11, RUB 8, VKR 7, OVO 4, RKP 3, NAJ 1.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Earl C. Kirkeby, WØHNV — The small impromptu "quickie" hamfests are gaining in popularity around this section. A fine party was held at Starkweather where HNR, HUL, NPW, and HNW organized a hamfest. About 40 hams appeared with their extra gear along and the trading and dealing was fast and furious after color movies were shown by LWX. More are planned for the future. NPW is on the air s.s.b. with a 10A exciter and a 300-watt linear, 75 meters. He also has tried 160 meters low power with good results. CAQ has a new HQ-140X. LCL traded for a SX-28; he also has a new 200-watter on 160 meters. Ham radio came into its own out Sharon way recently. IHM, who is supervisor of the local Ground Observer Post, was using the land line to report. When it went out he switched to his transmitter and with the help of FHB got the important traffic into the Fargo filter center. See you all at the Dakota Hamboree at Grand Forks July 18th. Traffic: WØNPR 60, FVG 58, LHB 50, EXO 41, KTZ 29, HNV 24, HUL 22, CAQ 17, LCL 5, USY 4, PHH 3.

SOUTH DAKOTA — SCM, J. W. Sikorski, WØRRN — Asst. SCMs: Earl Shirley, ØYQR; Martha Shirley, ØZWL. SEC: GCP. RM: OLB. PAMs: NEO, PRL. GCP is back from a two-month vacation in Oregon and is considering s.s.b. Mitchell ARC is in new quarters and elected KYL, pres.; GCP, vice-pres.; EYB, secy.; GXL, treas.; and GWW, act. mgr. RRN has a new DB23 and BLZ a new Transciter. KVV, Yankton, passed away from a heart attack. PRL printed and distributed a South Dakota 75-meter 'phone directory listing 110 stations. OOZ built a de luxe model cabinet for the complete station of ZWY, and SFARC acquired a Matchbox for the station. GDE is on 2 meters and looking for QSOs. OOZ has a new Ford ranchwagon. LXQ swapped his S40B for an HQ129-X. NAB is working the evening shift for the telephone company and attending science classes at Augustana College. The 75-meter 'Phone Net average was 27 during February; the C.W. Net's 12 sessions averaged 7. Traffic handled totalled 74 and 42, respectively. Traffic: WØOLB 164, GDE 93, PHR 47, SMV 39, SCT 34, KXZ 19, MPQ 8, WNØQKV 4, WØAYD 2, RRN 2.

MINNESOTA — SCM, Charles M. Bove, WØMXC — Asst. SCM: Vincent R. Smythe, ØGGQ. SEC: ZDU. RMs: OMC, DQL. PAMs: JIE, UCV. KLG has been appointed Official Relay Station. MXC traded his SX-25 for an SX-28. HZR and HFU, with the aid of BP, put on a dandy demonstration at the Minneapolis Radio Club with teletype. The demonstration was very interesting. The other BP said he was talking to UVL, at Pierre, and had to go out to get a package of cigarettes. When he returned he had received some traffic on his RTTY. If interested in RTTY, HZR can tell you where to get these units very reasonable. The Minneapolis Radio Club is now holding code classes for beginners. If interested, telephone DQL, TKX, or MXC. LCM is selling his Viking and 75A-1. 7XNX has moved from Seattle and now lives in Minneapolis. The YLs had a ham get-together and dinner at the St. Francis Hotel in St. Paul. Those attending were JMI, KFN, KJZ, Gerry Grantges, and Eunice Nordenfoss, who is IXR's sister. Gerry and Eunice are studying for their licenses. Eunice is going to try to get IXR's license if possible. BHY is building a new home. According to JNC there are about 100 hams employed at Minneapolis Honeywell Heat Regulator Co. WQM and MCY are back in Minneapolis for a stay. OMC, TKX, DQL, and CGK paid a visit to the Minnesota Men's Residence Association Radio Club at the U. of M. This Club is on the air using the call FID. BBV was in the Cities for a visit. Marty is a jet fighter driver in the Army and was formerly KR6IQ. These WNs are active on the MJN Net on 3690 kc. at 1800 CST: NJZ, ONY, QQL, QBW, QYO, QDO, QGD, PNE, REW, NGV, GXV, MUH, PBK, MJH, MYJ, MVH, and EGQ. NJV is Acting NCS on Fri. and KJZ is NCS on Sat. nights. Traffic: WØKLG 224, HUX 126, DQL 105, EHO 105, UCV 67, IRJ 63, KJZ 61, CXM 60, AGD 53, LST 47, KFN 46, SWB 45, GTX 44, MXC 28, GGQ 20, LUX 19, BCU 16, BUO 16, FFU 13, IKJ 13, ALW 11, HAH 10, TJA 10, WTP 10, W9YFU 8, WØFID 8, UZZ 8, PBK 7, ABA 4, EMH 4, JNC 4, LIG 4, AFP 3, MVH 3.

DELTA DIVISION

ARKANSAS — SCM, Fred Ward, W5LUX — NCM is the new EC for Union County. There is lots of activity at El Dorado now with a swell club doing a fine job. AY renewed his appointment as EC for Pulaski County and has just completed a portable rig for emergency use in the Little Rock Area. OXR moved to California and sold his rig to LUX before leaving. MSH has given up the CAN Net and 4OGG is manager now. It's still pretty rough getting traffic into Arkansas. RWJ has skeds with 4OGG to help move some of the Arkansas stuff. GLB has been appointed EC for Madison County. We would like to have an EC for each county in the State, with additional ECs for the cities. It's about time for you fellows to start looking for someone to elect as SCM as my term will soon be over. Let's try to get a good one this time. Traffic: W5RWJ 62, FMF 31.

MISSISSIPPI — SCM, Dr. A. R. Cortese, W5OTD — SEC: KHB. RM: WZ. PAM: JHS. Well, gang, not much doing this month it seems. We need some new ECs throughout the State, also appointments are open for OBS and ORS. I'm receiving applications for AREC. Come on, let's all get in the act. The Keesler Club is active again and sends in the following report: K5FBB has six new countries; toward DXCC and is constructing a rotatable 40-meter beam. The TVI Committee is active and plans are being made for a big Field Day. The Keesler, Pascagoula, and Gulf Coast Clubs will hold a Ham Festival on May 2nd at the West Side Community House at Gulfport, Miss. The Mississippi C.W. Net meets on 3590 kc. every night. The Mississippi Magnolia Emergency Net meets Sun. on 3870 kc. at 1:30 P.M. CST. Traffic: W5JHS 81, RIM 48, KYC 39, TIR 37, OTD 10, MGR 4.

TENNESSEE — SCM, Mark M. Bowelle, W4CXY/WLG — SEC: RRV. PAM: QT. RM: SCF. 'Phone net frequency, 3980 kc.; c.w. net frequency, 3635 kc. Traffic for Tennessee can be moved around these frequencies almost any time of the day or night. As we write this, "Operation Snow Sled" has just been finished, said operation being another East Tennessee communications emergency caused by snow and sleet taking out wire lines and power in several areas. As usual, the gang came through in grand style. UWA reports a fine show put on by the hams at TPI during their Engineers Day show. Although poor receiving conditions hampered operation, some ten Cookeville boys put on a nice exhibit and moved some traffic on 'phone and c.w. Both Memphis and Nashville c.d. boys are going strong on 2 meters. Memphis has its RACES plan approved and, we suspect, Nashville will not be far behind. Weakley County is the only other RACES plan approved in the State to date, to the best of our information. (Weakley County operates on 50.353 Mc.) Oak Ridge, Kingsport, and several other clubs are making plans for the Field Day affair and, as usual, Tennessee should be well represented on that day. Traffic: W4PL 1994, YIP 1261, OGG 983, PFP 235, OEZ 172, UWA 97, SCF 95, WQW 75, IIB 30, RHO 24, UIO 22, HIH 15, VJ 13, HHQ 12, RET 8, TUO 8, BAQ 4, RRV 3, RMJ 2.

GREAT LAKES DIVISION

KENTUCKY — Acting SCM, Robert E. Fields, W4SBI — MGT's appointment as SEC has expired and he cannot see his way clear at this time to continue. The new appointee is NBY and we're sure he also will do a good job with the help of MGT and all the Kentucky gang. BAZ says the KYN C.W. Net is humming again and gaining new members. We learned by smoke signals that JHU is now c.w. part time. BRY has just received a brand-new sheep skin (CPC 20 w.p.m.) for the shack wall. New OOs are OMW and EPA. ZLK has been building a stand-by receiver and has VFO so he can work break-in. YOK is working for WAS and needs Nevada. He has been DXing, too. New OPS TUT says he has an itchy toggle-switch finger and soon will be back on the air gunning for you guys. The KFN is operating again, fellows, but we need some traffic to bring our total up. Let's keep it going throughout the spring and summer. AZQ, a new AREC member and a new ham, has had a workout with emergency traffic. AUZ has a full-wave antenna up on 80 meters and is really setting the woods afire. JPP has returned from a vacation in Nebraska, mobiling both up and back. The mobile gang, QJU/M, OBG/M, PDC/M, JPP/M, and JDE/M, sure have been putting out some potent signals. ODK is in Florida on vacation. Let's have more news and traffic reports. Traffic: W4ZLK 244, BAZ 149, SBI 146, NIZ 40, AZQ 15, BRI 6, OMW 5.

MICHIGAN — SCM, Fabian T. McAllister, W8HKT — Asst. SCMs: Robert B. Cooper, 8AQA; Joseph Beljan, 8SCW. SEC: GJH. New appointments: EC to FPO and DUS; OBS to BRV. Well, the Convention is over, and from the comments we heard it was a huge success. One of the outstanding additions this year was the presence of the FCC examining crew. FLM and his photo-floods were kept busy recording Convention highlights on film; and we understand that after he and MGQ get the film edited, titled, and spliced it will be made available for showings at clubs, etc. After that wonderful lecture and demonstration on single sideband we think you'll hear more of the fellows up there. Our sincere thanks go to the whole Grand Rapids gang for the manner in which they handled the whole show. We learn via the Genesee Club bulletin that 17 State RACES plans have been approved by the FCC and FCDA.

(*Continued on page 86*)

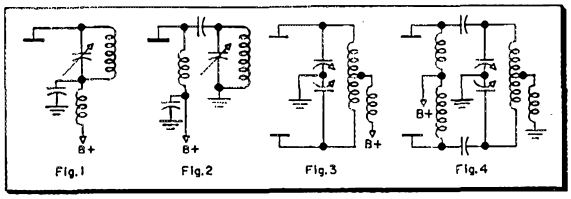


Fig. 1 Fig. 2 Fig. 3 Fig. 4

ANYONE who has been following the recent trends in amateur transmitting design, especially the designs featuring the pi-network output tanks, must have noticed a trend to use parallel instead of series feed to get the plate voltage onto the plate of the amplifier tube. Rather than take it for granted that everyone knows the difference between parallel and series feed, we have shown the two methods above. Fig. 1 is the series connection in which the tuned circuit and the R.F. choke are connected in series between the tube plate and B+, while in Fig. 2 the choke is in parallel with the tuned circuit.

The parallel connection has certain advantages. These advantages were recognized years ago by the National Co., and the R-175 choke was designed for this application in high-power amateur transmitters as far back as 1940. An article appeared in January, 1941, issue of *QST*, written by T. M. Ferrill, Jr., who worked out the original design. The article brought out these general advantages, and is well worth a reread. It should be obvious, in the series connection for example, that the B+ is all over the tuning capacitor and the coil. This is particularly hazardous if the coil is of the plug-in type and the operator is absent-minded. In this case, it might be well to remember that *your* knowledge of artificial respiration will be of no value to *you* unless you have taken the trouble to teach it to the other members of your family! In addition to the danger from changing coils, there is the danger from contact with the rotor shaft while tuning. This can be overcome with a split stator tuning capacitor (push-pull connection) with the rotor grounded as in Fig. 3. Now watch how the voltage between rotor and stator adds up; DC plus R.F. plus modulation peaks. With 2500 volts supply this adds up to at least 10,000 volts on modulation peaks. On eighty meters this can require a mighty large capacitor physically. Use of parallel feed (Fig. 4) allows use of a tuning capacitor that is theoretically only one quarter as large. In addition, the tuning capacitor and coil are grounded and the danger of self-elimination is gone.

Unfortunately, the stress on the choke is increased many fold as it is now connected directly across the tuned circuit. This necessitates careful design of the choke to eliminate any trap circuits within the choke windings that can absorb large amounts of power and burn up the choke. The R-175 choke was designed originally to do this job on the ham bands in common use at the time; namely, 80, 40, 20, and 10 meters.

Later, when the 15 meter band came into use, further design was necessary, and following suggestion of George Grammer in *QST*, this was done. Again, last year, a very fine transmitter was built and described by Doc Farrar, W1CLS, which added the six meter band to the already long list of useable bands. Doc found it necessary to again redesign the R-175 choke to include six meters. Naturally, the National Company wants to keep its products up-to-date, and useful to as many as possible, so the W1CLS revision has been included in the design of this choke.

You may note that the new choke, to be called the R-175*A*, does not look exactly like the redesigned choke W1CLS described in his article in the December, 1953 issue of *QST*. This change in design was made to allow the choke to be more readily manufactured as a production item. The characteristics of the design have not been altered.

This choke is now in production and will be available on the market by the time you read this page.

CAL HADLOCK, W1CTW

with 54 "other" plans also approved. Our own State plan has been returned for a few minor changes and Gary hopes to have it back soon with the "approved" stamp on it. The Berrien County AREC Net runs regular drills on Sun. afternoon on 160 meters. The latest stunt was taking a 160-*meter rig up in a private plane, with GTM at the mike.* UKV likes the new time schedule for the QMN nets, but is in need of a few more volunteers to act as NCS. ILP says he has yet to win a prize at a convention. How about one of those car-top antennas that went begging a couple of years ago, Lamp? WVL finally got the urge to try 'phone and he has had lots of fun on skeds with his in-laws on 40-meter 'phone. Now *that's* a new angle! TBP has been busy maintaining the two-way radio equipment for the township fire departments. NUL reports a good attendance on the THN Net. It is Michigan's newest c.w. net, operating on 3702 kc. at 1200 daily. They had 20 sessions during February, with 83 messages handled. It is a splendid net for the Novice; you can take your time and really learn message-handling procedure. Traffic: (Feb.) W8RJC 614, ELW 295, NUL 238, ILP 187, SCW 138, RTN 128, QIX 92, ZLK 88, IKX 87, NEK 86, SJF 85, PHA 81, WVL 73, IV 53, WXO 39, JYJ 36, TQP 28, SWG 27, HKT 26, FSZ 17, AQA 16, AUD 10, OQH 10, GTM 9, FX 8, JKX 8, EGI 6, DSE 4, HSG 2. (Jan.) W8JYJ 46, TBP 9, YMO 8, FFG 4.

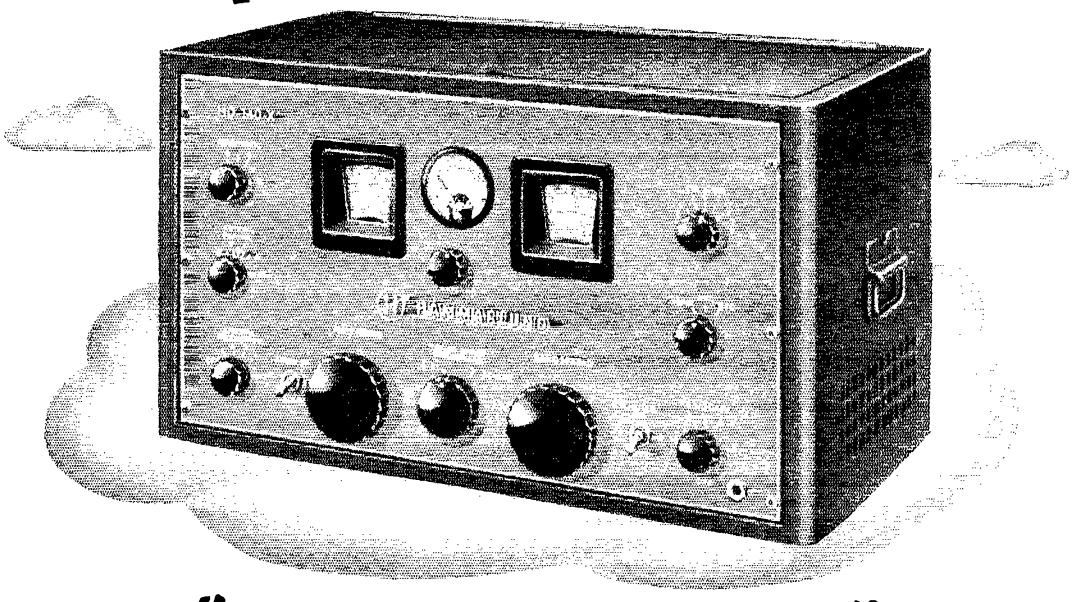
OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: C. D. Hall, 8PUN, and J. C. Erickson, 8DAE. SEC: UPB. RMs: DAE, PMJ. PAM: PUN. Newly-appointed ECs are EDG and UGE. FYO, the section's most active traffic man, again made BPL. MGC has taken down his beams preparatory to moving. GDQ has worked 10 countries on 160 meters. OSD, teen-age YL, has built a c.w. rig for 40-80 meters. It's nice having ARO back among the active traffic men. YCP is ready to go with his new kw. YGR has upped his YL total to 43 states. OEI made General Class. JAR, OUK, and LWL are scheduled to have their rigs on exhibition at Miami U. on Mar. 20th. RN contends we've had too much snow. GDB is director of TCPN for the 8th call area, while AMH is the alternate. WE's XYL has taken over the family rig to the extent of 30 states. Wonder if Bart will ever get back on the air? ILC has been sworn into the Dayton Civil Defense Corps. The Northeast Club of Cleveland reports officers as LCC, pres.; JFD, vice-pres.; NGW, treas., and an SWL, secy. The Toledo gang has been holding some novel exercises, the latest being a "progressive hunt." An admiring SWL sent valentines to all members of the Barnyard Net. We regret to report the passing of SIM, of Alliance. The Cleveland Novice Round-up proved quite successful. Novice winners were NZC, NLX, and NPJ. In the fully-licensed group the winners were AJW, JFD, and AEU. *Ether Waves*, of the OVARA, lists 25 members who have worked more than 50 countries. The West Park Freeloaders met at JNF's QTH on Mar. 8th to lay the groundwork for Field Day. *The Fort Hamilton Bulletin* states that HXB and UFF and their respective XYLs were among the Jitterbugs at the Cincy Dinner Dance; the local XYLs are baking pies for after-meeting snacks; and PMU received his General Class license. The *Dayton RF Carrier*, of course, is concerned mostly with the approaching Hamvention which is shaping up as another huge success. Other Dayton notes are that FFM has purchased a Viking II, SVI is ready to put out pictures on 435 Mc., and the DARA is planning a v.h.f. contest in April or May. We are sorry to hear of the death of INV of Dayton. The Toledo *Shack Gossip* tells us DN and HHF are experimenting with linear amplifiers, BN and DN are presently vacationing in Florida, HUX is struggling for her WAOC certificate, KIX is doing a rebuilding job, and V8B has started up his code and theory classes again. Springfield's *Q-5* mentions that BMC was host at the February Executive Meeting. How about referring to your members by call letters in *Q-5*? The Columbus *Carascope* states that HUE has made WAS, JDK is vacationing in Florida, GZ has become active on 40-meter 'phone, LVF is taking over the 10-meter net, and GKQ is running 800 watts on 75 meters. *Ham Flashes*, which covers Eastern Ohio, reports the death of IJQ, a World War II veteran; BYW has completed the building of his new home; the February meeting of the MVARA was held at IOO's home; RIO is slowly recovering from a serious auto accident; CAZ has been working n.f.m. and a newly-licensed amateur in Niles is PUO, a 15-year-old YL. Traffic: (Feb.) W8FYO 700, UPB 396, DAE 192, IFX 140, YCP 135, AMH 130, RO 118, ARO 111, AL 83, GDB 66, SRF 59, YGR 53, RLR 46, GZ 44, HZJ 39, KXG 30, NYY 27, IJH 23, AJW 22, FSM 20, DG 19, DL 18, HUX 18, HXB 18, TLW 16, HNP 15, ILC 15, GDQ 13, LZE 13, EQN 12, RZ 12, CBA 11, ET 11, LMB 11, CTO 10, HPP 10, KIH 10, QIE 10, IZQ 9, SPU 7, UZJ 7, BLS 6, JAR 6, RN 6, HFR 5, IAY 5, AQ 4, MGC 4, THJ 4, BEW 3, BMS 3, WYL 3, NQQ 2, OCR 2. (Jan.) W8SRF 63, BN 22.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC: RTE. RMs: TYC, KBT. PAMs: GDD, JQI, IJG. IICP, with the ARRL TVI mobile unit, was the guest of the AARA and gave an excellent demonstration.

(*Continued on page 88*)

THE HQ-140-X . . .



"A Ham's Dream"

—says W4VPU

After trying out his new Hammarlund HQ-140-X receiver, Harry H. Harris, Jr., of Charlottesville, Va., W4VPU commented, "This is truly a Ham's dream."

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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, New York. Ask for Bulletin 611.

HAMMARLUND

SINCE 1910

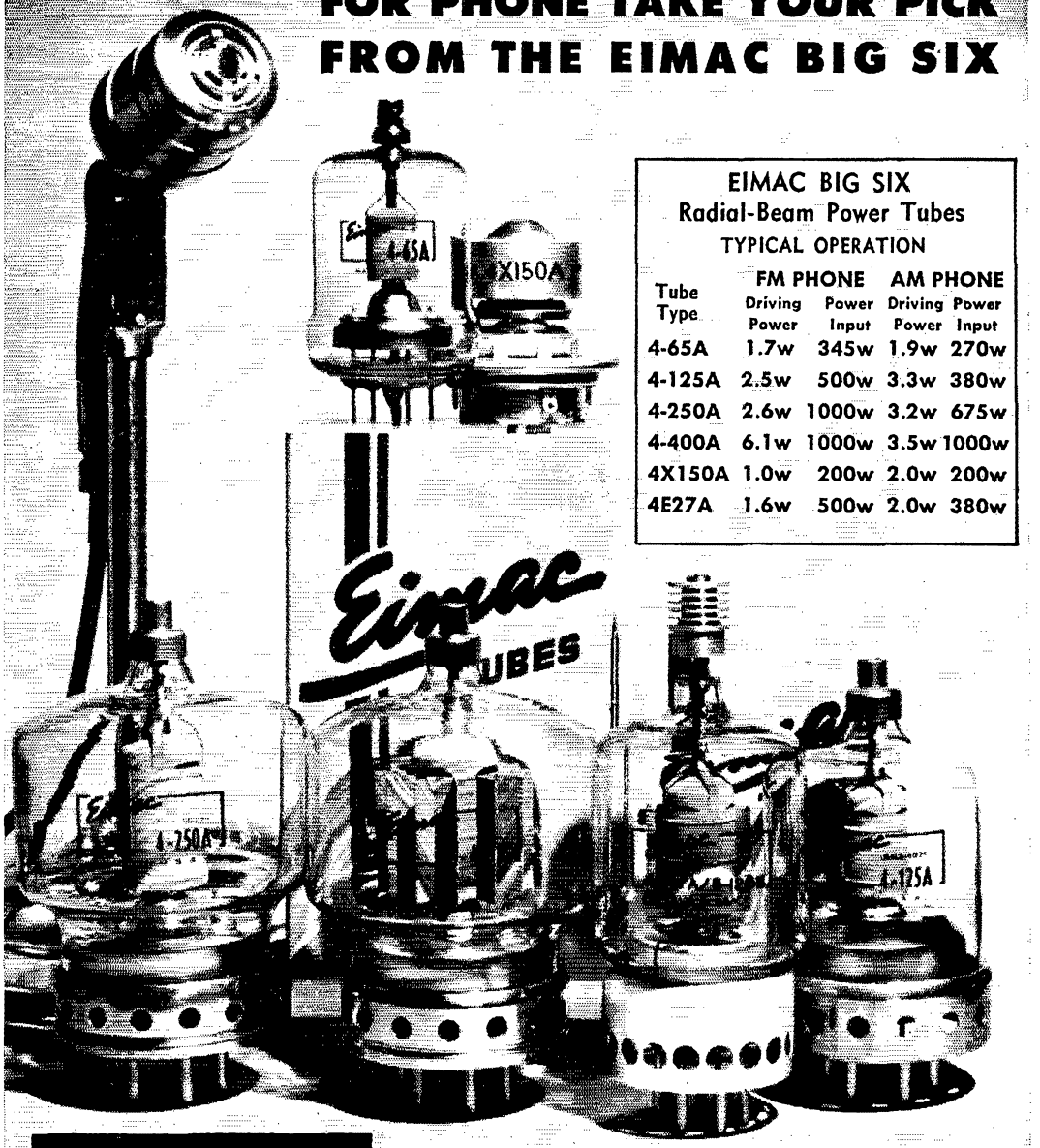
The new editor of *SARA News* is EFU. Don't forget to support Bill No. 896 which, if it passes, will allow us to sport ham calls on our license plates. K2AE and son 1R are members of the OOTC. IBM club station, K2CXP, has moved to its lush operating room at the Country Club. LBD has a new rig using a 6146 (from *Handbook*) on 7 and 3.5 Mc.; also 40 watts on 144 Mc. The SLRC now has 10 members and will limit its membership to 25 for this year. The Club has completed its plans for Field Day. YVP made WAC. WVS is very active on all bands including 144 Mc. Through the motivation of SGV and funds from the various service organizations, an amateur station has been installed in the V.A. Hospital at Albany under the call K2CWX. The station operates on all bands and is kept alive by members of the AARA. New on 144 Mc. are KIT, ZTZ, YVP, K2EOM, and KNs GNO and DRV. ZBS, who has an interest in 10-meter ground wave, has organized a net on 29,490 kc. It operates every evening at 11 P.M. Vertical antennas with ground planes are used. Carl is interested in hearing from the Metropolitan New York and the Connecticut Areas. New in Yonkers are KNs GZB and GZC, ages 13 and 12. K2BEK is on 3.5 Mc. HZZ just completed a VFO as the first step in his plans for building a rig for operation on 80-, 10-, and 20-meter c.w. The time schedule on NYSS has been changed from 2000 to 1900 hours. Our sympathy to LEL on the recent loss of his mother . . . she encouraged his entry into amateur ranks, supported his radio schooling, rewarded his progress with equipment, and with her help he advanced through Sea Going Experience to enter electronics work. Traffic: (Feb.) W2EOM 114, K2EOQ 79, W2ILI 32, LRW 30, GDD 28, K2BJS 22, W2EFU 20, CFU 11, APH 9, TYC 7, WSS 3. (Jan.) W2EOM 41.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Asst. SCM: Harry Dannals, 2TUK. SEC: ZAI. PAM: JZX. RM: VNJ. The new officers of the Federation of Long Island Radio Clubs are DKH, pres.; KQC, vice-pres.; DVK, treas.; JZX, secy.; ARW, hamfest chairman, SQY, club adm. Members of the N. Y. C.-L. I. 'Phone Net operating on 75 meters have been requested to call in on the NYS 'Phone Net on 3925 kc. at 6 P.M. in place of the local operations because of the poor conditions on this band which are expected to continue for some time. NYSS also is having trouble on 80 meters. This Net now operates at 1900 EST except Thurs. Saturday time is 1630, 3595 kc. TUK and HAP are back from W4-Land. ZM, QCWA secretary, has moved to Locust Valley and reports the Quarter Century Net meets Sun. at 1100 on 3810 kc. The following new appointments were granted during the month: ORS — K2CQP. OPS — VNJ. OBS — NJL. OO — KGN. Amateur call letter license plates are again before the State Assembly. Call, write, or wire your Senator and Assemblyman stating that you favor Assembly Bill No. 896, and ask your friends and neighbors to do the same. K2CUI has been doing some DX and reports F7CX on 20-meter 'phone daily from 0800 to 1500 EST looking for W2s. Operators are W1VFS, ZFE, and W9QEP. IVS is looking for DX on 3.5 Mc. JXM has a new half-gallon rig completed and is trying to drive out the Indians. OBU has a new p.p. 811 modulator. The Radio Club of Brooklyn Net meets every Mon. at 11 P.M. on 14,290 kc. All Brooklyn hams are invited. KJG is building a 10A s.s.b. exciter and starting a kw. rig. OMG has moved to Jackson Heights. OME is up bright and shining at 6 A.M. with the Early Bird Net on 3845 kc. working W6, KZ5, CO, and VP9. GP is trying 'phone after 33 years on c.w. New members of the New York Radio Club are K2EDU, W2FDR, K2GFB, W2GLJ, NKG, RWC, and YCH. ZPG now is working at Sperrys. AEE worked KH6 on 75-meter 'phone. VNJ reports NLI is holding up well and traffic was up because of the Tampa Fair. KFV and his XYL, KEB, are handling their share of traffic these days. K2CQP, busy with school, managed a good total also. LPJ, the old stand-by, is in with a busy month. JOA resigned as manager of TAN because of school work and W1UTH has taken over the job. New members of the Huntington Radio Club are KN2s GDU, GDW, and GTH. LHH has a new NC-183D. BIZ is troubled with TVI. HAE has a 32RA. IRY is the new communications director for Williston Park. There has been considerable comment on the FCC proposal for a license fee. Many seem to feel it not too high at $3. However, it has been the view of some, including several of the larger clubs, that in addition to being a hobby the amateur takes part in c.d. work which is of value to his community, and is paid for by the amateur. ZAI reports an increase in the AREC membership, with a total of 712 members in the section. The New York C.D. Net meets on 3970 kc. at 0900 Sun. Area 2 stations (Nassau and Suffolk Counties) call in on 147 Mc. at 0850. QOW returned to 75 and 2 meters after a prolonged period of inactivity. SMQ, JDN, and WVU are active on 75 meters. Traffic: (Feb.) W2JOA 717, LPJ 668, KFV 601, K2CQP 561, W2KEB 530, VNJ 501, BO 500, AEE 453, JZX 129, EC 124, GP 105, MUM 79, ZM 56, OME 45, IN 33, OMG 30, KJG 26, PF 14, YBT 11, KGN 10, OBU 8, OGX 6, JXM 5, IVS 4, K2CUI 1. (Jan.) W2JXM 10, OGX 6.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC: NKD. PAM: CCS. RMs: NKD, CGG, WCL. CVF, Civil Defense Area 1 Radio Officer, held

(Continued on page 90)

FOR PHONE TAKE YOUR PICK FROM THE EIMAC BIG SIX



EIMAC BIG SIX
Radial-Beam Power Tubes
TYPICAL OPERATION

Tube Type	FM PHONE Driving Power	FM PHONE Power Input	AM PHONE Driving Power	AM PHONE Power Input
4-65A	1.7w	345w	1.9w	270w
4-125A	2.5w	500w	3.3w	380w
4-250A	2.6w	1000w	3.2w	675w
4-400A	6.1w	1000w	3.5w	1000w
4X150A	1.0w	200w	2.0w	200w
4E27A	1.6w	500w	2.0w	380w

Eimac TUBES

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an Area meeting of all RACES key personnel on Feb. 12th. Copies of the State RACES plan were distributed to all who attended. ZPD and K2AMN have organized a c.w. training net for the Bloomfield Communications Group. K2BWP is on 144 Mc. with a new rig. DXD, back home after a trip to England, has added a new rig to the shack on the 144-Mc. RTTY channel. The Wind Blowers V.H.F. Society held a dinner Feb. 24th at which time their ARRL affiliation papers were shown for the first time and signed by all members. ISK was voted in as a new member. K2BAY needs a crystal so that he can get in on the NJN. Can anyone help? JKII and KXD would like to alert the pre-war Nickle Plated Net to reassemble on 160 meters Sun. at 1100 for a reunion. NIY has received Argentina's Antarctic certificate. HXU says the 14-Mc. QRM is driving him to stamp-collecting. KN2CYU (XYL of W2ZYM) is going up for her Technician Class soon. KN2CZX passed the Technician Class exam. KN2DPO and KN2CTL have dropped the "N". K2DOX has a new rig with 813 final. K2CZY had his first taste of 14-Mc. DX by working PJ2CE. KN2GTD is a new ham in Bogota. KN2GRU is a new ham in West Englewood. KN2GBP is all set for his General Class license with a new rig ready to go. The RVRC has moved its meeting place to Rutgers University for all feature attractions. Director Cooke spoke to the Club on ARRL affairs at its last meeting. COG has been elected as club printer for RVRC news letter. BAI completed 20 years in the Naval Reserve and holds the rank of Lt. Comdr. He was presented the Bronze Star before the entire reserve unit. HJU bought a new Viking II before going to New Orleans for the Mardi Gras. HJD visited ex-VAV in St. Louis prior to joining the Navy. The RVRC gang had a very enjoyable visit at W1AW. QW held an auction sale Mar. 2nd. The Avenel RC elected K2DSW, pres.; K2AFQ, vice-pres.; and K2CLL, secy.-treas. FSL is in charge of the Club's code practice sessions. Club members recently gave a demonstration of amateur radio to the local Boy Scout Troop in Avenel. YLS is back on 144 Mc. after a long absence. The GSARA had Director Cooke as guest speaker at its last meeting. OUS has a nice turnout on the 144-Mc. Emergency Net each Mon. at 2130 hours. K2ARU and K2ARQ keep the 144-Mc. band hopping at all times. The Ocean Amateur Radio Assn. held its seventh annual dinner dance Mar. 27th. K2DHE is back at his home QTH after piloting his aeroplane on an extended trip throughout the U. S. K2EBL is pouring out 500 watts on 144 Mc. NIE is getting ready to hit the high seas in his cruiser, 144 Mc. will be his mobile marine band this year. BTG is looking forward to Field Day. EGM is busy erecting a new tower and beam for 144 Mc. Traffic: W2CGG 477, JCO 176, EAS 162, K2BWP 130, W2FMP 46, K2DSW 38, W2DXD 34, K2BAY 9, W2HIA 7, CJX 2, NIY 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — The Des Moines Club is sponsoring the ARRL Midwest Division Convention for 1954. The North Iowa Radio Transmitting Assn. is being reorganized and is drawing up a constitution and by-laws. It seemed good to get a copy of their *Splatter* again. We recently were informed of the passing of UOT. New stations on TLCN are CQL, of Spencer, with 750 watts and GXH, of Sioux City. PP is all tied up with WHO's TV installation. SEF has a new 50-watt rig. GJT has a "fire-sale" 32V-1 that sounds very nice. The Iowa-Illinois Amateur Club visited the National Guard Armory to inspect the new radio equipment. BBZ is working hard at being a sailor. SCA sent in the second largest traffic total of his ham career and BDR tops it. NGS informs me that he is in a wheelchair with muscular dystrophy; one more ham who gets real pleasure out of ham radio. LCX is back on the air looking for KH skeds. EHH earned a swell write-up in the paper for his work with a community group of boys 9 to 15 years old, who have formed their club and earned their ticket and club station, QVN. YTA says 2 meters is warming up. BSQ is rebuilding. PJF is on 80-meter c.w. NWX will make a trip to Clipperton Island where he will operate FO8AJ. Traffic: WØBDR 2179, SCA 1764, CZ 176, OZO 106, QVA 68, GXH 66, GSH 48, BLH 37, NGS 35, YTA 32, SEF 27, QVN 20.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. RM: KXL. PAM: FNS. Hats off to the NCS and alternates. In the QKS Net we have BLL, ROY, FEO, EOT, and NIY. In the Kansas 75-meter 'Phone Net we have AAJ, JDX, VTT, LIX, and FNS. New officers of the Se-Kan Radio Club are ONF, pres.; HNG, vice-pres.; FNS, secy-treas.; MIJ, act. mgr. Picnic dates so far are Christy's picnic at Osage City May 23rd, the CKRC picnic at Salina June 6th, Kansas-Nebraska Radio Club picnic tentatively set for Aug. 15th at Clay Center and the Tri-Cities Hamfest Sept. 5th at Scott City. On Feb. 12th at 6:12 A.M. the Kansas 75-meter 'Phone Net went into emergency work in the western part of the State, with REP and TSH of Great Bend acting as NCS with the assistance of FNS, HS, CIK, VTT, and CSV. CSV did some good work operating on emergency power. Stations known to have participated were HS, CSV, BET, TNA, FEO, MI, ALD, WMQ, YOS, NAS, MJD/M, MAS/M, JDU, QJC, NLV, NHT, QNJ, TSH, REP, MAE, GPZ,

(*Continued on page 92*)

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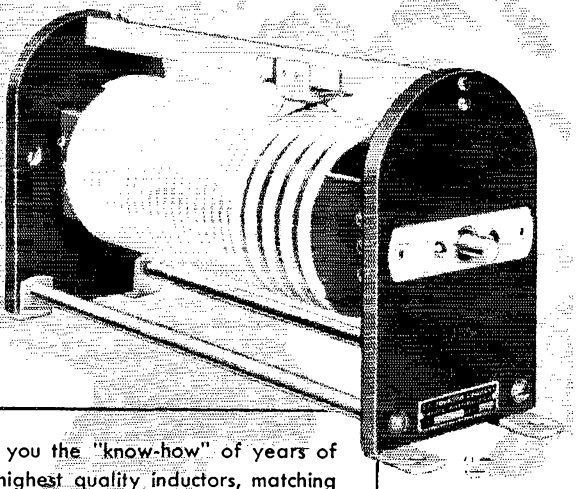

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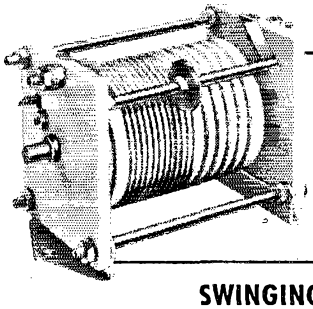

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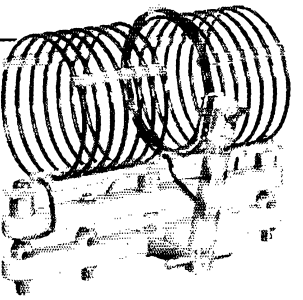

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NJS, NLV, DSM, AER, FSE, SIG, FPY, YLO, FHU, and FHC. MOX/Ø, at Lawrence, a new OES appointee, has a TV transmitter under construction. MUY, of Salina, has gone to s.s.b. LXA has moved to a new location in a trailer with his 800 watts of 813s. MBH sold his BC-610 to UCS and is using a 66-ft. vertical on it. NIY makes BPL again and February was another record-breaking traffic month. Traffic: WØNIY 346, BLI 302, FEO 206, EOT 111, ABJ 54, YFE 50, FDJ 41, SIG 37, KSY 29, PSL 27, QQQ 24, WGM 20, CSV 18, ICV 18, MXG 18, QGG 18, GCH 17, FNS 16, KFS 16, MAE 16, NFX 16, VBQ 16, RBO 15, BET 14, DEL 12, FSE 12, LOW 8, TNA 8, ZKO 7, EIM 5, LIX 3, PLS 2.

MISSOURI — SCM, Clarence L. Arundale, WØGBJ — SEC: VRF. PAM: BVL. RMs: OUD, QXO. The Missouri Emergency 'Phone Net will hold its annual picnic on June 6th at Swope Park, Shelter House 8, Kansas City, Mo. It will be basket-lunch style with prizes and free refreshments. The Suburban Radio Club has elected the following officers: DOA, pres.; NMM, vice-pres.; PMU, treas.; and AKS, secy. The current club project is the completion of the 3-kw. trailer mounted power supply. EAQ has returned from Japan. CGJ is conducting code classes at the Boys' Club in Springfield. The Egyptian Radio Club raised over two hundred dollars for the Braille Technical Press at a recent club auction. FIR has a new daughter. HUQ is EC for Rolla with BZM acting as assistant. CPI and GAR earned BPL certificates. NXA has a three-element beam in operation and is working good DX with it. ARH was active in the DX Contest. QMF reports increased activity on 2 meters. CPI, GAR, and QXO report operating conditions are very difficult much of the time. LQC has issued three Code Proficiency certificates to members of his code class. QWB has entered the dry-cleaning business. WNØSOZ is on the air now. PME is back on the air. All stations interested in traffic are invited to participate in our traffic nets and report to the SCM. Traffic: (Feb.) WØCPI 710, GAR 508, QXO 451, GBJ 181, ZLN 76, CKQ 72, EBE 55, KA 48, KIK 37, HUI 27, OUD 24, BUL 20, NXA 10, QMF 10, TSZ 9, QWB 8, WAP 8, GXZ 7, LQC 7, CXE 4, WIS 4, ETW 2, ARH 1, FUM 1, JHY 1. (Jan.) WØQWB 10, ETW 6.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — Asst. SCM/NCS: Tom Boydston, ØVYX. SEC: JDJ. NCS: RDN. IXL has new VFO with hot and cold running water, fur-lined tube sockets and differential keying. The Ak-Sar-Ben 2-meter gang is in a new set-up which will be the thing for c.d. AIN's working hours and net activities don't agree. TQD has Elmac receiver, TBS-50. DX competition is too rough for TQD. There are 20 stations on the regular roll of the c.w. net with a traffic total of 251, QNI 395, in 28 sessions. KDW is an excellent reporter for Nebraska activities in *Clir.* EWO now is on 2 meters with no QRM or contacts. The North Platte Club now has the 3948 plus or minus crystals. ERM has been elected as Official Bulletin Station for the NPARC, transmitting weekly news on 3995 kc. on Mon. at 6:30 P.M. Among some of the new calls around the band there are QKR, at Gering, and REL, at Minatair. KDW is a new member of the Traffikers Club. LRK has a new transformer in the HT-9. KXD has a new Viking VFO for Viking mobile transmitter. Anyone interested in ARRL appointments such as OO, OBS, ORS, and EC, or in AREC membership, please contact your SCM. Traffic: WØTQD 3336, KØAIR 1942, WØRDN 385, FQB 104, ZJF 59, IBA 34, KDW 32, CBH 30, KØWBF 26, WØEUT 20, HTA 20, VYX 17, NAA 16, EGQ 15, MAO 15, WR 14, LRK 12, AEM 11, RAM 8, NGZ 5, UPY 5, ZNI 5, ASI 4, DDP 4, HQN 4, KXD 4, LGT 4, FJU 2, HQQ 2, HXH 2, OFL 2, QOU 2, THF 2, GTW 1.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Roger C. Amundsen, W1HYF — UNG is going great guns aiming for BPL. WVV, of Darien, sends an FB first report and is trying for WAS. RRE, Acting PAM, reports CPN leaders are MLT, LWW, FMU, and RMZ. BVB is the only OO sending reports. The Willimantic gang is organizing a club. Best of luck to EFW, your new SCM, and hope the gang will support Milt. He and KYQ had charge of the second annual CPN and CN dinner held at the Waverly Inn in Cheshire on Mar. 26th. ZTQ is a new Novice in Southington, where hams have organized for c.d. NFG moved to Highland Ave. TD renewed OBS appointment. KYQ, EFW, and RRE, on CN, and EFW, BVB, and RFJ, on A.M. CN, are leaders for the month. RRE renewed OBS appointment. An FB bulletin was received from OAK for the Vt. gang. Feb. 10th was the night that Stratford issued RACES authorizations. NLM wants to sell his HT-9. LIG has a new super-six. The mobile season is just around the corner and yours truly is going to give 80-meter c.w. another mobile try. Traffic: (Feb.) W1UNG 235, EFW 229, SJO 187, AW 150, CUH 112, KYQ 85, LIG 75, YBH 73, RRE 72, BVB 70, QJM 66, HYF 42, YYM 34, VOV 33, BDI 28, FTM 22, NEK 18, RFJ 18, WNH 17, KV 14, LWW 13, OPZ 3, RAN 2, WPR 1. (Jan.) W1SJO 191, WNH 12.

MAINE — SCM, Bernard Seamon, W1AFT — The Sea Gull and Pine Tree Nets are off until the ending of

(*Continued on page 94*)

MALLORY HAM BULLETIN

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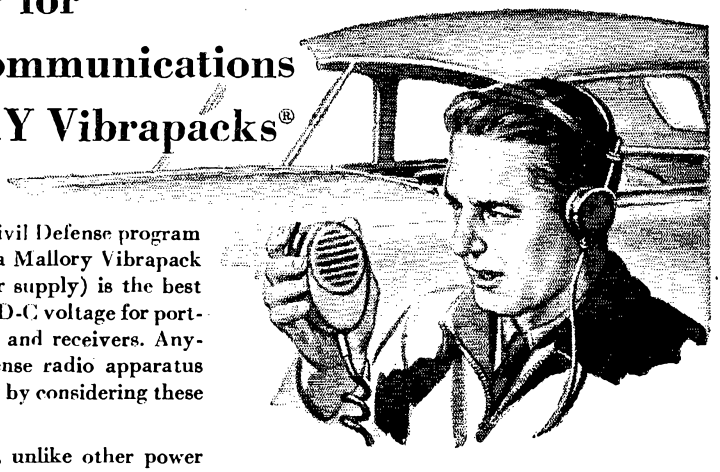

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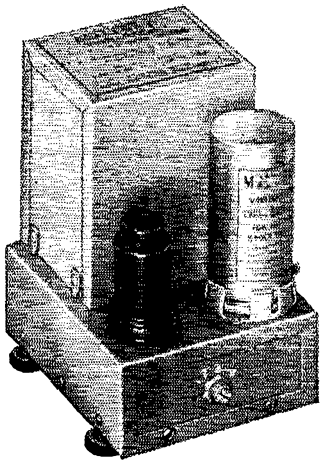

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Daylight Saving Time in the fall. The Maine C. D. Net will drill each Sun. until further notice on 3993 kc. at 10 A.M. EDT. SEC Don Bean, BYK, will be Net Control. All county c.d. stations and alternates should check in. At the last meeting of the PAWA before we went to press, there were 35 present, including 21 Novices. Good going, Portland. The Oxford County Club had to cancel its meetings because of impassable roads and is holding the weekly meeting via 10-meter ground wave. The Gardiner c.d. gang is all set with a complete v.h.f. set-up. AWR has gotten his old (1916) call of FD back, courtesy of the FCC. The Androscoggin Amateur Radio Club will hold another hamfest on June 20th in Auburn. This will be the only major hamfest in the State this year as Portland has taken no action so far. Order your tickets early. There will be prizes, contests, interesting speakers, and a fine banquet. Get your tickets early from any of the Lewiston-Auburn gang. HUL advises that HXQ is learning to play poker. What! Just shows what playing chess will lead to. Please help your SCM this summer by sending in all the dope you can about you and your club's activities. Traffic: W1OHT 72, LKP 71, BEU 34, VYA 22, KAS 20, UZR 18, UDD 16, JIS 13, LYR 11, WAU 8, WRZ 8, AFT 6, EFR 6, WTG 3, FD 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New ECs: AGX Peabody, CMM Georgetown, OGK Saugus, VRK Swampscott. Appointments endorsed: ECs — DDC Ayer, AR Belmont, JJY for National Guard Emer. Comm. Plan; OPSs — TSB, SCS, IIM, MD, HIL, AR; OOs — RRP; ORSs — AGX, JJY; OBS — CTR. SPL is new OBS. ALP spoke at the Bedford Radio Club and the North Shore Radio Assn. for c.d. at Lynn. WN1ZHW, Newton, has a Lettine 240 and an SW-54 on 3.7 Mc. AKE, on 80 c.w. and 6 meters has an NC-100 and an RME-125A. VIN has his General Class license. YOG is on 40 meters. EPW is on 10, 80, and 2 meters and 10-meter mobile. RUG is on 10 meters. On 2 meters: TQF, QF, ZQL, QLT, ex-6MZS and 8EDT, is a new ORS. AGX has a new Viking II and VFO and is on 2 meters. ICU has a new QTH. HIL has a new Elmac AF67 and HRO-60, is mobile on 75 meters, and visited VVS in Vermont. DDC gets on 40 and 75 meters and says there are lots of hams at Fort Devens. JJY is busy on the National Guard Emergency Plan. New officers of the Hingham Amateur Radio Club: DMS, pres.; AST, vice-pres.; ONV, secy.-treas. AST, ONV, AYG, BW, MD, and WTN are on the Planning Committee. WN1ZXG is a new ham. Mr. Hallenstein, of the FCC, spoke at a recent meeting. The Quannapowitt Radio Assn. held a meeting with a discussion on the Club's new S.W. Bridge. The South Shore Club had a talk on Antennas by PKW; also a State Representative spoke on how to prepare and start a bill for license plates for radio amateurs in Massachusetts. All clubs and hams are urged to find out who your Senators and Representatives are and be ready to talk to them in person. NBS is building and has a VFO on the air. AVY has appointed WGN as Asst. EC for New Bedford. TVZ's ORS appointment has been endorsed for another year. WU is mobile again. HWE has WNH and Old Timers Club certificates. UTH now is Net Manager for TAN. VTT will have a rig for all bands. New officers of the Falmouth Amateur Radio Assn., WNM, are DVS, pres.; TJW, vice-pres.; QLT, secy.-treas.; UG, NFE, and LYV, board of directors. Meetings are held the last Wed. of each month at the Falmouth Recreation Bldg. Visitors are welcome. WSN is new ORS. EMG is in Florida for a visit. Sorry to have to report the death of HQH. THE is in Philadelphia. AWA is Regional Coördinator for Region 4, Mass. C.D. The South Shore Club had movies on Oscillators and Physics of the Atom Bomb, courtesy of Bill Charette. FZU is operating the Area C. D. Station at Lakeville. The South Eastern Mass. Amateur Radio Association's new club quarters are coming along fine. PWL is in the hospital. BB took part in the recent F.M.T. The Winthrop Emergency Group held an air raid practice alert on Feb. 22nd with radio units in action. The last drill had CMW, GGP, BDU, DJ, MQB, NMX, HFJ, BB, and XYLs. The Revere group is setting up a 2-meter net for Sector 1. UHN and WTY are on 10 meters. The Town of Milton was the scene of a bad fire in Sector 5's monthly test, with several c.d. directors on hand and the following in various other towns offering assistance: FWS, WFQ, TYN, EKG, VPR, MMH, SH, ALP, KWD, VAN, ZWQ, IPA, WSN, and HOM, and mobile aircraft WK. JCK still is in the hospital in Washington, D. C. Traffic: (Feb.) W1EMG 268, MME 175, IBE 161, UKO 153, UTH 139, AVY 96, UE 92, LM 84, NUP 47, VYI 33, EPE 29, VVA 27, BY 20, QLT 17, FGT 11, WU 9, VMD 6, VTT 6, WGP 6, HWE 5, AHP 2. (Jan.) W1NUP 12, QLT 10. (Dec.) W1QLT 5.

WESTERN MASSACHUSETTS — SCM, Roger E. Corey, W1JYH — SEC: KUE. RM: BVR. PAM: RDR. WMN meets Mon. through Fri. on 3560 kc. at 7 P.M. and 8 P.M. QWJ won a Heathkit VTVM at the annual HCRC banquet. BDV has designed a simple but effective ground plane for 28 Mc. which he and WEU are using to good advantage. COI picked up two new countries during the DX Test. KFV, AEW, WEF, WDW, and JYH also took part in the c.w. portion of the Contest. BNO has moved to a

(Continued on page 96)

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new QTH. NAX has a new AREC net under way in Milford. MNG, OBQ, VNH, TTL, ESA, JWV, NLE, RRX, and PHU attended the annual Hartford v.h.f. meeting. VNH has built up a 2-meter version of the Horse Traders with as many as sixteen Connection Valley stations checking into the first session. UKR, RLQ, and JYH took part in the YL-OM Contest. The PRC has appropriated funds for a complete new club station. LJQ, EVZ, ODE, and TAY give code practice Wed. from 7:30 to 9:00 P.M. EVZ is NCS of a new c.d. net which meets Fri. on 29.5 Mc. at 7 P.M. KUL is FD chairman for the HCRC. UVI gave a demonstration of amateur radio for the Westfield Police Dept. Sixteen appointments were cancelled this month for failure to get an endorsement or for lack of activity. How does your appointment stand? QWJ and JYH have both finished new filter-type s.s.b. exciters for 4.0 and 14 Mc. Anyone interested in a Western Massachusetts s.s.b. net? Traffic: W1HRV 144, TVJ 132, UKR 86, BVR 60, WCG 34, SRM 32, TAY 20, JYH 17, WDW 17, HRC 10, RRX 9, JAH 4, OBQ.

NEW HAMPSHIRE — SCM, Carroll A. Currier, W1GMH — SEC: BXU. RMs: CRW, TBS. The Manchester Radio Club has elected RGC, pres.; RYC, vice-pres.; YHI, secy.; WUU, treas. PVF is at Fort Dix and has a new mobile rig. PCARC has the call WQM, with TDV as trustee. SWJ is teaching code at the club and has helped more than fifteen to get their licenses. FTJ won the YLRL Anniversary Party 'Phone Cup. She holds the c.w. cup, having won it for three years. YIM now is located in Hampton and is on 10 meters. QHS still is doing an FB job on frequency checking. The NHEN has a good attendance Sun. on 3850 kc. at 1300 hours. COC is a new ORS. TBS has been appointed RM for Northern New Hampshire. POK has a new rig in a 6-foot rack. SEV now is 5CAD. WUG had a fine vacation in Florida this winter. The New Hampshire C.W. Net is looking for more outlets. Don't forget they meet Mon. through Fri. at 1700 on 3685 kc. It's time to think about getting the portable rigs ready for Field Day activities. UNV is in the Navy for a two-year hitch. CRW has a fine-sounding mobile rig. Traffic: (Feb.) W1CRW 388, CDX 27, WUU 25, GMH 14, FZ 13, WBM 12, POK 6. (Jan.) W1WUU 32.

RHODE ISLAND — SCM, Merrill D. Randall, W1JBB — SEC: MIJ. RM: BTV. RIN meets every evening Mon. through Fri. at 1900 on 3540 kc. R. I. 'Phone Net meets every Sun. at 1100 on 1890 kc. And don't forget RINN every evening, Mon. through Fri. at 1830 on 3743 kc. They are going great but would like a few more of you Novices. Call in and get the dope! Every once in so often my job gets in the way of my SCMship. This month was one of them, so if this column seems scanty, blame it on Uncle Sam. Guess I'll have to give up working. Also, I have not yet received my favorite source of news, PRA's *Zero Beat*! Plans for NCRC's Field Day revolve around a change of location. This year they are going to try Black Horse Point. May we hear from the rest of the Rhode Island clubs that are planning on setting up for Field Day? We would like to arrange a visiting sked as we think our vacation is coming up at that time. Our new address: Girard Avenue, Newport, R. I. Traffic: W1BBN 119, IMY 108, BTV 62, VXC 46, W4CVO/1 20, W1AIT 17, TGD 15, YKQ 11, OIK 9.

VERMONT — SCM, Robert L. Scott, W1RNA — PAM: RPR. RM: OAK. VTPN and GMN: 3860 kc. VTN: 3520 kc. There is going to be a Vermont Hamfest this year, either at Burlington or Brattleboro, and at the moment it looks like Brattleboro. More on this as soon as details shape up. The Tri-County Amateur Radio Club of Brattleboro is sponsoring a Worked Vermont certificate award. Any station working 13 of the 14 counties earns the award. Send QSLs for verification with return postage to Tri-County ARC, c/o Ray N. Flood, W1FPS, 2 Marlboro Ave., Brattleboro, Vt. Mobiles and portables also count. The International get-together, picnic, or hamfest of sorts, is tentatively lined up by the BARC at Mallets Bay, near Burlington, for June 13th. Keep in touch with the Burlington gang for further details. Traffic: W1RNA 269, JLZ 75, TLI 75, AVP 60, OAK 47, IT 33, KJG 21, TAN 21, BJP 18, TEW 15, QVS 11, AXN 6, VZE 5, ELJ 3.

NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — AN and ZR, long-time residents of Fairbanks, have transferred to Katalla, Alaska, where AN will take over a repeater station for C.A.A. Bill will be on soon with a Viking and will be looking for W7 contacts as well as all the KL7 gang on 75 meters. AFK and his XYL mobiled out over the Alcan Highway to the States. After a short business trip to Washington, D. C., they will enjoy a well-earned vacation before proceeding to Guam. In order to be eligible for Alaska call letter license plates, one must have amateur transmitting and receiving equipment in the vehicle. This law was passed by the 1953 legislature, to become effective for 1954. V.h.f. enthusiasts take note. KTVA, Channel 11, has been heard in Lake Minchumina, which is over two hundred airline miles from Anchorage and across a range of mountains, also in Valdez, which is more than a hundred airline miles from Anchorage. KL7IS has been on the

(Continued on page 98)

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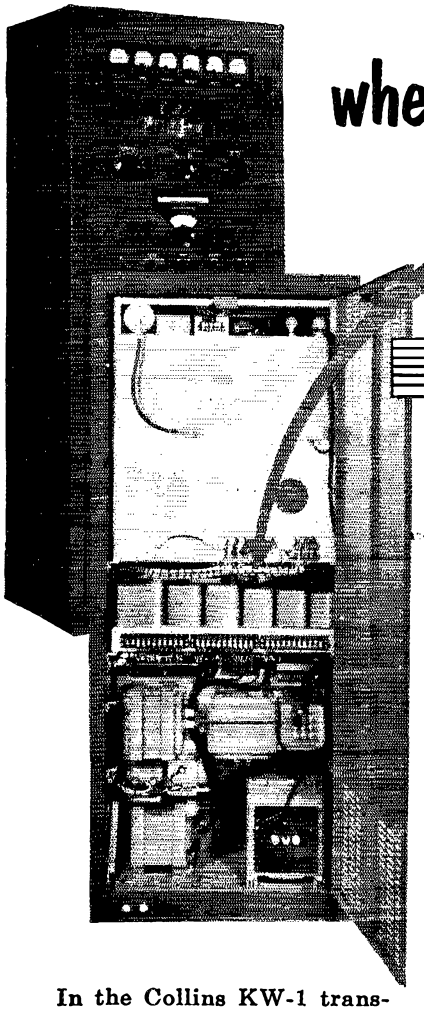

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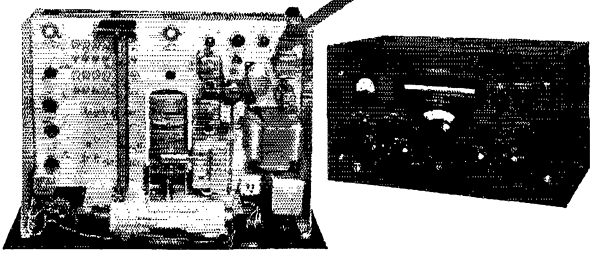

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receiving end at Lake Minchumina. It would appear that v.h.f. has a good chance in KL7-Land. If interested, contact KL7VT at Summit, Alaska.

IDAHO — SCM, Alan K. Ross, W7IWU — Coeur d'Alene: KOG is the new EC for the area. Bud, former EC for Grangeville, will take over easily. He also is the Radio Officer for RACES for Area One. Caldwell: EYR and SAE built three-element 20-meter beams. SAE lacks Africa for WAC. SWD dropped the "N" and bought an Eldico TR-1TV. ZMM now checks into the 7-Mc. Saturday Night Net. Lewiston: The Lewiston-Clarkston Amateur Radio Club's call is VJD. IDZ is building a 10- and 75-meter battery-operated rig. A new ham in town is WN7VIO. Boise: Word comes of the passing of ex-BVD, in Nampa. NVO has a new Elmac mobile. The FARM Net is doing nicely with MKS as manager, ACD and FJD as controls, and OHR as alt. control. Others who have called the roll are ILL, NVO, TGU, JHY, and TCI. DMZ, from American Falls, called up IWU while in Boise. Traffic: W7NVO 16, EYR 3, SAE 3, IWU 2.

MONTANA — SCM, Edward G. Brown, W7KGJ — Newly-appointed Emergency Coördinators are EWR for Havre and KGF for Billings Areas. Congratulations are due FSK and MM, who made BPL with their February traffic counts. The Great Falls gang is having mobile drills the 2nd Sun. of each month. TGG helps the OM when the traffic gets too heavy. CT is NCS on RN7, also manager and NCS of MSN of C.W. Net. Les transmits Official Bulletins on 3520 kc. at 1830 each week day. The Missoula Emergency Net meets Sun. on 3890 kc. at 1 P.M. COH has his new Extra Class license. It isn't too early to begin planning your hamfest activities. The Glacier Waterton Hamfest dates are July 16, 17, and 18 at Waterton Park, Alberta, Canada. VE6VN is president and VE6DR is secretary-treasurer. Thanks, gang, for sending in news of activities and sure hope it keeps coming, although news was a little slim again this month. Traffic: W7SFK 575, MM 522, TGG 82, CT 40, TGU 31, PCZ 27, FIS 6.

OREGON — SCM, John M. Carroll, W7BUS — The coming OARA Convention will be held in Klamath Falls June 26th and 27th. The sponsoring club is headed by Helen Lee, SBX; Roy Felix, SBU, vice-pres.; Paulene Stemler, SBW, secy.; Gertie Felix, UFN, treas.; Joy Ustick, GLF, and Geo. Conner, JRU, executive board. Preregistration prizes have been announced if registration is made prior to June 12th. BOE, 74 years young, filed his registration with the SCM for AREC. FUN is new Rogue Valley Club president. IRZ and FUN are using s.s.b. VCQ now has General Class license. QMK is working for WAS. SBT is working with v.h.f. on 2 meters mostly. FRO and his XYL, GLK, are now settled on their antenna farm. MSD and OLZ are on 40-meter c.w. MMI has a new XYL and received "Greetings" from Uncle Sam. LNG was best man for MMI and TAH's sister was maid of honor. DZB, active on 75- and 40-meter 'phone, has 4 new confirmed countries. VIL is a new Novice. TZP has Tech. Class license. TJJ is having mobile troubles. TLS has TVI. NE now is on 15 meters with three-element beam. MRU is on 75 and 40 meters. EZR has a new QTH. The Portland 29.3-Mc. Mobile Net participated in the polio drive with FB results. AJN reports his requests for check-ins on OSN have been well received and PHJ and AJN have received MTHC certificates for having acquired over 300 points in BRAT scoring. YG is active again as OBS. Bob Tinkle is secretary of the ITK Radio Fraternity. THX is active on OEN and AREC. RQN is active on MARS. JDX is operating a Viking from home QTH. Traffic: W7AJN 41.

WASHINGTON — SCM, Laurence M. Sebring, W7CZY — SEC: QZF. RMs: FIX, OE. PAMs: EHH, PGY. The Tacoma Radio Society has been officially formed with 21 charter members. Elected officers are OFF, pres.; BG, vice-pres.; and act. chairman; BTV, secy.-treas. The Club meets twice each month, the 1st and 3rd Fri., at the South Tacoma Community Center. JHX has installed a new tower on his house 32 feet above the roof. He will have a double twin-five for 2 meters. ICD is living at Richmond Beach in an excellent location for hamming. He is running 125 watts to a folded dipole and HT-9 transmitter. SFS monitors 29,600 kc. daily with stand-by receiver. The Lewis County Amateurs Radio Club meets the 1st and 3rd Mon. of each month. PGY has a new ground-plane antenna on 20 meters. KZP is working hard on high-fidelity sound equipment. POZ moved to Kennewick to be with station KWIE. The Lewiston-Clarkston Amateur Radio Club has organized an emergency set-up with directional loops, airplanes, walkie-talkies, motorcycle mobiles, and car mobiles. They are all ARRL members. Re January report: JEF retired from the Navy not the Marines. FIX has a 50-watt rig on 1988 kc. OEX is the new EC for Seattle Area with PGY as Asst. EC. The Annual Spokane Amateur Radio Banquet was held at the El Rancho Cafe on April 6th. The VARC held its annual banquet and elected the following officers: JJK, pres.; NZM, vice-pres.; OEB, secy.; WN7UIW, treas.; TGO, sgt. at arms; and PRP, trustee. Traffic: W7JEF 2758, PGY 1305, BA 1121, QYN 708, FRU 691, HAK 630, KT 401, RXH 89, OE 81, EHH 44, FIX 44, CZX 40, QOU 32, APS 25, ICD 20, BLX 16, AIB 15, BG 14, ZU 12, EVW 8, GAT 7, NWP 7, SJL 7, EAU 6, PEZ 4, HDT 2.

(*Continued on page 100*)

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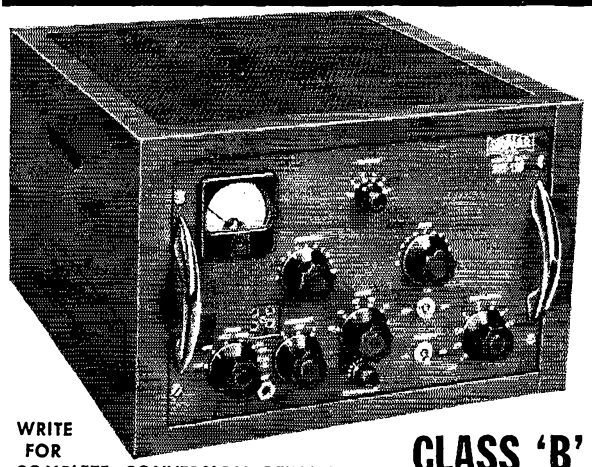

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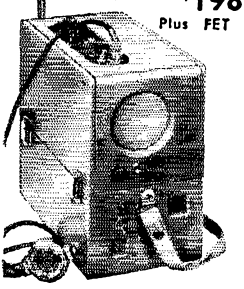

PACIFIC DIVISION

HAWAII — SCM, James E. Keefer, KH6KS—W5QDF/KH6FAA departed for the U. S. A. on Mar. 19th. Hawaiian amateurs again are reminded of the August 14/15, 1954, outing and hamfest to be held on the Island of Kauai. Be there! The February HARC meeting was held at KGMB-TV. This meeting was quite an eye-opener to many as far as electronics is concerned. While speaking of TV and TVI some of you may not know that KH6KH represents the Honolulu hams on the local TVI committee in addition to his duties as HARC president for '54. He can be of considerable assistance on those stubborn cases of TVI. Those making BPL in February are KG6FAA, KA3AC, KA7LJ, KA7RC, KH6FAA, and KA8AB. Late BPLers for January are KG6FAA and KA8AB. Traffic: (Feb.) KG6FAA 7011, KA7LJ 5538, KA3AC 3108, KA8AB 1849, KA7RC 1004, KH6FAA 925, KH6AJF 322. (Jan.) KG6FAA 5048, KA8AB 1408.

NEVADA — SCM, Ray T. Warner, W7JU — Nevada's most active station, NOW, who again made BPL with a traffic count of 1002, is being transferred. To say we will miss you is putting it mildly, Neil. After a year of week-end tests 6NLZ and JU clicked on 144 Mc. for the first Nevada-to-West-Coast QSO. SXD, who may be found on 7-Mc. c.w. almost every A.M. from 4 to 6 PST, has a new Viking II. TVF, of Las Vegas, is getting FB reports on his powerful little 10 watter and a short vertical whip. ISCH/7, of Stead AFB, is active with Heathkit gear. MVP is active on 20, 40, and 80 meters with 400 watts c.w. BVZ is experimenting with 6 meters from his ranch QTH in Paradise Valley. JUO is again interested in 2-meter work. BJY now is a neighbor of PGD, who is a neighbor of BVZ. This makes a total of seven hams on the same street in one city block. Traffic: W7NOW 1002, JU 16, MVP 5.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — More and more reports are coming in of hams in this area getting their license plates. Soon they will be commonplace and the fight to get them will be forgotten. However, fellows, please keep in mind that the law expires in 1956 and the fight will be on again. In fact, preparations already are underway for the coming battle to keep our plates permanently. HC is busy on the nets as well as at State but is NCS as often as possible. MMG reports all is quiet with no bad signals on the air. UKM now is mobiling on 144 Mc. WMM moved to La Honda and says 144-Mc. signals sound real good up there. ZXS and JKC are taking an early vacation. JIV is about ready to go on single sideband. WGO is busy on MTN. He also is PAM and working up a 144-Mc. get-together. K6BBD is busy on MTN and just received his 20-w.p.m. Code Proficiency certificate. YHM slowly is getting back into business on the nets, work permitting. AIT welcomes a set of call letter license plates. FON is busy on MTN and has received his call letter license plates. The Mountain View ARC had a talk by John Reinartz, K6BJ, on ham shack instumentation. The SCCARA had an enjoyable *meeting* at the Italian Hotel in San Jose. Thanks to INN, up San Mateo way, I am now receiving news notes. The new officers for 1954 are MKM, pres.; DCR, vice-pres.; EDC, secy.; AQR treas.; and INN, adv. council member. Regular meetings are held the 2nd Wed. of each month in San Mateo Fiesta Bldg. Traffic: W6YHM 71, FON 52, HC 19, WGO 17, AIT 8, K6BBD 7, W6MMG 6.

EAST BAY — SCM, Guy Black, W6RLB — Asst. SCMs: Harry Cameron, 6RVC, and Oliver Nelson, 6MXQ. SEC: WGM. RMs: IPW, JOH. PAM: LL. ECs: AKB, CAN, CX, DNX, FLT, NNS, QDE, and TCU. Having Bob Erler as our new PAM is the big news this month. In a manner of speaking Bob has been acting as PAM for years and we are just getting around to recognizing it. The other big news is that the ARRL Pacific Division Convention has been set for July 3–5 in San Jose. The SCCARA is asking all clubs in the area to help out. The East Bay Radio Club has been asked to put on a 2-meter hidden transmitter hunt, the SARO a 75-meter hunt, and the Oakland Radio Club the Wouff-Hong ceremony. The San Jose gang deserves our thanks for taking on the organizing job. CAN has been appointed as OES, and HBF is now OO, Class IV. It's the most important class! If you don't know why look up page 10 in the booklet, free to ARRL members, *Operating an Amateur Radio Station*. YSX now is living on the Peninsula. WGM still commutes from Vallejo to Oakland five times a week. OJB has been visiting the Bay Area. AAQ is putting out a swell dope sheet for the ORC and concentrating on RTY. IPW now is running a kw. to a 304TL. K6AQ is active in the subscription radio station, KPFA. K6AAK gave a bang-up talk to the Napa Radio Club on antenna networks. He has gone to the Philippines for a while. NDR is active on 144 and 220 Mc. up in Napa. NZ has his antenna farm working again with the help of EFD. K6BDF has taken over the "G" spot on TCC from HOR, with IPW to help out. Did you know that the East Bay section covers the five counties of Contra Costa, Alameda, Napa, Solano, and Lake, and that there are 1550 amateurs in that area? Traffic: K6FDG 1481, WAY 471, BDF 255, W6IPW 195, JOH 104, K6DMI 13, W6QPY 11, CAN 3.

(*Continued on page 102*)

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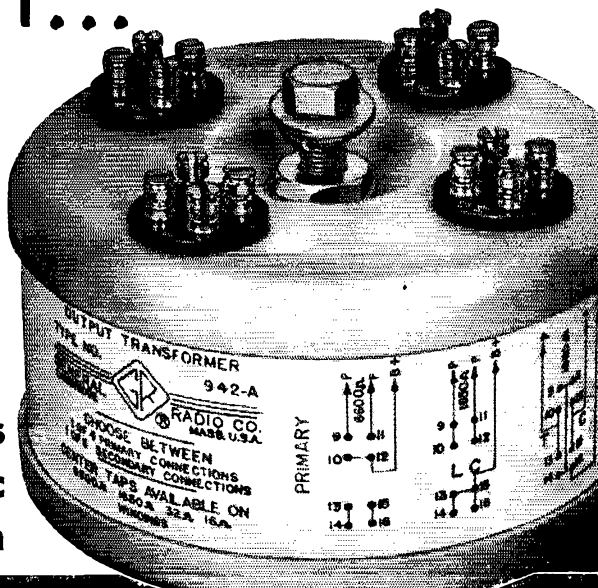

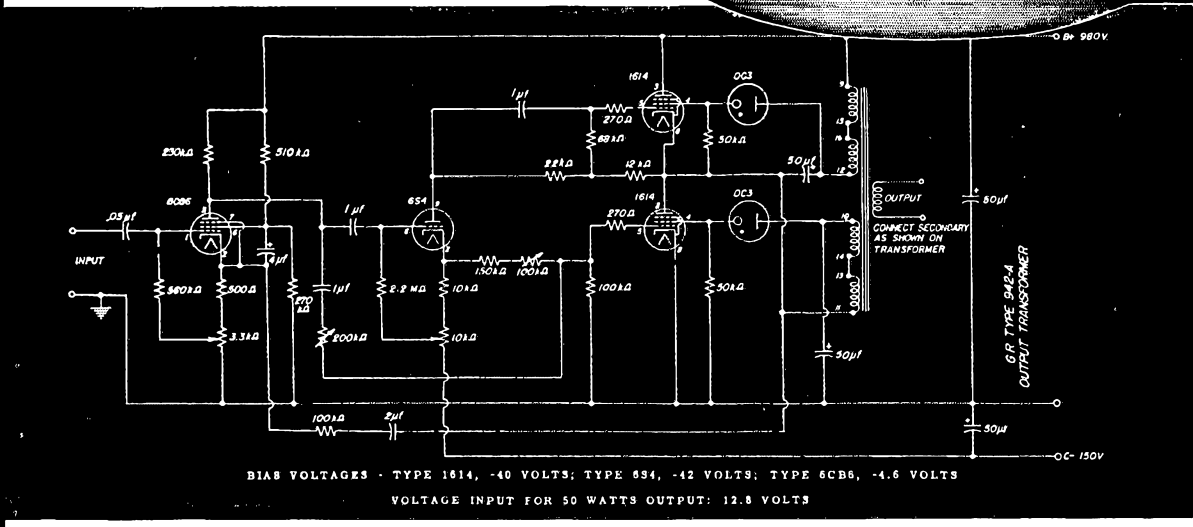

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SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — The following are the official stations appointed by the SCM of the San Francisco section: Official Observers — GQA, WB, RBQ. Official Relay Stations — CXO, GQY, BIP, CWR, FYJ, RBQ, NL, PHT, and GCV. Official 'Phone Stations — CXO, CBE, and QMO. Official Bulletin Stations — CXO and MWF. 'Phone Activities Manager — KZF. Section Emergency Coördinator — NL. Emergency Coördinators — BYS, KNZ, ZUR, LOU, and SLX. Official Experimental Stations — NAC, GQK, and JAA. Others interested in joining the official stations in this area, kindly contact GGC for further information. Stations are needed in all divisions, especially OBS in the northern part of the section. The SFRC meets the 4th Fri. at 51 Lakeshore Plaza. AHH took over the meeting as GGC was at Wasco with the Mission Trail gang. DMN, from the Jennings Radio Mfg. Co., spoke on single sidebands and the boys kept him busy answering questions. The boys are all ready for Field Day. The HAMS decided to sojourn to Vallejo for its next meeting and visit the local club. All machines will be equipped with 2-meter rigs. OTW reported that the SCRA will elect new officers at its next meeting at Sonoma County Court House. The SFNYC met at the shipyard and is preparing a mobile rig which it is hoped can be used on Field Day at some remote point in California away from San Francisco. No news this month from Humboldt. OZC's QTH still is the meeting place for the Tamalpais Radio Club. The SFYL Club now has 19 YLs. Several already have been successful in getting WN calls. The CCRC Calendar is acclaimed a huge success by all. The 29ers joined the AREC and is in the Warden Service with 26 members and 18 mobiles on 10 meters. There was a large turnout at the dinner held at the Parkside Club in February by the 29ers. NL, BYS, and ZLQ attended and talked on EC. The new OBS, MWF at Mill Valley, is on 75-meter 'phone transmitting Official Bulletins. He has a half gallon modulated with a pair of 811s. KFS cannot work out of the house on 420 Mc. so perhaps he'll try for General Class now. KN6CUT was stopped by the local police because the whip on the OM's car was a little over the 13.6 limit. GCV now is on with a kw. on 20 meters and the KAs are keeping the patch hot. YIK is cruising the Caribbean, courtesy of Uncle Sam. BMY has 4 watts on s.s.b. HRS is sporting a new mobile. FSL joined the SFRC and made the HAMS 100 per cent SFRC membership. QMO now has a certificate in the ham shack which she won by being first in the YLRL Contest for the 6th call district. W6GCW worked W4GCW. How many of you have worked your call in other districts? Send it in to the SCM. Now is the time to check on the mobile rig as Field Day soon will be here. GQA sent out 27 pink slips with just one Novice call on them; 18 were out-of-band citations. CTH is now vice-president of Television East Bay which expects to go on the air with color sometime in September. Traffic: W6SWP 704, PHT 299, GQY 216, K6NCG 99, W6QMO 96, GCV 39, GGC 6, GQA 6.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — Well, fellows, we had a very fine meeting in Redding and discussed future possible division of the Sacramento Valley section. Ray Cornell, Pacific Division Director, was present and gave his version as to a split. It seems that the members of the northern part of the section are not too many. Ray suggests that we attempt to get a larger membership before trying for a section in the northern part of the Sacramento Valley. Now, fellows, let's get out and increase our membership to build up that northern part. TMP is acting as Assistant SCM for the area around Red Bluff as it is difficult for the SCM to be at all meetings. We also have Assistant SCMs in Sacramento, Chico, and Red Bluff so, fellows, now is the time to increase our membership for the good of all amateurs in this area. We have lost our SEC, who has moved out of the State. I am asking all clubs and members of ARRL in the Sacramento Valley section to recommend a new SEC. Pictures taken at Redding will be sent to *QST*. The Redding meeting started with a model airplane flight, controlled by radio. The first to make BPL is IEO. REF is a new ORS in Sacramento. From the Yuba City Area we learn that a new club has been formed in the Yuba City-Marysville Area. At the meeting the following (and prospective amateurs) were there: FCP, KDJ, JOJ, GUX, CLS, TEE, DMA, IU, FRB, K6AAW, WTP, WCW, YSC, K6DEO, KN6BDJ, and EKP. Members are acquiring 2-meter gear and forming an emergency net. TYC reports that the MAN Net on 7025 kc. needs more traffic, so help out that cause. ZNU, who is our deaf mute, is going in for RTTY which should be quite practical for him. JRY is busy assembling a Viking II. ICO won the raffle prize at the Shasta County Radio Club meeting. BIL, now Official Observer, still is out after the hard-to-get DX. Let's have those appointment requests with a lot of news. Traffic: W6IEO 509, REF 59, JDN 54, K6NAK 23, W6ILZ 2, TYC 2.

SAN JOAQUIN VALLEY — SCM, Edward L. Bewley, W6GIW — SEC: KRO, RM: OPU. FKL has been appointed Asst. Director for the Fresno Area by JZ, Pacific Division Director. MGN, DVL, DUD, WYT, WJS, ZYR, AGO, DNM, and FEA donated blood for BNP, who is in the Vet's Hospital at Fresno and doing OK. JPU is on

(*Continued on page 104*)

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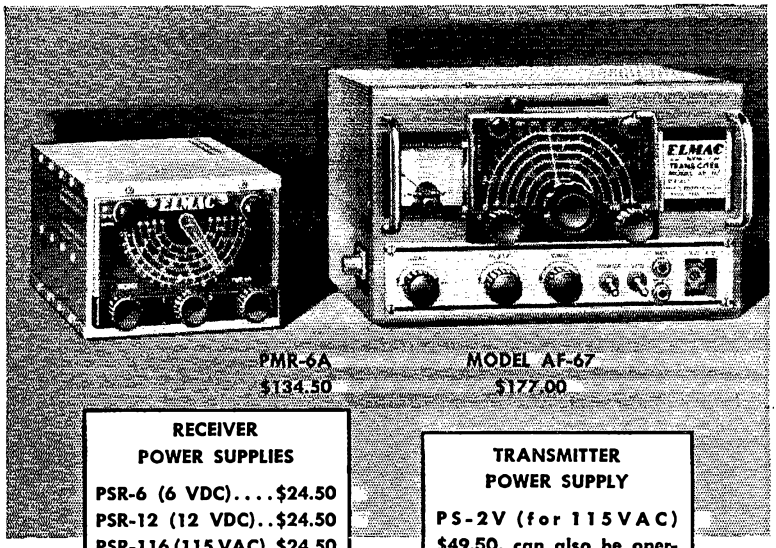

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  (1) BC & 160 (2) 80 & 75
  (3) 40 (4) 20 (5) 15 (6) 10
- HIGH SENSITIVITY & SELECTIVITY
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TRANS-CITER

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- AM-NBFM-CW
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- 6 OR 12 VOLT OPERATION

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the air with RTTY. ONK is getting good results with a home-brewed 2-meter beam. AHO is back home. JPU and GEG are putting up 60-foot verticals. PPO is off the sick list and back on the job, operating /6 from Oakland. The Turlock Club was visited by ZF, Asst. Director from Sacramento. Ex-FYM is in San Bruno, and operating 9YSR/6. WJF was stopped for having illegal license plates, and cleared himself by quoting California Vehicle Code, page 72, section 170. ZRJ and K6BGM have their pair of 814s on the air. OWQ is on 2 meters, also has 700 watts on 75, 40, 20, 15, and 10 meters. EBS and PWE are experimenting on 220 Mc. and looking for Valley contacts. HQY is conducting code classes in his home. EXH is using VFO on 2 meters. NNG and ANE, ex-Novices, now are General Class. NBQ was NCS during February for SCEN. VPV is heard on s.s.b. KIG has an HT-20. AV became a Silent Key. Traffic: K6FAE 683, W6OPU 51, FEA 27, EBL 23, WJF 16, TXM 10, GIW 3, OWQ 3.

ROANOKE DIVISION

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — YOS has completed an all-band-switching transmitter. TTG reports that a new club has been organized in Aiken with ZVY, pres.; AIB, secy.-treas.; STH, pub. dir.; and NQP, act. dir. The Aiken Club meets monthly on the first Wed. of each month in the Aiken City Hall at 8 P.M. All amateurs in the vicinity of Aiken during meeting nights are invited to attend. TTG also reports that his antenna is back up after being blown down by strong winds and that he hopes to have his mobile rig on the air soon. Virginia Tollison reports that new officers of the Greenville Club are FNS, pres.; VIW, vice-pres.; TCX, secy.; VUU, treas.; KED, act. mgr.; and NWG, asst. act. mgr. New mobile stations reporting into the South Carolina Mobile Roundup at 2 P.M. Sun. on 3930 kc. are 1AUD/4, 4UOQ, and MBR in Charleston, OGE in Batesburg, USW in Florence, and NZK in Columbia. The Columbia gang held a regular hamfest April 4th at Heises Pond near Columbia. Traffic: W4ANK 530, FFH 44, PDM 8, FM 2, YOS 2.

VIRGINIA — SCM, John Carl Morgan, W4KX — The harness of this SCM job will take getting used to, FF having set a pace that will take scrambling to follow. I know I'll have YOUR aid in keeping Virginia in its preëminent position. MWH, FF, and KX were on hand at Charter Night of the Central Valley ARC. Some 40 hams and their ladies enjoyed a tasty Skyline Drive feed. Wel-

(*Continued on page 106*)

FIFTH ANNUAL VIRGINIA QSO PARTY MAY 9TH

A QSO party, open to all Virginia hams, will be held between the hours of 1:00 P.M. and 9:00 P.M. EST, Sunday, May 9, 1954. Every licensed amateur in Virginia is urged to participate.

Bands: 3.5 Mc., 7 Mc., 28 Mc. No power limit, or mode restrictions in this get-together. Objective will be to contact as many fellow Virginians in as many different Virginia counties as possible during the eight-hour period, exchanging certain information with each station worked. Stations may be worked only once on each band (regardless of mode used) but they may be worked again on a different amateur band.

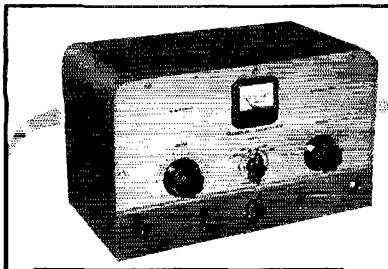
Contest call is "CQ Virginia" on 'phone, "CQ VA" on c.w.

Information to be exchanged in each QSO is to consist of the following items: 1. Number of QSO (in the party). 2. Your call. 3. Your RS or RST report to station worked. 4. Your county. For example . . . W4KX might send the following message on his fifth QSO in the party: "NR 5 W4KX 569 FREDERICK."

SCORING: Each message sent counts 1 point and each one received, 1 point. Two points, therefore, are possible from each QSO. Multiply total number of QSO points by number of different Virginia counties contacted in course of party for final score.

The following frequencies are suggested as rallying points during this affair: vicinity 3680 kc. (VN/VSN freq.); vicinity 3705 kc. (VNN freq. — Let's not forget our Novices!); vicinity 3835 kc. (VFN freq.); 7050–7100 kc.; 7200–7250 kc.; 28,800–29,000 kc. (c.w. and 'phone). Mobiles can shine by showing up from counties with little or no ham population.

There will be prizes for winners. All Virginia hams, except SCM and members of the contest committee on awards, are eligible for awards. All logs should be mailed to SCM before June 1st. Send in your log whether you have one QSO or a dozen! Scores will be announced in the Virginia Net bulletin and the winners in *QST*.



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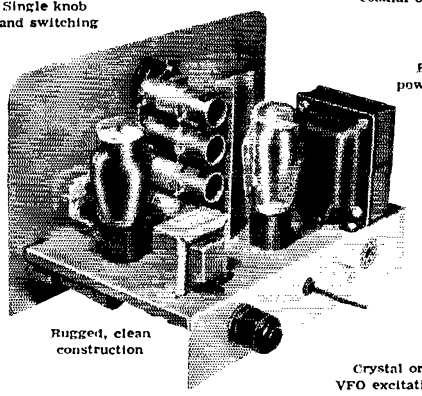
Range	80-40-20-15-11-10 meters
6AG7	Oscillator - Multiplier
6L6	Amplifier - Doubler
5U4G	Rectifier
105-125 volts AC 50/60 cycles 100 watts	
Size — 8⅛" high x 13⅛" wide x 7" deep	

MODEL AT-1

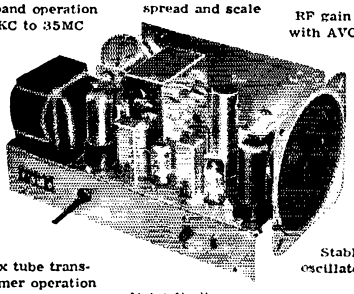
$29.50

SHIPPING WT. 16 LBS.

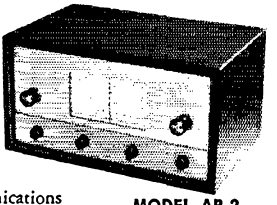
Here is the latest Heathkit addition to the Ham Radio field, the AT-1 Transmitter Kit incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, standby switch, key click filter, AC line filtering, good shielding, etc. VFO or crystal excitation-up to 35 watts input. Built-in power supply provides 425V @ 100MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis and detailed construction manual. (Crystal not supplied.)



New HEATHKIT COMMUNICATIONS RECEIVER KIT



Range	535KC to 35MC
12BE6	Mixer oscillator
12BA6	IF amplifier
12AV6	Detector - AVC - Audio
12BA6	BFO oscillator
12A6	Beam power output
5Y3GT	Rectifier
105-125 volts AC 50/60 cycles 45 watts	



A *new* Heathkit AR-2 Communications Receiver. The ideal companion piece for the AT-1 Transmitter. Electrical band spread 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.

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- ***Range — 2MC to 250MC***
- ***Meter sensitivity control***
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- ***Headphone monitoring jack***
- ***Transformer operated***

The invaluable instrument for all Hams. Numerous applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, etc. Receiver applications include measuring C, L, and Q of components, determining RF circuit resonant frequencies, etc. Thumbwheel drive for convenient one hand operation. All plug-in coils are wound and calibrated (rack included). Headphone panel jack further extends usefulness to operation as an oscillating detector.

MODEL GD-1A

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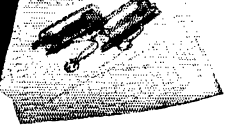

Two additional plug-in coils are available and provide continuous extension of low frequency coverage down to 355KC. Dial correlation curves included. Shipping Wt. 1 lb. Kit 341. **$3.00**

come home and to mufti to IA and jr. operator TFX after 20 months in Japan. Congrats to erstwhile confirmed batchelor ATQ, who's now UNconfirmed. YZC is the new RM and prime mover of the new "Teenager" net (Sun. 1400, 3680 kc.). KRR dug up a Form 1 card of the 1920s to report a new 64 jar slop rectifier and UV-203. Fred, incidentally, manages to be high traffic man, though he claims to spend 95 per cent DXing. YVG is a musician evenings, works days, and handles post-midnight and early-bird traffic. YVO moved to Kansas and QNIs VN and VSN as /Ø. MLE now is 3YKT in Pennsylvania. LW puts out an FB section bulletin. He says he's trying "Matchbox" with auto controls. OWV moved to a new wigwam in Harrisonburg; he sends a copy of his FB Virginia MARS Net bulletin. Skip cramping your style on 80 meters or higher? Try VON at 1900 Mon.–Fri. on 1820 kc. The Shenandoah Valley ARC sold the old club house and site and bought ground for a new club house and antenna farm. The SVARC also is planning the usual snack stand and message-handling booth during the Apple Blossom Festival. FZG is our old friend IPC. He's ex-3FZG. Your SCM has a sheaf of nice, crisp appointment certificates and we'd like to entertain YOUR application. Whether or not you're an appointee, we want your activities reports each month-end. Traffic: (Feb.) W4KRR 361, YZC 25, LW 11, BZE 8. (Jan.) W4KRR 281, YVG 30, YZC 21, LW 17, VMF 12, LJE 10, LK 3. (Dec.) W4RJW 76, CFV 39, YZC 26, OWV 15, ZFV 8, TYC 6, WBC 3.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — 4ZMZ/8 did a very good job in demonstrating amateur radio and handling traffic at the Charleston Boy Scout Exposition. He will have a Viking II on 40, 20, and 10 meters soon. QHG and SFT have new 10-meter pack transceivers completed which reflect a very good job of design and construction. These units are ideal for emergency use. Interested hams may contact either for details, etc. PZT is QRL constructing a new frequency standard for OO work. BNL is on 40 and 75 meters using an ATD transmitter and is doing a good job. He now is an MARS member. ISB did very well on 'phone in the last CD Party. MBA is QRL with school activities. 6RQQ desires 7-Mc. QSO to complete WAS. NLT is new OBS and has mobile rig nearly completed. GEP is an active MARS member. HI is on 6 meters and desires contacts on this band. Make arrangements for schedules with him on 75 meters. FGL paid a visit to ETF and PQQ to discuss 'phone net operations. It is hoped that as many West Virginia hams as possible will take an active part in the West Virginia QSO Party to be held soon. Watch for announcement of this in *QST*. Traffic: W8AUJ 361, KWL 203, HZA 183, ETF 82, W4ZMZ/8 70, W8GEP 54, GHG 24, MBA 22, PQQ 16, BNL 12, ISB 9, UDJ 2.

ROCKY MOUNTAIN DIVISION

(*Also see page 108*)

SECOND ANNUAL ROCKY MOUNTAIN DIVISION QSO PARTY

All amateurs in the Rocky Mountain Division and surrounding states are cordially invited to take part in the Second Annual QSO Party to make and renew acquaintances and to publicize the Division convention to be held at Elkhorn Lodge, Estes Park, Colorado, June 12 and 13, 1954.

Rules: 1. *Time and dates:* Begins 0800 MST May 8th; ends 2300 MST, May 9th, 1954. 2. *Where:* All bands. Suggested gathering places: C.w. 3690–3710, 7170–7180 kc.; 'Phone, 3880–3900, 7240–7260 kc. Use other bands, too. 3. *General call:* C.w., "CQ RMD"; 'Phone, "CQ Rocky Mountain Division." 4. *Contacts Permitted:* You may work for credit the same station once on each amateur band, i.e. one contact credit will be given for a QSO anywhere in the band 3500–4000 kc., either 'phone or c.w., and one contact credit for QSO in the band 7000–7300, etc. No cross-band QSOs will be counted. 5. *Exchange:* Each party to a contact will give his name, location and whether registered at the convention ("yes," if registered, "no," if not). 6. *Scoring:* Score 1 point for complete information sent and 1 point for complete information received, a total of 2 points for each complete contact. 7. *Reports:* Logs must show time, date of QSO, call of station worked and information received. Total your score, give your name, location and whether registered at convention, and mail to your SCM (see page 6 of this *QST* for address) postmarked not later than May 16, 1954. 8. *Prizes:* First, free de luxe treatment at convention for one person, registration, meals and room with bath; second, free registration and meals for one person; third, free registration for one person.

Send your convention registrations to W. M. Reed, WØWRO, 1355 East Amherst Circle, Denver 10, Colorado.

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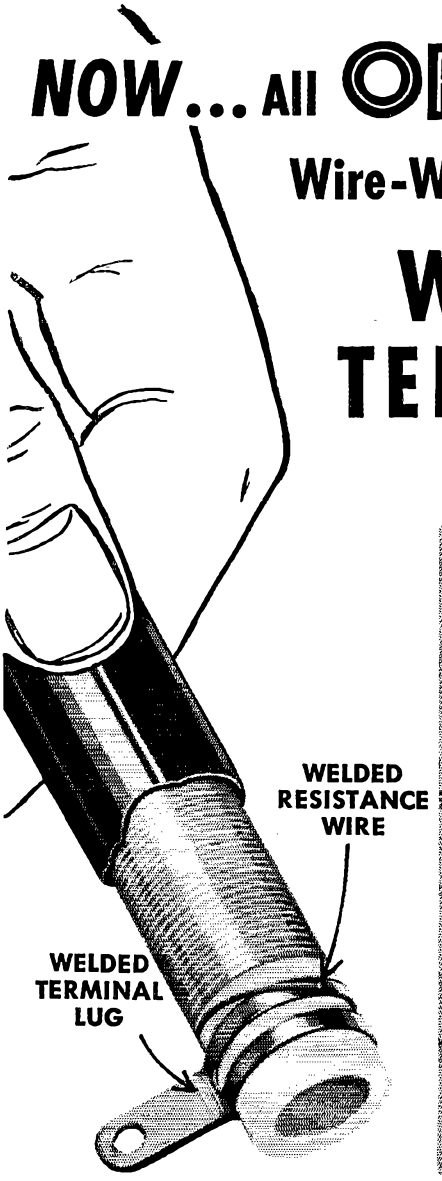

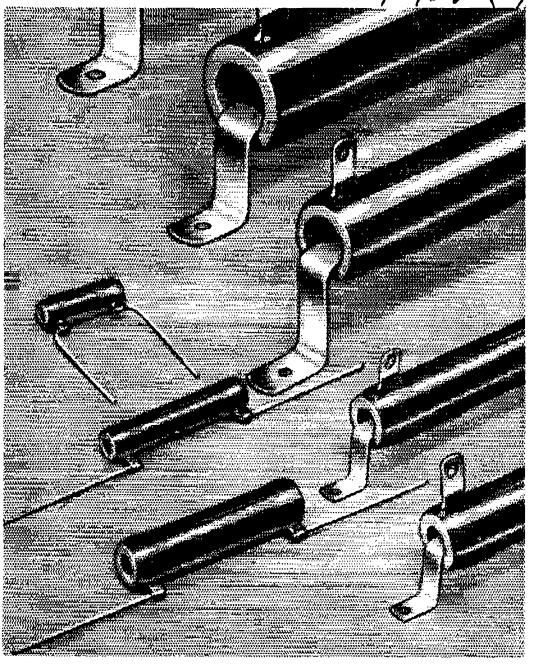

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COLORADO — SCM, Karl Brueggeman, WØCDX — SEC: AEE. The January meeting of the Northern Colorado Amateur Radio Club was attended by BSA, DRA, DBG, NNL, ULZ, MPK, and others. DRA showed a Colorado State Patrol safety film and DBG demonstrated some 220-Mc. equipment he has been building. BSA has built a direction-finding loop and, assisted by DBG and DRA, conducted a field test using mobile equipment mounted in their cars. There are now five mobile units in Greeley. At the February meeting the CARC members discussed possible affiliation with the club by hams from surrounding towns. The Alamosa gang really has been going to town. Thirteen took exams for licenses and all passed, 10 for Novice and 3 for General Class. WNØOVX is teaching theory and KQD code. VQY now has his new 900-watt rig on the air with p.p. 813s. 1UF received his General Class ticket Feb. 5th. 1UF, OHB, and WNØOXR are the new Asst. ECs for Alamosa and KQD is the new EC. KHQ, RTA, and SDW/Ø made BPL in February. EKQ reports a slow traffic month because of lack of operating time. KHQ's antenna blew down during the big dust storm. IC now is holding his Director/Vice-director get-together Sun. at 0800 MST on 3890 kc. just before the CEEN Net meeting. The Denver Radio Club gang is hard at work on the details for the convention this summer and promises the best one yet, so get your reservations in early. Also, remember the QSO party. We are getting more YLs in the ranks every day. We'll see if we can't gather all their calls together and have a little YL section next month in this column. Traffic: WØKHQ 1058, SDW/Ø 775, RTA 137, EKQ 114.

UTAH — SCM, Floyd L. Hinshaw, W7UTM — A group of amateurs at Davis High School and vicinity are making Field Day plans. The group includes QDJ, QDM, VJJ, QVO, and WN7TFO. QDJ reports not much success in the DX Contest. JPN says the Salt Lake City c.d. filed RACES application in February and listed 57 amateurs signed up. JVA gets on the air for an occasional RC but work still keeps him too busy to hold skeds. UTX has returned to Michigan; our loss of a good traffic man is their gain! RCP/7 still is busy with school work but finds time to participate in transmitter hunts conducted by the USAC. Utah County has received its RACES license and conducts its c.d. tests using the call KOAA/6. 2-meter tests are now being run between SP and TCC to learn if coverage can be had over the rugged terrain. JPN renewed his OPS, OBS, and OO appointments. Traffic: W7UTX 48, UTM 22, JPN 12, SP 12.

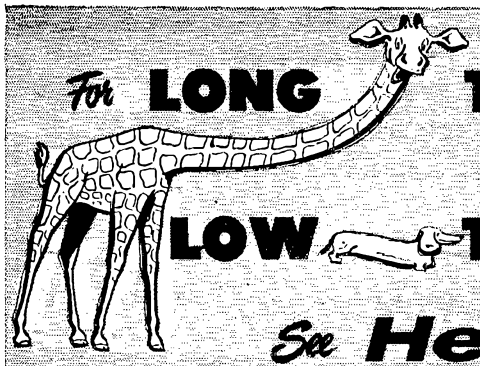
WYOMING — SCM, Wallace J. Ritter, W7PKX — HRM is out of the hospital now. LHW is in the hospital at Cheyenne. ROI left for Texas, RKB for Los Angeles. TMZ is in Shreveport installing NCO Academy there. TRD passed General Class exams. VJB and GPX are new calls in Cheyenne. HDS still is trying to start a Novice net. KUB is working on half-kw. s.s.b. rig. EUZ is active with 10-watt portable rig. The Casper Radio Club assisted in the March of Dimes with mobile pick-up of donations. The hobby show demonstration of amateur radio was accomplished in fine shape by the Casper Radio Club, with considerable traffic handled on both 'phone and c.w. DXV is active on RN7, RN10, MSN, and YO Nets. The Pony Express Net still is increasing in the number of active stations, with an average of 40 check-ins regularly. There is not enough traffic, however. How about some originations? Traffic: W7PKX 325, DXV 149, PAV 10.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: ISD. ZGE has a new operating desk. VOM has 2-meter fever, while EJZ is turning to DX. YAI meets AENP, CGCH, Dagwood Net, Southern Belle Net, and Dixie Traffic Net. The Mobile Club now has operators assigned to man the c.d. trailer. The trailer has air conditioning, sleeping quarters, refrigeration, and four operating positions. It is pulled by truck which mounts a gasoline-driven generator for power. WOG is active in AENB, AENP, TCPN, and Alabama Rag-Chewers Net. TXO handles most traffic on MARS nets and is working out on 160 meters along with AUP. BFM is whooping it up on AENB, AENP, Tennessee Net, and MARS. TKL reports that Huntsville weekly transmitter hunts offer no prizes but lots of fun. VIY now has a pair of 813s going and is pushing close to the gallon class. A new club is reported in Birmingham with WN4YEH, pres.; WLO, vice-pres.; ZSB, secy.; and YXS, treas. A one-hour code class is held each Thurs. at 1930. HCV is building a TV camera and collecting parts for a ham TV station. That makes three building in the State. Traffic: W4EJZ 84, RNX 80, YAI 66, DXB 48, WOG 48, TXO 34, BFM 21, WPC 19, EBD 18, PWS 18, OAO 14, TKL 12, PPK 11, VIY 5.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — Coöperate during Operation Okeechobee May 16th, the biggest simulated emergency test ever attempted. IM, our SEC, is putting out the information. The Tampa Fair traffic was handled magnificently by the Palmetto Net with assistance from 4RN, TLJ, VA, NYLI, EPA, Mich. and Ohio nets. The personalized originations by

(*Continued on page 110*)



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Collins 75A3 and speaker	$550.00	Hallicrafter SX71	$249.95
Hammarlund HQ140X (speaker $14.50)	$264.50	Hallicrafter HT-20 xmitter	$449.50
		Hallicrafter SX88	$595.00
Johnson Viking II (wired $337.00)	$279.50	Elmac PMR6A or PMR12A	$134.50
Johnson VFO (wired $59.75)	$ 42.75	Elmac AF-67 transciter	$177.00
Match Box	$ 49.85	Gonset Super-6 $52.50; Super-Ceiver	$119.50
National NC88	$119.95	Gonset Communicator II	$209.50
National NC125	$199.95	Morrow 5BRF	$ 67.95
National NC183D	$383.50	Morrow 5BR	$ 74.95
National HRO60	$533.50	Morrow FTR	$128.40
Hallicrafter S40B	$119.95		

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QBR are worthy of duplication by every ham. Write him. Deland: WS reports skeds on 145.8 Mc. Gainesville: TJU reports a total of 348 handled by the Tropical 'Phone Net. Doug also is operating RTTY at DFU. EHU, EAS, and SDN also are RTTY. TJU offers information to any requesting. Hi-fi is the leading subject at Fla. U. Holly Hill: AYD reports 21 Mc. good and a 10-meter opening Feb. 21st. Jacksonville: ZJ is running the JARS code classes with good results. TRN arranged for visiting hams coming in at the State line to get information on Jacksonville hams. The local AREC drills on 29 Mc. are excellent. UHY is EC. ZGR has full power on 20/75 for good DX. Key West: 3VLQ now is 4DRT and an OBS. 3YHO/4 is a new EC. QPZ is mobile with a Viking, ZBF is mobile with a Gonset. The Club runs code classes. Lakeland: New club officers are SVB, VIE, WN4BGF, and BJI. Leesburg: QBR reports Kiwanis Clubs in Leesburg, Eustis, Howey in the Hills, and Sanford exchanged greetings via FE, YBZ, OVO, QBR, and AWY. Miami: MVR, one of the best ECs anywhere, had to give it up. IYT is Acting EC. RID won the last Flamingo Net hidden transmitter hunt. Ocala: DVR (NCS of the c.w. net) has a new Modulator with clipper filter. Okeechobee: PZT is modulating 813s per *QST* dope. Sarasota: LMJ reports the Florida 'Phone Net handled 542. Tampa: TYE now is working 5 or more nets. Traffic: (Feb.) W4LDM 2923, PJU 2027, DVR 1161, KZT 696, BMY 618, OZC 600, FWZ 418, IYT 314, PZT 301, TYE 269, WJC 257, WEO 229, LVV 158, LMT 109, WS 84, QBR 36, KJ 25, TJU 17, TWR 14, FKR 10, AYD 8, VIE 8, ZUS 4. (Jan.) W4LVV 6.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — Acting SEC: NN. W4UXW/VO6 still wants QSOs with the gang. ZUN is working 75-meter 'phone after getting General Class license. ZPN removed the "N" from his call. VFJ is working 75 meters also. DEF/DAO is going mobile. PQW has a new shack. PTK works the mobile gear on 75 meters. PAA removed the low-pass filter and cured TVI. Hi. BFD keeps his hand in on 7 Mc. VR does likewise. UYS works 144 Mc. HJA has new Elmac gear in his car. MS is in the home stretch with his TV transmitter. YRF and his brother are building high power. GRO is DX man on 75 meters. CCY built a new 20-meter beam and is hot after DX. QU keeps the rig dusted off with USNR skeds. JPD is gathering mobile parts again. NOX keeps Pensacola represented with traffic handling. NJB renewed ticket. 1REV/4 keeps skeds with New England. WN4BGG has been gathering parts for an 813 final for when he gets that General Class ticket. ZFL has been getting out FB with low power on 20-meter 'phone.

GEORGIA — SCM, James P. Born, jr., W4ZD — SEC: NS. PAM: LXE. RM: MTS. Nets: GCEN, 3995 kc. at 1800 EST on Tue. and Thurs., 0830 EST on Sun.; ATLCW, 7150 kc. at 2100 EST Sun. State mobile and c.d. frequencies: 3995 and 29,700 kc. We are all saddened to learn of the death of HBG. The Atlanta Radio Club's Hamfest and Southeastern Division Convention will be held June 6th at Robinson's Tropical Garden on Paces Ferry Road on the banks of the Chattahoochee River. ZL2RC was guest speaker at the March meeting of the Atlanta Radio Club. Ron made a very interesting speech and showed color films and slides of hams and ham equipment, also points of interest in New Zealand. Ron was elected honorary member of the Atlanta Radio Club and was presented a certificate. LRR has moved to Columbus. WSZ is NCS for the Southeastern Teen-Age Net, which meets on 3880 kc. at 0930 EST on Sat. and 1400 EST on Sun. DYR is a new ham at Temple. It is with a feeling of sadness that I file this, my last report as SCM. The last four years have been very pleasant ones, indeed, and it is with deepest appreciation that thanks go to all who have made these years so enjoyable and profitable. To my successor my wishes go for a most successful administration, and the fullest coöperation will be given him in all ways. Traffic: K4WAR 1384 W4USA 1097, IMQ 422, ZD 73, MA 66, WSZ 38, FOE 37, OCG 34, MTS 23, YMV 15, ZSC 2.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: HZ. KD worked VP9BDA for country No. 12 on 160-meter c.w. BU, using Viking II and HRO-60, schedules son WP4WX at engineering school, who uses 32RA and HRO. DJ is working VK and ZL on 80 meters at daybreak. QM, in Mayaguez, has a good 75-meter 'phone signal in San Juan using p.p. 6L6s. MV reported to his XYL daily via ham radio while visiting hams around the Island. IY is putting up 20-meter ground plane. VP3YG QSOed DJ, KD, RC, UW, DV, and CB on the AREC 3559-kc. Net. AREC Nets meet on 3559 kc. Mon at 2400 GMT, 3925 kc. Wed. at 2400 GMT. NY repaired the Signal Shifter. WR reports to the 3925-kc. Net from Aguadilla using Viking II and SX-71. HM blew 500-watt plate transformer but continues on 3925 kc. with TBS-50. PQ advises QRX for Ponce traffic at 12:30 P.M. and 6 P.M. daily on 3925 kc. ID and TZ handled Florida State Fair traffic from KG4AJ. Ex-OX3BFX, ex-HH3DM, now is W9EMN/KP4. WP4WF reports from the U. of Miami that he will be on 3735 kc. with an ARC5 looking for KP4 contacts. The Polytechnic Institute in San German recently organized the Polytechnic Amateur Radio Club. JM is organizing a DX-pedition to a small French West Indies Island on which there has never been a ham set. Traffic: KP4DV 4, ID 4, TZ 4.

(*Continued on page 112*)

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25 mmfd.....25c ea.—5 for $1.00
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RG 59/U 6c ft.	per 100'	4.00
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Kilowatt twin lead, clear poly insulated. 12 ga. cond. 9c ft.	100'	5.00

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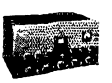

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SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Howard C. Bellman, W6YVJ — SEC: QJW. Asst. SCM: William C. Cue, 6KWQ. RM for LSN: BHG, RM-at-large: GJP. PAM: PIB. Plans are under way for the April meeting of the Traffic Breakfast and for the June Home Show at the Pan-Pacific in which radio amateurs have been invited to take part. The Crescenta Valley RC meetings, held once a month at the La Canada Elementary School Cafetorium, provide a special event each time. Anyone interested in ham radio is invited to attend. KLR reports in and requests OO information. He runs a kw. final at 600 watts on 75, 40, and 20 meters, is the NCS for MTN, checks in ESN Sun., and is an EC. K6BWD has a new QTH, Ruby, WRT, reports Ronnie Eastman is KN6DRZ, 12 years old and the son of Lee, AWI, and Gladys, DXI. Two new YL operators are KN6BBM, Verdena of Wilmington, and KN6DPX, Shirley of Alhambra. Verdena's OM is WGA and Shirley's OM is POP. K6EA is back from the northern wilds and ready for some "hot" LSN traffic. BHG has it via QIW that the SBN members have been asked to check in LSN. USY sent in a couple of pictures of his XYL on a telephone pole making sure it is OK for the OM to install a 20-meter rotary. QGT, newly-appointed EC, says a total of 57 operated every Mon. night in February on 2 and 10 meters. Asst. ECs are RSV, AMU, IYA, DPJ, and SSB. K6DQE, secy.-treas. of Aerojet Radio Amateurs Club, K6CLZ, reports the new men in office are PQH, pres.; ZDI, vice-pres.; K6DQE, secy.-treas.; and ZXH, act. mgr. A TVI committee was formed. The club boasts 14 members with some members awaiting tickets and the rest include the officers and SDU, RYC, MCK, MOJ, WYF, CHZ, and JHZ. The AM c.w. team in the DX Test, with ADP, BXL, GFE, and JID, totaled 104,000 points. MBW, TRF, and USY received BRAT awards for the month of February. PMO, the Associated Radio Amateurs of Long Beach, tops the front of the *Ham Oscillator*, the club paper. The paper tells of a timely legal talk by EUV on telephone patches and mobile operating versus driving. QJW reports very few mistakes being made by license-plate people. 9AMF/6 is back with the West Valley group after 6 months in the East. BAY has a new jr. operator, Tim. NTN, Pasadena EC, and OBS, is "tickled" by receiving long-distance telephone calls and letters from code practice people on sending his 2200 PST, 3700 kc. 10 w.p.m. Official Bulletin transmissions. K6FA is ex-W9LS, ex-WØLS. YSK reminds us that the San Fernando Valley RC meets the 1st and 3rd Fri. at 8:00 P.M., at 12611 Vanowen St., North Hollywood. Traffic: (Feb.) W6LYG 753. MBW 253, FMG 189, JQB 184. BHG 175. KLR 173, K6BWD/6 115, W6CMN 75. USY 70, PZN 60. WPF 45, ISQ 43, TRF 42, HIF 27, NTN 25, NIE 18, KYV 11, AM 8. (Jan.) W6MBW 128, K6BWD 74, W6WPF 63, KLR 18, CMN 15. (Dec.) W6MBW 224

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH; Dr. John A. Stewart, 7SX. SEC: OIF. PAM: KOY. Arizona 'Phone Net: Tue. and Thurs. 7 P.M. 3865 kc. Arizona C.W. Net: Tue. and Thurs. 8 P.M. 3515 kc. Arizona Novice Net: Tue. and Thurs. 6 P.M. 3704 kc. NOTICE: The Montezuma Well Hamfest will be held May 22nd and 23rd. All hams and their families are urged to attend. Watch for announcements on Arizona 'Phone Net and by IRX, OBS for Arizona, at 6:40 P.M. on 'Phone Net nights. A new club has been formed in Tucson, the Hughes Amateur Radio Club, with 20 charter members and TFQ as president. The OPRC had a bang-up TV demonstration by Red Robertson of Packard Bell Co. at its February meeting. NYT is mobile on all bands with a new Elmac and Vaaro Coil. NRM is on 40-meter c.w. with a new rig. Col. Cook, formerly 5OIZ of White Sands, N.M., now is 7HT at Fort Huachuca. RFE moved to San Manuel. 5BDB moved to Tucson. 9OGX moved to Phoenix. LBN moved to Tempe. NYN now is 75-meter 'phone. New General Class licenses: UBT, UNL. LZL has a new Viking. Please send in station activities reports and new calls issued within the State. Appointments for OBS and OO are open. Write your SCM for details. Traffic: W7QFQ 292, KOY 149, LVR 104, LAD 102, IRX 16, K7NRZ 7.

SAN DIEGO — SCM, Don Stansifer, W6LRU — Asst. SCMs: Tom Wells, 6EWU; Shelley Trotter, 6BAM; Dick Huddleston, 6DLN. SEC: VFT. ECs: K6DY, W6DEY, DLN, FJH, HFQ, HRI, IBS, KSI, KUU, QJH, WYA. KN6DVF and DVC are new Novices in the Dana Junior High Radio Club in San Diego. CRT, CHV, JMB, KJR, MCY, LRU, and K6EC were active on c.w. in the DX Test. IBS is new EC for the 2-meter AREC Net. KSI is EC for the South Bay unincorporated area. The Escondido High Radio Club has 6 new Novices, KN6DKR, DKS, DKT, DKU, and DPE. PYU has a new kw. on 75-meter 'phone. GDG has a 7-wave-length rhombic on 75 meters aimed at Japan. HMF has a new rig on 7 Mc. UGM is a new OBS in Imperial County and his schedule is Tue. at 2000 on 3840 kc. and at 2030 on 3640 kc. The San Diego gang misses ORD, who has been transferred. JMD is active on 20- and 40-meter c.w. with a new 200-watt rig. LRU got his tri-10-over-15 and 20-meter beams up in time for the contest with an assist from OAJ and CGQ. A successful joint Red Cross-AREC simulated emergency drill was held to test the AREC coördination. WNN has a potent 75-meter 'phone rig in his

(Continued on page 114)

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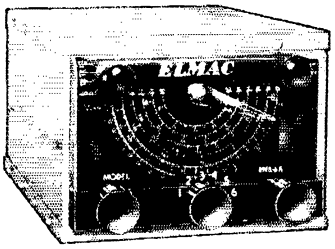

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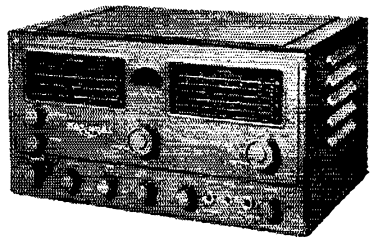

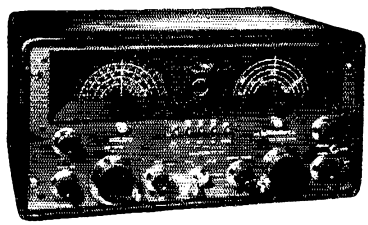

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car. A Viking II with VFO has been installed at Red Cross Headquarters by the AREC with receivers and associated equipment, giving the AREC a central location, with emergency power and all-band coverage. Thanks to the many who made this project a success. The AREC welcomes the 2-meter group into its organization, making three active nets, 2, 10, and 75 meters. WLQ is active again on 20-meter c.w. after moving. BLZ is experimenting with s.s.b. and is getting on 2 meters. The San Diego DX Club again is active, and is currently meeting each month at a member's home. Discussions are held regarding DX conditions, QSLs, and the like. Traffic: W6IAB 2397, ELQ 865, IZG 606, QJH 540, BKZ 38, FCT 14, ORD 1.

SANTA BARBARA — SCM, Vincent J. Haggerty, W6IOX — FYW reports considerable 2-meter activity in the northern part of the section. YCF was a visitor at the February meeting of the Santa Barbara Amateur Radio Club. BCX was guest speaker at the February meeting of the SBARC and demonstrated new communications gear in addition to giving his audience a scoop on a "hot" antenna for 7 Mc. NCT was first to obtain auto call plates in Santa Barbara. Congratulations to KN6ATX on the development of *Key-Klix*, the monthly bulletin of SBARC. Traffic: K6NBI 79, W6YCF 33, FYW 4.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM. PAM: IWQ. RMs: PCN, QHI. RRM's report to the ECs should certainly encourage them to get in their Form 5s. SFA reports the North Texas Emergency Net had a "Hamboree," explaining that the word was a coinage for letting the Boy Scouts visit by radio on their net after their regular Sunday morning roll call. Publicity was good, too. The Dallas Amateur Radio Club station received QSLs from Argentina and from an SWL in Poland. The East Texas Amateur Radio Club reports new officers are WVH, pres.; AQC, vice-pres.; WIJ, secy.; and OIS, reëlected as treas. The annual ETARC Hamfest was announced for April 25th at Longview. PYO, KJB, LZV, RHC, WQZ, JQN, PGG, AFR, AFW, AFY, and WIJ participated in a March of Dimes Telethon over the Longview TV station. Thanks to WIJ for reporting. The South Plains Amateur Radio Club at Lubbock announces officers are AUJ, pres.; NGX, vice-pres.; and ZJP, secy.-treas. BVG, at Waco, wants to know why we do not have a DX contest for power under 100 watts. EGX is on active duty as chief radioman at the Naval Reserve Training Center at Abilene. New ECs are YXR at Waxachie and YJA at Electra. AWT reports from Fort Worth now. Traffic: (Feb.) W5PAK 159, UVC 130, UBW 115, VFP 74, VHF 65, KPB 62, GER 60, ASA 55, RRM 28, HBD 22, AHC 14, RDG 14, AWT 12, SFA 4, ROH 2. (Jan.) W5RRM 40, RDG 10.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: CKQ. RM: MQI, resigned. PAMs: SVR and ROZ. The Lawton-Ft. Sill Hamfest had amateurs from 27 cities. The Tulsa Amateur Radio Club has scheduled a picnic to beheld at Mohawk Park on June 6th. Further details may be obtained from any Tulsa amateur. The North Fork Amateur Radio Club will hold a hamfest at Quartz Mt. State Park June 12–13. Prizes amount to more than $500; preregistration is $1.50, late $2.00. PGN has struck OIL. 9VUF, ex-5MQK, is back in Guthrie. JBX, DXJ, and MQV are back on the air with new rigs. CKQ, our SEC, is off the air until the new 813 rig is completed. YJ, club station at A. & M., now is reactivated and the Club is working on the kw. rig. GVV, ex-SCM, now is State Director Army MARS. Interest and applications around the State are increasing rapidly. The Oklahoma City Caravan Club has changed frequency to the low portion of the 75-meter band. Tulsa and Comanche County ARECs are having good attendance at the Sunday P.M. roll call. WZV is new EC for Comanche County. MFX is new EC for Garfield County. Your new SCM still is a little confused but grateful for prompt traffic reports and news items. As you all know, a conscientious SCM like GVV is a very hard man to follow, so please bear with me. Traffic: W5ORH 175, SWJ 136, YZB 134, ROZ 62, RST 53, MRK 52, ADC 42, MFX 39, VEP 38, PML 35, KY 33, YQO 33, TNW 30, SVR 25, WSQ 24, GVV 17, MQI 16, GIQ 6, PNG 5, WTA 4.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — KSW is in Methodist Hospital in Houston and he has Doc's portable transmitter and receiver. Keith monitors 3855 kc. and works the mobiles. Congrats to the Marings on the birth of Keith jr. on Jan 15th. Keith is active in TSGRC and operates s.s.b. MN still makes BPL every month. The San Antonio gang is going strong. Bob Wilson hid a transmitter and LVE was the first to locate it, while HHO was second. The HARC had a hot-dog supper at Grand Prize Brewery recently and there was a large turnout. Eighteen new members were accepted into membership. ULN was presented with OO, OBS, ORS, and Asst. SEC certificates at a recent banquet of the Galveston County ARC in Galveston. There was a large turnout of swell fellows and JHW gave a program on the measurement of Q in antenna loading coils. FJF gave a talk on Ionic oscillators at a recent HARC meeting. BGR is active on 75-meter mobile. JRV still is active with code practice.

(*Continued on page 116*)

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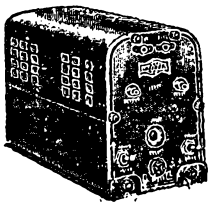

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New, compact equipment, VFO and simplified all-band operation gives you plenty of pleasurable QSO's — no matter where or when! Big station performance in a package that can be used in both the car AND in the shack!

Let me help you get the right equipment, and all the little things needed to complete a top performing installation!

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THE HARRISON ECONOMY PACKAGE

TRANSMITTER

Sonar MB-611 (see above)	$72.45

CONVERTER

Gonset 3-30. Covers 3 to 30 Megacycles.	$44.75

POWER SUPPLY

Sonar V-32 power supply 6 VDC.	$27.00

ANTENNA & MOUNT

For 10 meters	$7.92

ACCESSORIES

Gonset noise clipper	$9.25
E-V carbon mike	9.90
Mike plug to fit transmitter	1.17
Coax cable, 10 ft. RG-58-U	.80
2 coax connectors	1.92
10 ft. battery cable	1.80
Crystal, 7 mcs. range	2.95
10 METER PACKAGE TOTAL	$179.91

YOU SAVE ... $37.50

SPECIAL PACKAGE OFFER ! ----- **$142.41**

• (For 20 meters add ....$15.88)

THE HARRISON DELUXE PACKAGE

TRANSMITTER

Elmac AF-67, all bands, 10 thru 75 meters. Crystal or VFO	$177.00

RECEIVER

Elmac PMR6-A 10 tube dual conversion receiver with built-in noise limiter. Covers 10 thru 160 AND broadcast band	$134.50

POWER SUPPLIES

Special dynamotor power supply for transmitter (6 VDC)	$ 66.50
Elmac PSR-6 power supply for receiver (6 VDC)	24.50

ANTENNA & MOUNT

Webster "Band Spanner" with telescopic tuning top section	$ 29.50
Master Mobile 132-XSSC deluxe body mount with heavy duty stainless steel spring	14.95

ACCESORIES

Shure 505C reluctance mike with press-to-talk switch	$ 17.70
Mike plug to fit transmitter	1.17
Coax cable, 20 ft. RG-58-U	1.60
5 coax connectors	4.80
Coax relay for antenna switching	9.40
Battery cable, 20 ft. heavy duty	3.60

COMPLETE DELUXE PACKAGE **$485.22**

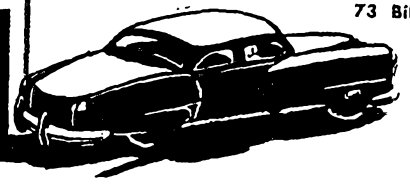
NOTHING BUT THE BEST!

BUY NOW -

• USE NOW - PAY LATER!

Easy terms to suit your budget! as little as 10% down, spread the rest over a full year. Order now—and tell me what terms you would like.

73 Bil



HARRISON RADIO CORP

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ULN is on 15 meters mostly. VUS is looking for 811s. WXJ needs Nevada, South Dakota, and Delaware for WAS. WN5BPF has worked 36 states and VE and XE on 40 meters. WN5BPH has been giving code lessons to his girl friend. YBL has a new VFO and a power supply for an 813. He plans to go on 20-meter c.w. He has worked WAS and TI3, OP4, KJ6, VE, XE, and CO on 80 meters. The STEN will hold its annual convention in Kerrville May 29th and 30th. QDX is chairman. Contact him for further details. QEM is in charge of prizes. FNH is registration chairman. VIU and DSH are in charge of entertainment. OWS is program chairman and Juanita, XYL of DXD, is in charge of the ladies' program. The Bayhare ARC is holding code and theory classes at the radar station in La Porte. For details contact GLS or UUK. URU has a new mobile and an FB antenna loading coil. Traffic: W5MN 1339.

NEW MEXICO — SCM, G. Merton Sayre, W5ZU — SEC: MYI. PAM: BIW. V.H.F. PAM: FPB. RM: NKG. On Feb. 21st amateurs assisted at the Ruidoso Sports Car Races by effecting liaison between flagmen posted around the track. Communications were highly successful with two networks using 3838 and 29,600 kc. in mobiles. The following attended: BAG, BFB, BFU, BIH, BIK, BIW, BRX, BXP, BZA, BZB, CGE, CHR, CXC, DRA, FVY, MVL, NEH, PCC, QIR, RFJ, RFK, SUO, TBP, TDB, WIY, WPA, WVA, YFN, YHP, YWG, and ZU. FPB has been in the hospital as the result of a car accident. ONK was Mort's roommate for a few days. AKR is operating from Sandia Crest on 7042 kc. We expect an antenna farm at RFF's since he acquired more land near home. N8J has completed the 832-A transmitter which he plans on making mobile. NSJ has worked FAG and WQS and now they are on each night at 8 on 431.6 Mc. A 4X150-A transmitter for 430 Mc. is the present task of NSJ. An active campaign was waged to get as many amateurs as possible to write FCC re the proposed fee for ham licenses. The New Mexico State Ham Picnic will be held near Silver City, probably June 5-6. For particulars, see *CQ NM* or listen to the Breakfast Club on 3838 kc. Traffic: K5FEF 627, WSP 86, W5HJF 29, K5FAB 22, W5BIH 18, BIW 15, LLG 15, WPA 14, BZA 11, ZU 10, ZUV 10, ZSL 9, RFJ 8, JZT 7, UAR 7, WBC 6, GEM 4, TBP 4, PSP 2.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — DQ resigned as SCM after putting in over 25 years continuous service, an all-time record for that post in ARRL history. The HARC presented Art and his XYL with an engraved silver tray at a recent get-together to honor him. We regret the passing of HI. A former SCM, he was one of the early pioneers in amateur radio and commercial broadcasting in Canada and was the founder of CFCY in Charlottetown. In his memory the hams of that City have formed the Keith Rogers Memorial Radio Club with the following officers: BZ, pres.; GR, vice-pres.; IA, secy.-treas. ZZ, EK, and RR were active in the DX Contest. Newcomers to 'phone are VB, ZR, and ADA. Recent additions to the Halifax Area are RN, GL, WX, and VX. Hams in the Saint John Area are getting the TV bug with the appearance of CHSJ-TV, the first TV station in VE1. Now that TV is here our rigs should be cleaned up and cured of spurious emissions. I refer you to the many articles on TVI suppression in *QST*, and Phil Rand's editions of "Television Interference." Don't forget to have appointment certificates endorsed when they become due. Traffic: VE1FQ 126, OC 65, QM 31, ZM 21, OM 5, DB 3.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — The forming of a v.h.f. club of Hamilton way is in the making. Those interested are invited to get in touch with EAB, secretary of the Mohawk Amateur Radio Society. AVS still is plugging away at improving the keying system. VD is completing a new rig. AOE now is break-in. VZ awaits improved weather conditions to get an outdoor antenna up. BSW is building an audio amplifier for discs. DHG edits the fine bulletin of the West Side Radio Club, Toronto. This Club meets on 2nd Fri. at Swansea Council Chambers and invites visitors. DLS, DRD, DPQ, DNE, DQX, NG, all members of the Forest Hills Amateur Radio Club, which is strictly for ragchewing, are heard nightly on 3735 kc. at 1900 EST. CAB is a new OES. The Gateway Amateur Radio Club of North Bay announces another bang-up hamfest will be held July 1-2-3. The February meeting of the Ottawa Club was one of general discussion on TVI, ragchewing, and interesting movies. To DU, of London, we extend sincere congratulations on being the holder of Official Relay Station continuously for twenty years. He is heard daily on OSN on 3535 kc. Appointees are reminded that annual endorsement is required on all certificates. Representing the Canadian Marconi Company, Mr. Harry Buchanan recently presented the Hamilton Amateur Radio Club, for the second year in succession, with the Field Day trophy for being top scorer in the Canadian Division. With regret we report the passing of two friends of ham radio, Jim Hurst, radio inspector for Northbay Area, and Colonel A. R. St. Louis, a guest speaker at the Ottawa Radio Club on various occasions. Traffic: VE3ATR 223, BUR 154, AJR 127, NG 87, NO 63, EAM 54, GI 42, DQX 27, CDG 25, IA 20, AOE 15, AUU 6, AVS 1, SG 1.

(*Continued on page 118*)

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C.U. on 10-20-40 & 75 Meters

Now it is easier than ever to buy from WRL. Pay as little as 10% down and the balance in 18 months. No red tape — we handle our own financing. We will give you a generous trade-in allowance on your present equipment. We have over 600 reconditioned used items — with new factory guarantee. Send for free list. You will profit most when you deal with WRL — THE WORLD'S MOST PERSONALIZED RADIO SUPPLY HOUSE and "LARGEST DISTRIBUTOR OF AMATEUR RADIO TRANSMITTING EQUIPMENT."

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Dear Leo:
I want to tell you how much I have enjoyed my Globe King ever since I purchased it. It has been on ten and seventy-five and reports on audio quality are all excellent.
You are to be congratulated on the excellent workmanship in constructing The Globe King. In my estimation, The Globe King Xmtr is tops on the Ham bands.
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GLOBE KING XMTR
TVI SCREENED CABINET NOW STANDARD EQUIPMENT
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$51.50 (Cash Down) ($495.00 Kit Form) ($515.00 Wired)

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HANDY WALL SIZE

COMPLETE
BAND SWITCHING
NEW MODEL 40A
GLOBE SCOUT

$8.95 PER MONTH (12 Months)
KIT FORM $89.95
WIRED $99.95
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LATEST TRIUMPH OF THE WRL ENGINEERING STAFF
Complete bandswitching 160 thru 10M transmitter with combination pi-network antenna tuner which will work into any antenna. Three-stage modulator allows 100% modulation of final. Has complete power supply. XMTR housed in new special grey TVI screened cabinet. Ideal XMTR for the novice or experienced ham.

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QUEBEC — SCM, Gordon A. Lynn, VE2GL — It is with deep regret that we record the sudden passing of VE2FP, ex-ACM, on Feb. 16th. The sympathy of the entire gang is extended to the bereaved. BR has been named Radio Officer of the Civil Defense Organization, Montreal Metropolitan Area. KS has returned to the air with 15 watts on 40 meters with indoor antenna. APP, KJ, ACM, AEM, and EC maintain twice-daily skeds on 80-meter c.w. AON is very active in the Quebec 'Phone Net. AIZ has returned from a four-month visit to Europe where he met several hams. CA reports conditions rather poor during the month, with a let-up in traffic handling. UM has been transferred to VO6-Land, where he hopes to be on the air. PQN continues to meet nightly, with DR, ATQ, BB, LM, GK, and LO being the most regular. Traffic: VE2DR 182, LM 40, EC 34, BB 22, CA 20, GL 17, LO 10, ATQ 5, GK 4.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — I am pleased to confirm my reëlection as your SCM and as in the past will continue to do all I can for amateur radio and ARRL. Please keep me advised of your activities by the seventh of each month so that these reports to *QST* may be interesting to all readers. YZ has a new receiver for 14 Mc. and will be hunting DX. YT and KA have Class "A" and are heard regularly on 3.8-Mc. 'phone. We are sorry to report EA's XYL has been confined to the hospital. A speedy recovery, Mary. HM and NX are keeping regular skeds with the Polar Net. MJ has his antenna up again after replacing all ropes. MD has taken up residence in Edmonton and should be heard real soon. DZ has a new antenna-tuning unit on the roof. Traffic: VE6HM 100, OD 16, MJ 5, YZ 3.

BRITISH COLUMBIA — SCM, Peter McIntyre, VE7JT — SEC: DH. Thanks to DH, FS, QC, and AV for sending in their reports. It is amazing how many have broken arms or the like when it comes to the end of the month or are just not interested enough to mail in an activity card. AV reports mobile activity on 75 and 2 meters and that local c.w. QRM keeps him from qualifying in the Frequency Measuring Tests. If the "W" boys can clear the W1AW frequency at the times the tests come on I wonder why the VE7s cannot do likewise. The BCARA had an "Open Forum" on March 3rd which was very well attended. 5GA/7 is going full blast from Sydney. Welcome to VE7-Land, Bill. From Nanaimo we hear that ALL and JI are going all out on 2 meters, ALY has left for parts uncivilized, AHH still likes the bug, and BF has "gone fishing" from ham radio. DH is just listening, SH's door frame antenna is working, directional by opening and closing the door. AQB is debugging the rig. US is on single sideband with a good-sounding signal but he is not satisfied with it. ACC now is on 75-meter 'phone. With new mail routing and mailman on our district I'm having trouble with my mail. Several letters have gone astray as well as cards, so if I owe anyone a letter bear with me. Maybe the other two McIntyres who live on the route will forward the stray mail to me. Traffic: VE7QC 34, DH 32, FS 2.

MANITOBA — SCM, Leonard E. Cuff, VE4LC — KG was a recent visitor to Winnipeg on a business convention. He reports putting up a new antenna for 20 meters. HL recently purchased an automobile and hopes to operate mobile this summer. ML and IF are building 20-meter beams. IB, with the help of DE, put up a new 75-meter antenna. DE soon will be back in VE7-Land. QI is busy building a single sideband rig and if the quality of the workmanship is any indication it should be the best in this district. ER also may be heard occasionally on s.s.b. MA has been working on a new broadcast station in VE6-Land but now is back in Winnipeg. EF is a new one heard on mobile. DJ recently was in Kingston, Ont., for a two-month course. DN has been transferred to Petawawa in the VE3 district. Good luck in your new QTH, OM. HT has retired from the money-making business of farming and now is an operator for the RCMP at Brandon. BL has been transferred to Fort Smith, N.W.T. in the VE8 district. We'll be looking for you from the Far North, OM. Traffic: VE4AZ 8, JM 6.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — Don't forget the hamfest to be held at Moose Jaw May 24th. The MJARC has a good program lined up and wants to see you there. If you cannot attend, get your membership and maybe win a television set. GX and GQ were visitors to Saskatoon. EO is working on his 'phone ticket. AT received his WAC certificate. LM and JO have new mobile rigs and put out nice signals. AE has a new signal too, a new son. Congratulations. Ex-4HR now is 5BC at Sutherland. JK says conditions on v.h.f. have been very poor. EH is rebuilding with a 6146 final. Traffic: VE5CI 25, DS 21, CW 13, RE 12, HR 10, LE 6, DH 5.

Strays

W6IUZ, on the air since 1930, has retired as assistant general manager of Eitel-McCullough (Eimac) after thirteen years of service.

HARVEY HAS THE MOST COMPLETE STOCK OF MOBILE GEAR

The New GONSET COMMUNICATOR II

Built-in Adjustable Squelch and Ear-Phone Jack

An improved model of the popular Communicator, 2-meter station. Cabinet modified to include ventilating screens. Ideal for CD work because of squelch and automatic speaker muting when phones are plugged in. Has receiver dial light, on/off switch and built-in speaker, noise limiter and 19" whip. Takes crystal or carbon mike. Crystal control.

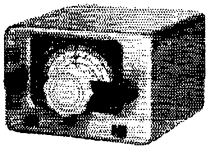
Complete with tubes (less crystal and mike)..... **$229.50**

New Mobile Receiver GONSET SUPER-CEIVER

Uses any converter as a tuning head. Employs crystal-controlled first IF and dual conversion to 265 kc. Adjustable-pitch BFO; AF, RF and AVC controls; built-in noise clipper and squelch; built-in PM speaker. Furnished with convertible (dual) 6-12 volt pack and tubes.

less converter **$119.50**

GONSET "SUPER 6" Six Band Amateur Converter



A compact converter covering 10, 11, 15, 20, 40, and 75 meter phone bands. Also covers 6 mc. (49 meter) and 15 mc. (19 meter) short wave broadcast bands. Uses 6CB6 low noise rf stage, with panel controlled antenna trimmer, 6AT6 triode mixer, 6C4 modified Clapp oscillator, and 6BH6 IF stage.

Complete with Tubes..... **$52.50**

MORROW CONVERTERS Series 5BR

These converters tune the 75, 40, 20, 15, and 10 meter bands. Available in 3 models as listed below.

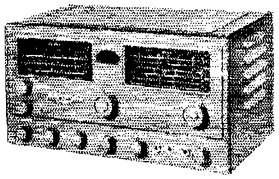
5BR-1 with built-in noise limiter... **$74.95**
5BRLN-1 less noise limiter..... **69.95**
5BRF designed for FTR receiver..... **67.95**

MORROW RECEIVER Model FTR

A fixed tuned receiver of excellent selectivity and stability. Features the new Morrow noise balanced squelch circuit.

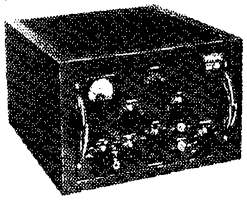
Complete with power supply..... **$128.40**

The NEW NATIONAL NC-98 RECEIVER



An outstanding, sensitive receiver of advanced circuitry. Covers from 550 kc to 40 mc. Special features include: Crystal Filter . . . 'S' Meter . . . Accessory Socket . . . Calibrated Electrical Bandspread on either Amateur or SWL Bands . . . 1 RF Stage . . . 2 IF Stages . . . Slide Rule Dials . . . Antenna Trimmer . . . Noise Limiter . . . Provision for Narrow Band Adapter . . . Separate HF oscillator.

Complete with Tubes and built-in Power Supply *(less speaker)*..... **$149.95**
Speaker in matching cabinet..... **11.00**



The New 1954

SONAR SRT-120 Mobile-Fixed Transmitter

Retains all the outstanding features of the earlier model SRT-120 plus the following new features:

• Improved RF Circuitry • Illuminated Meter • Heavier Gauge Steel Cabinet • New Antenna-Loading Circuit for Better Matching on All Bands • ⅛ inch Aluminum Front Panel • Perforated Cabinet Top for Improved Ventilation.

Complete Kit with Tubes..... **$159.50**
Factory Wired and Tested..... **198.50**
External VFO Head..... **19.95**

ELMAC Model AF-67 TRANS-CITER

A combination exciter, speech amplifier, VFO, driver, and low powered transmitter. Suitable for mobile or fixed-location operation. Covers 7 amateur bands: 160 through 10 meters. Single control bandswitches all stages simultaneously. Built-in VFO. Untuned crystal oscillator uses any crystal with fundamental or harmonic at desired frequency. Operates AM, NBFM, or CW. Has coaxial output connector with Universal Pi Matching network. Has provision for 40 watts of audio at 500 ohms. Meters grid and plate circuits. Can be used from 6 or 12 volt AC-DC source. For maximum flexibility, requires high voltage supply: 500 volts @ 170 ma, and 225 volts @ 60 ma. Input 60 watts.

Complete with tubes and 15-prong power connector **$177.00**

WEBSTER 'Band Spanner' ANTENNA

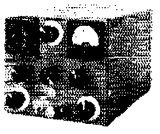
Operates on 75, 40, 20, 15, 11, and 10 meters without external taps, projections or coils. Band is changed by raising or lowering top whip to precalibrated setting. This adjusts inductor to exact antenna resonance required. Minimizes loading problems **$29.50**

MASTER Mobile Antenna and Coils

Operates as 10 meter antenna when used without coils. When used with coils permits operation on all bands. Two sections come apart easily for inserting and changing loading coil. Each coil is pretuned. Extremely high Q.

Antenna *(less coil)*..... **$6.86**
75 meter coil..... **6.81**
40 meter coil..... **6.81**
20 meter coil..... **6.81**

JOHNSON VIKING Mobile Transmitter Kit



A low cost, efficient rig in kit form, ready for quick and easy assembly. 30 watts input at 300 volts... up to 60 watts, at 600 volts. 100% modulated...three stages, 807 output...75, 20, and 10 meters with provision for additional band . . . crystal control. Other features include: bandswitching, gang-tuning, RF fixed bias supply, and metered stages..... **$99.50**

VIKING Mobile VFO

Designed especially for mobile operation. Has easy to read edge-lit dial. Is accurately calibrated for 5 bands. Dimensions: 4 x 4¼ x 5". Power requirements: 250 to 300 volts DC at 20ma, and 6.3 volts at .45 amperes.

Complete kit (less tubes)..... **$29.45**
Factory wired (less tubes)..... **44.95**

WE'RE GENEROUS ON TRADE-INS! **What've you got to trade on this fine equipment? Because of our big outlet in the New York market, we can make you a generous allowance. Send full description.**

Anywhere in The World ORDER BY MAIL DIRECT FROM HARVEY

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hrc Harvey RADIO CO., INC.
103 W. 43rd St., New York 36, N.Y. • JUdson 2-1500

220-Mc. Amplifier

(Continued from page 20)

on the plates, with no more than 100 ma. plate current.

Typical operation, with the exciter output stage at 250 volts on the plates and running 12 watts input, is shown below:

Final Plate Voltage	*Screen Voltage*	*Screen Current*	*Grid Current*	*Plate Current*	*Power Output*
500 v.	285 v.	13 ma.	1.7 ma.	100 ma.	25–30 watts
400	220	11	1.7	85	15–20
300	200	8	1.8	60	10

The grid-current values are for operation with plate voltage applied and under load. With the plate voltage off the grid current should be higher. If the grid current *rises* when plate voltage is applied, check the setting of the screen trimmer again, as this indicates regeneration.

Figures in the first line in the above table exceed the recommended maximum ratings for the tube, while the 400-volt conditions are well on the safe side. As a few watts one way or the other will make very little difference in the range of operation, there is no point whatever in pushing the tube beyond its conservative ratings. Doubling the power makes only a small impression at the receiving end, yet an extra 10 watts input can make a considerable difference in your tube's life expectancy. Take it easy!

In operating the amplifier with modulation, the modulated d.c. voltage is applied to both screen and plate, the former through the dropping resistor. In coupling to an antenna, instead of to the lamp load, the setting of the coupling loop, L_3, may be somewhat different. The best method of adjusting this is to use a field-strength meter to check the power radiated by the antenna system. A simple meter for this purpose was described in *QST* for December, 1953.[2] Recheck the setting of the plate condenser each time the position of the coupling loop is altered.

To use the amplifier with an 832A, the layout and dimensions may be left the same as given for the 6252, but a movable shorting bar should be placed on the plate line. This can be a strip of copper crimped around the line at the bottom end. Slide it up the line until the plate tuning condenser will tune through resonance. In the original model, this developed with the short about a half inch up the line from the by-pass plate. For a 5894, the grid and plate circuits both must be shortened slightly, and suitable values of screen and grid resistors for this tube substituted.

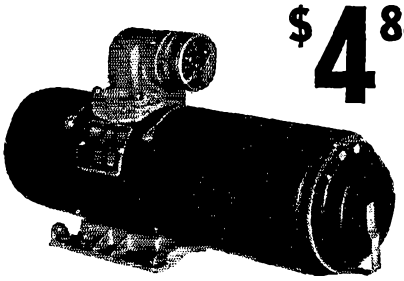
[2] "A 220-Mc. Station for the Beginner," Tilton & Southworth, December, 1953, *QST*, p. 43.

Strays

Dummm de dum dum. . . . Lost, strayed or stolen from the club room of the Dade Radio Club, Miami, Florida: SX-25 receiver, serial 146384. — *W4LVV*

RADIO SHACK MIRACLE-PRICED BARGAINS

PE-101C DYNAMOTOR FOR 6, 12V MOBILE OPERATION!



$4.88

REG. $45.00 VALUE! SAVE $40.12

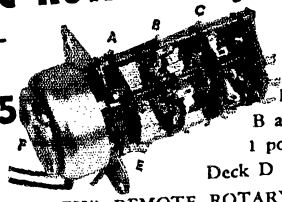
A sensational value you see once in a blue moon — *and then only at Radio Shack!* Brand new — made by Wincharger Corp. for aviation use, but easily converted according to conversion and descriptive data INCLUDED with unit. Search no more for PE-103 or equivalent because this is IT and priced like you want it — $4.88.

Converts to furnish: 6VDC in; 300V @ 90 ma. and 160V @ 110 ma.; 12V in; 610V @ 150 ma.; and 325V @ 125 ma. secondaries. Base mtd., size: 13" x 4". Absolutely new and in original cartons. Unless we find more, quantities are LIMITED. Ship. wt. 12 lbs. *Order No. R-5091Q.*

6VDC ROTARY SWITCH

~~$7.25~~

$3.95



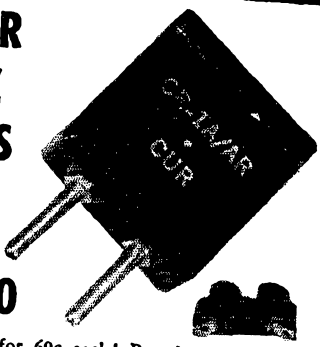
Decks A, B and C are 1 pole 6 pos. Deck D is DPST.

LELAND "LEDEX" REMOTE ROTARY, SOLENOID-operated multi-circuit wafer switch obsoletes manual switching! Innumerable remote control applications: remote crystal selection, band switching, antenna selection, audio circuits; uses limited only by your own ingenuity! *How it works:* solenoid (F) produces rotary motion from 6VDC impulse. Action is transmitted to rotor shaft of 4-gang wafer switch by rachet mechanism. Cam-operated interrupter switch (E), attached to wafer (A), opens when solenoid nears end of stroke, de-energizing solenoid. By combining interrupter switch (E) with wafer contacts on (A), either stepping or rotary selective action is achieved. Size: 4½x2½x2½". Resistance ½ ohm DC. 25 deg. rotary stroke, 8 lb. in. torque. Ship. wt. 1 lb. Pictorial-schematic circuits included. *Order No. R-4519Q.*

40-METER QUARTZ CRYSTALS

69¢

REG. $2.80



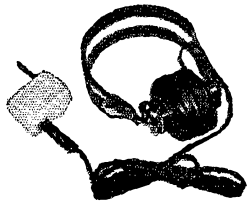
UNHEARD OF for 69c each! Brand new FT-241 40-meter crystals made of the finest Brazilian quartz. Prong spacing ½"! Write or phone early — it's hard to beat for the money!

Order No.	Freq.	Order No.	Freq.
R-5148Q	7020	R-5150Q	7270
R-5149Q	7080	R-5151Q	7280
R-5152Q	Sockets for above		15c

$6 OFF! HS-33 HEADSET

REG. $10.95

$4.95

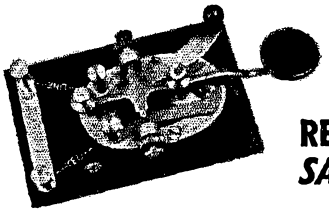


FOR 600, 4000-OHMS

New *low-cost* communication headsets specially purchased for 600 or 4000 ohm operations! Same famous HS-33 Army-Navy headsets using ANB-H-1 receivers. GUARANTEED frequency response of 100 to 4000 cps ±3db; down 20 db at 6000 cps. Response is measured on 6CC coupler 1 milowatt input with 300 ohm impedance. Total impedance — 600 ohms! IMPORTANT: to obtain 4000 ohms impedance headset, use adapter listed below! Ship. wt. 1 lb. *Order No. R-5191Q.*

Adapter for 4000-ohm operation — *Order No. R-5074Q* 88c

J-38 TELEGRAPH KEY



79¢

REG. $2.50

SAVE $1.71

Compare! And you'll find Radio Shack's 79c price the lowest in the U.S.A. for a fully adjustable telegraph key that's perfect for the novice and code-practice! Has circuit-closing switch, burnished corrosion-proof binding posts and parts — frame and base have 2-6/32" threaded inserts. Mounted on 4¾" long x 3" wide black molded base. Knob included! Also well-built and smooth-running for hams, radio stations. Ship. wt. 1 lb. *Order No. 5194Q.*

RADIO SHACK

CORPORATION

167 WASHINGTON ST., BOSTON 8, MASS.

Cascaded Half-Lattice Crystal Filters

(*Continued from page 24*)

The side lobes and nulls should be checked next. If the lobes are greater than those illustrated in Fig. 1, the crystal trimming capacity is too large; if the lobes are smaller, or even nonexistent, but the skirts of the main curve wider, the value of the trimming capacity should be increased.

No additional i.f. alignment is needed for the c.w. filters, but the b.f.o. should be retrimmed so that zero knob setting corresponds to the final alignment frequency. As in all highly selective i.f. systems, the b.f.o. setting is very critical during receiver operation.

When the desired selectivity characteristic is obtained it is a good idea to fasten the bandwidth control permanently in position. A short length of No. 12 copper wire soldered to the brass cam nearest the front panel and bolted to the chassis accomplishes this readily.

Insertion Loss and Audio Considerations

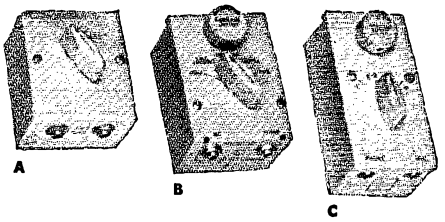
With the filter switched out, the i.f. gain is somewhat greater than in the original receiver because the grids of the first two i.f. tubes are effectively tapped across a greater portion of the resonant circuits. In the 'phone position the loss is about 25 db. with respect to the *Out* position, and in the c.w. position about 10 db. As Goodman has recently pointed out, gain should come after, and not before, the selectivity circuits in order to prevent overloading and cross-modulation, which undo the good work of these circuits.[5] Some increase in i.f. gain is had by shorting out the 50,000-ohm resistor which is in series with the screen voltage supply lead to the first three i.f. tubes, but most of the loss is more easily made up in the audio section. There are several possibilities: A 6J5 can be substituted for the triode-connected 6F6 audio driver by merely reconnecting the grid resistor of this stage to the same bias supply tap which feeds the first audio tube. An alternate scheme is to use a 6SN7 dual triode for the first two audio stages, and take advantage of the leftover tube socket to install a noise limiter. Still more gain can be had by connecting the 6F6 audio output tubes as pentodes.

Since the 'phone filter limits the high-frequency audio response to 3000 cycles, some attenuation of low audio frequencies is desirable in order to restore a reasonable proportion of highs and lows, and to prevent signals from sounding mushy. One of the original 0.05-μf. audio coupling condensers should be replaced with 0.001 μf. Since the original variable i.f. bandwidth feature is now gone, the set no longer has enough bandwidth, even with the filter out, to serve as a hi-fi b.c. receiver, anyway. It is FB for communication work, though.

[5] Goodman, "Getting the Most Out of Your Receiver," *QST*, January, 1954.

LOOK STEINBERGS LOOK

JACK BOXES



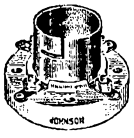
A B C

(A) BC-345. 3½" x 3½" x 1⅞" aluminum, 2 standard open-circuit jacks, 3-position switch, 6-contact banana plugs and jacks.
(B) BC-1366. 4¼" x 3" x 2¼" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 5-position switch, 11-contact banana plugs and jacks.
(C) BC-213. 5¼" x 2¾" x 2⅛" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 4-position switch, 8-contact banana plugs and jacks.

YOUR CHOICE 30¢

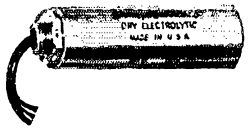
8/8/8 MFD. 500 V. D.C

Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 5" x 3⅜" x 2¼" **$1.95**

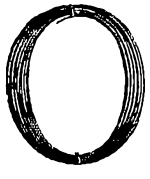


TUBE SOCKETS

For 4-prong tubes 866, 809, 811, 100th etc. Heavy phosphor bronze side wiping contacts, metal shell, white porcelain base. Regular list $1.50, while they last ..... **45¢**



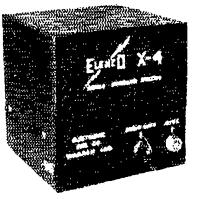
Triple 8 mfd. 450 V. electrolytic upright can condenser, separate negatives, all leads insulated from can. Nationally known mfr. Reg. dealer net $2.58.....ONLY **59¢**
10 for **$5.00**



PHOSPHOR BRONZE AERIAL

125 ft. of the finest aerial wire obtainable. 42-strand phosphor-bronze with linen center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list $4.95..... **90¢**

Single Sideband

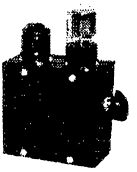


X-4 SSB EXCITER

Only 6" x 6" x 6", 10 watts peak output. Same type crystal filter used in SS-75. Output frequency 3.6 to 4 MC. Provision for VFO input or crystal operation. Power required: 6.3 V., 1.6 A., 200–300 V.D.C., 80 MA., 45 V. bias. Wired, tested, aligned, **$69.50**. Kit form..... **$49.50**

ELENCO X-4 VFO

Only 4" x 4" x 2". Modified Clapp circuit, very stable, finest components. Plugs into X-4 Exciter, tunes 3.6 to 4 MC. Upper or lower sideband selection. Wired, tested..... **$24.50**



VOICE CONTROL

For voice control of X-4 Exciter and your receiver. Only 4" x 4" x 2". Power required 6.3V 6A., 200–300 VDC 10 MA. Wired and tested..... **$19.95**
X-4 Mixer, one band, 40 or 20 meters **$19.95**
Power Supply for operation of all X-4 equipment.....**$49.50**

WRIGHT T-R SWITCH

For break-in operation on CW, AM, or SSSC. Use one antenna for transmitting and receiving. It's instantaneous! No moving parts, no power needed to operate. Coax fitting for connections to feeder and receiver. Will handle 1 Kw. With 75 meter plug-in coil....**$9.95**
40, 20 meter coils, **$1.75** each

COLLINS

75A-3 reciever.....	$ 530.00
Matching speaker.....	20.00
32V3 transmitter.....	775.00
KW-1 transmitter.....	3,850.00
70E8A-VFO.....	97.50
35C2 lo-pass filter.....	40.00
8R-1 100 KC crystal calibrator.....	25.00
Conversion kit for 75A2, with 3KC mechanical filter	80.00
Plug-in adapter for 75A1, with 3KC mechanical filter.....	65.00

MINIMUM ORDER $2.00. Send 20% deposit with COD orders. Please include sufficient postage or instruct us to ship by Express Collect. Overpayment will be refunded by check.

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Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines ... let us know what you need.
73, Jule Burnett W8WHE

Tech Topics

(*Continued from page 46*)

satisfactory if it has been determined that a Q_1 of 10 or 12 will be sufficient. Where higher values of Q_1 have to be used, the reactance of L_1 should be

$$X_{L1} = \frac{R_L}{Q_1} \text{ ohms,}$$

and L_1 is

$$L_1 = \frac{X_{L1}}{2\pi f_{Mc.}} \ \mu\text{h.}$$

C_1, of course, must have the proper value to tune the tank to resonance at the operating frequency. An approximate formula for R_L that is useful for design purposes is

$$R_L = 500 \frac{E_B}{I_B}$$

where E_B is the plate voltage and I_B is the desired full-load plate current in milliamperes.

— *G. G.*

Armed Forces Day

(*Continued from page 70*)

at a speed of 60 words per minute on the following schedules:

Time	*Call Signs*	*Frequencies (kc).*
1300 EST.....	A2USA	3497.5
	NDC	7375
1300 CST.....	A4USA	3497.5
	NDS	7375
1300 MST.....	A5USA	14,405
	NDF or NDW2	7375
1300 PST.....	AF6AIR	14,405
	NDW	7375

Each transmission will commence with a period of ten minutes of test and station identification to permit amateurs to adjust their equipment. At the end of the test period the message will be transmitted. The radioteletype message should be submitted "as received" to the following address: Armed Forces Day Contest, Room BE-1000, The Pentagon, Washington 25, D. C. Time and call sign of station copied, and name and call sign of amateur receiving the transmission should be included.

50 Mc.

(*Continued from page 69*)

years ago, we now find contacts solid out to about 20 miles or so, almost irrespective of the terrain in between. Intervening hills several hundred feet higher than the roads we travel seem to be little if any barrier, up to about that distance. And polarization, that bugaboo we've heard so much about in the process of conversion to horizontal for home-station use, seems to matter hardly at all. In open terrain matching polarization makes for much stronger signals, but in among the hills and through the hearts of cities it is often difficult to tell one polarization from the other.

Lafayette for

Greatest Tape Buy Ever!

1200 FT. REEL
Genuine Plastic Base
RECORDING TAPE

$1.89 per roll plus postage — C.O.D.'s accepted

LAFAYETTE made a terrific deal with one of the leading manufacturers of recording tape to supply us with their regular tape which sells for almost twice our price. WE GUARANTEE ABSOLUTE SATISFACTION OR YOUR MONEY BACK. The finest, professional-quality recording tape obtainable. Highest performance for thousands of playings. Red Oxide Base in a smooth, uniform coating; greater signal strength; with maximum fidelity; uniform frequency response from 40-15,000 cps at 7½" per second; and freedom from background noise and distortion. Each reel is individually boxed.

FREE! Lafayette's new bargain packed catalog. Write today!

Include postage with your order.

TELEPHONE INTERCOM

- *Self Contained Battery*
- *Buzzer Signal*
- *Ideal For TV Installers*
- *Operates Up To 2 Miles*

You can now have a complete 2-station telephone type intercom system at an amazingly low cost. Simply lift the receiver from its hanger and press the button to signal the other party. It operates on self-contained #1 flashlight cell for as much as a mile. You may use Mallory 4 volt Mercury cell for longer distances. Batteries are easily replaceable. The Alnico 5 magnet gives loud and clear reproduction. Molded high impact case resists breaking. Installation is extremely simple and consists of merely attaching the clips provided to the ends of the wire. Ideal not only for ordinary intercom use as a telephone set, but perfect for TV installers where the antenna lead can be used as the connecting wire. Complete set consists of 2 phones, hangers for mounting on wall, batteries and 50 feet of 2-conductor wire.

Stock #ML-39, Complete Set.....NET 5.98

ROTO AUTOMATIC HACKSAW

Fits any ¼" Electric Drill. Cuts any wood, metal or plastic up to ¾". There are no gears or bearings to wear out! Saw blade is only exposed moving part. Folds to 1"x1½"x4"—fits any tool box. Uses standard hacksaw blades. Handle covers and protects saw blade when not in use. Shpg. wt. 1 lb.

HD-60.....NET 3.72

WESTERN ELECTRIC HEARING AID

Reg. price ~~$185.00~~ — *Our price* **$14.95**

Brand new, in original Western Electric's jeweler's case. Supplied with receiver, receiver cord, battery cord and plug (less batteries). Money back guarantee. Act now while they last! Uses Burgess XX30E and 8R batteries at $1.55 per set.

NOW! PHILCO BOOSTER

MODEL TB-3 In original factory sealed cartons. Money back guarantee!

~~$39.50~~ *list*
$12.50 ea.
$11.50 ea. *in lots of 3*
Shp. Wgt. 5 lbs. ea.

The Philco Television Booster Model TB-3 is a high quality, push-pull, wide-band radio-frequency amplifier designed to amplify r-f signals in the television bands. This unit employs two 6J6 tubes as r-f amplifiers, uses a selenium rectifier in a self contained power supply. Channels 2 through 13.

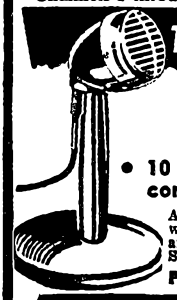
Talk about tuners!
THE STANDARD CASCADE TUNER TOPS 'EM ALL!

$14.95 ea.
$14.25 ea. *in lots of 3*

BRAND NEW! GUARANTEED!

The No. 1 Tuner in the trade. Lafayette is out front with this red-hot STANDARD COIL CASCADE TUNER deal. Lafayette made a buy—we paid cash—and you get the saving! Regular dealer price $24.50. Servicemen, now is the time to stock up and save! *Size: 4⅝" x 3¼" x 6¼" supplied with 6J6 and 6BQ7. Stock No. TL-11. Shpg. wt. 4 lbs.*

Top Quality CRYSTAL MIKE



$5.75

- —52 db output level
- Range 30 - 10,000 cps
- 10 ft. cable and connector
- Handle and interlocking base

A really fine microphone by a manufacturer known the world over. Use for amateur broadcasting, public address and home recording. Can be used with floor stand. Shpg. wt. 2½ lbs.

PA-21.....5.75

SELENIUM RECTIFIER

Stock No.	Mil	Each	Lots of 10 Each
RE-12	65 MA	.57	.55
RE-14	75 MA	.67	.64
RE-10	100 MA	.80	.75
RE-15	150 MA	.92	.85
RE-16	200 MA	1.19	1.08
RE-11	250 MA	1.29	1.19
RE-17	300 MA	1.39	1.29
RE-18	350 MA	1.57	1.50
RE-13	400 MA	1.75	1.68
RE-19	450 MA	1.77	1.70

Most popular sizes for radio and TV. Famous brand. All fresh, new stock. Input voltage 130 volts. You can't go wrong at these prices.

Dept. VC

Lafayette Radio

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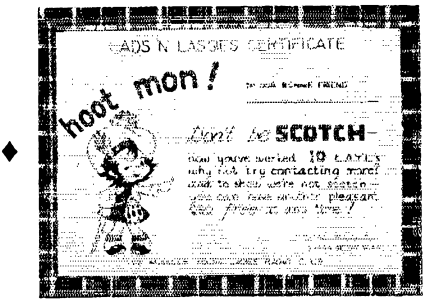
BRONX, N. Y.	542 E. Fordham Rd.
NEWARK, N. J.	24 Central Ave.
PLAINFIELD, N. J.	139 West 2nd St.
BOSTON, MASS.	110 Federal St.

YL News

(*Continued from page 49*)

Hoot Mon!—Lad 'N Lassie Certificate

In the April 1952 issue, this column, announcement was first made of the Lad 'N Lassie Certificate given by the Young Ladies Radio Club of Los Angeles to any amateur who submits proof of on-the-air QSOs with 20 of the club's active members. The rules now have been modified so that QSOs with only 10 members are required, rather than 20 as originally stated. Proof of QSOs should be sent to "Queen of the Clan" Gilda Shoblo, W6KER, 3715 Liberty



Blvd., South Gate, California. Currently active club members are: K6ACF, W6AKE, K6ANG, W6AVF, K6CDB, W6CEE, W6CQV, W6DPB, W6DXI, W6EHA, W6FEA, W6GAI, W6JCA, W6JMC, W6JMS, W6JZA, W6KER, W6KYZ, W6LBO, W6LMQ, W6MFP, W6NZP, W6PCO, W6PJU, W6QGX, W6QOG, W6QYL, W6SGL, W6SHR, W6TDL, W6UHA, W6WRT, W6WSV and W7TUR/6. Some 35 certificates have been issued thus far — why not try for yours now?

Keeping Up with the Girls

Congratulations to W2BTB, Jeanne. She was awarded a special citation in conjunction with the 1953 Edison Radio Amateur Award in appreciation of her unselfish public service. . . . Congratulations also to W6QGX, Harryette, of Puente, Calif., for placing second in the Los Angeles section in the 7th V.H.F. Sweepstakes last January. Harryette made 130 contacts in 3 sections on 2 meters. See photo on page 60, April '54 *QST*. . . . W7PUV writes "I never see much about the activities of Arizona YLs. Maybe people just don't know we exist!" Inez is doing her share of operating, though. A "WN" at first, she has been on the air for 2½ years and during the past year made WAS — all contacts on 7-Mc. c.w. using 45 watts . . . W6UHA, NCS of the 20-meter YL net (Thursday, 2:00 P.M. EST, 14,240 kc.) relates that one Thursday OM W9LXC of Sheboygan, Wisconsin, broke in to announce that the Kiwanis Club of that town was listening with interest. Maxine exclaims, "Imagine our surprise when 125 men said, "Hello, girls!" (See Stray, p. 10, April *QST*.) . . . On another Thursday, W6NZP broke in on the net while operating at VQ4AQ in Nairobi, Kenya. Evelyn, who has been visiting hams all over Africa, told net member W6QOG, Helene, that just about every hamshack she visited had a W6QOG QSL on the wall. . . . W1YYM, Ellen, is an OPS and ORS; W8SPU, Helen, is EC for Wyandot County, Ohio. . . . Three W7 YLs active in local c.d. communications are W7FWR, Mary Ann (she's still W7 QSL Bureau Manager, too), W7JFB, Miriam, and W7PTX, Betty. . . . Seventeen-year-old KN2GLL, Evelyn, of Livingston, N. J., is a regular participant in her town's 2-meter c.d. net. . . . VE3AJR, Dell, reports a new YL in Ontario — VE3DDA, Eleanor Elliott of Brantford. . . . And W1YJJ is a new YL in Melrose, Mass. Ora's OM is not a ham, but as a c.d. director he talked at length about radio communications and encouraged her to try for a license. . . . W6WRT, Ruby, and W6KER, Gilda, disclose that despite an all-day dose of "liquid sunshine" (3 inches in 12 hours), 39 YLs and OMs attended the second annual

(*Continued on page 128*)

YL-OM Valentine Day dinner sponsored by the Los Angeles YLRC. Club president W6KER was presented with a ceramic ash tray made by W6MFP. Agnes, stamped with her call letters and the YLRL emblem. . . . Ex-KH6TI, Dell, is now W1YLP. . . . W6QPI, Betty Gillies, is again chairman of the 1954 All Women's Transcontinental Air Race which will be held July 3rd through 6th. The flight will be from Long Beach, Calif., to Knoxville, Tenn. W6NZP, Evelyn, again will coördinate amateur activities at the starting point, with W6KER assisting. W4s TIE, Margaret, and UDI, Lennette, will organize plans at the eastern terminus. As mentioned here last month, W2JZX, Vi Grossman, for the third year is in general charge of amateur assistance for the entire race. . . . Capt. H. O. Crisp of the Board, National Friendship Society of Radio Amateurs, wrote in the March-April 1954 issue of *Skywire* that, second to KT1LO, W1MCW, Lou, our foremost DXing YL, puts out the best 20-meter 'phone signal that he hears. . . . VE3DEA feels that she has "found a place in the sun" with the handling of much traffic to and from the arctic region. Acquainted with most of the VE8 operators, Denny delights in relaying messages to mothers, wives, etc. — and she's rightfully proud to be using the 70-watt rig (on 20 'phone) she built herself. . . . W6s CEE, Vada; JMS, Lucile; QMO, Jeri; and KN6BUG, Barbara, attended the 3rd Annual Get-Together of the Mission Trail Net. W6JMS went home with a TV set. . . . W6KXT (ex-W5PTI), Rene, and her OM will continue to work 15 meters regularly from Lima, Peru, under the call OA4N until they return Stateside in September. . . . W4HWR, Hilda, and her OM hope to rejoin their W friends in June after a two-year stay in England. . . . W9GME has been appointed assistant to Central Division Director W9AND. Grace also was chosen to head RACES for the Chicago area. . . . We are sorry to report that W4RLG, Frances Shannon, will be confined to a hospital bed for the next six months. Frances, you will recall, had the highest score in the c.w. section of the 14th Annual YLRL Anniversary Party. Cards and letters should be sent to her at the Army Hospital, Ward 28, Ft. McClellan, Anniston, Alabama. . . . W4KZT, Lucille, and her OM, W4LDM, originated 1600 messages at the Tampa (Fla.) Fair. . . . Best wishes to W8UDA, Dottie, and her OM (see photo of Dottie on page 51 of April *QST*) upon the arrival of their baby daughter on March 6th. . . . YLRL Seventh District Chairman, W7HHH, Bea Austin, extends to all YLs an invitation to attend the 1954 Oregon Amateur Radio Association Convention, June 26th and 27th. The YLRL is well represented on the convention committee with W7SBX, Helen, pres.; W7SBW, Pauline, sec.; and W7UFN, Gertie, treas. Reservations may be made through Luryne Conner, W7SB8, Lakeshore Drive, Klamath Falls. . . . And a final notice of the Fourth Annual Get-Together, May 21st-23rd, of the Women's Auxiliary, Milwaukee Amateur Radio Club. All YLs and XYLs invited. Write Committee Chairman Mary A. Meyer, Route 4, Box 568, Waukesha, Wisconsin, for further details.

—•••—

As Chairman of the Tenth YLRL District for the past year, WØCXC, Mary Jo Overbeck of St. Louis, Mo., has made an effort to join in as many of the YL events and activities as possible, and she frequently has urged the YLs in her area to do likewise. Mary Jo operates several bands — 'phone and c.w. — running 450 watts, and she is particularly interested in s.s.b. and RTTY. Her OM is WØJFI, and there are four young jr. ops who sometimes interfere just a bit with extensive hamming!

Deadlines

It is always a pleasure to hear from column readers. News, ideas, suggestions, comments, and constructive criticisms are continuously welcome. It is only by hearing from readers that we know what they want — so do write, anytime. (OMs respectfully included!)

Please remember that items specifically earmarked for a certain month should be received at least six weeks in advance — for instance: Notice of a YL get-together to be held in August should be received not later than June 15th, if the item is to appear in the August issue.

Happenings

(Continued from page 55)

as an entrance to amateur radio he within a year is obliged to undertake another examination for a permanent license and again stand the cost of a fee. This may very well result in discouragement of newcomers to the amateur service via the Novice route. The League believes that by shouldering the responsibility of conducting Novice (as well as Technician and Conditional Class) examinations, the amateur service is providing more than its share of licensing costs.

Summary of the Amateur Contribution to Commission Workload

Amateurs are already assuming a considerable proportion of the cost to Government of administration of the amateur service; this is being done purely on a volunteer basis, at no cost to the Commission. We believe that because some of these procedures have been customary for so many years, in the present matter adequate cognizance of their contribution to the Commission's work may not have been taken. But it is a very real contribution. We believe that the amateur service is already furnishing more than its share of the costs of its licensing and administration, that to impose a licensing fee on the amateur service would be unfair and unjust, and we request the Commission to exempt the amateur service from its fee schedule.

If a Fee Is Required, It Should Be Nominal

While we believe we have adequately demonstrated, factually, that the amateur service should be exempted from a licensing fee, it may be that an interpretation of the law from which the Commission's present proposal derives would indicate that *no* service can be exempted; or it may be that the Commission may in its own judgment decide that, regardless, a fee of some amount will be required of every service. In that event, the view of the League is that the fee should not be more than the nominal amount of $1, to cover all instruments of authorization needed.

The actual issuance of amateur licenses has, commendably, in recent years been put on a "streamlined" basis. New manifold forms have permitted economy of operations. A "short form" renewal procedure has recently been introduced which provides that the amateur in filling out his application form actually furnishes the Commission with its file records largely completed for each transaction. Although of course we do not have access to cost-accounting records of the Commission, we believe it would be extremely difficult to justify a fee of $3 for the processing of renewal applications. Even the handling of modifications, particularly where only a simple change of address is involved, does not seem to justify such a fee. With a considerable background ourselves of dealing with amateurs we are not so naive as to believe that every application can be handled without some administrative processing in addition to routine clerical work; but that same experience leads us to appraise the $3 fee as too high for the average. The only application which might involve a fee as high as $3 with justification is one involving an actual examination, and as we have pointed out earlier the amateur service shortly will be assuming a considerable amount of the workload of the Commission in the actual administering of code tests and written papers.

It is the League's view, therefore, that should the Commission decide upon the principle that some fee will be required of each of its licensees, we ask that the figure in the amateur service be set at the nominal amount of $1 as being more in line with the nature of the service and the policy expressed in the Budget Bureau's directive.

AMERICAN RADIO RELAY LEAGUE, INC.

By PAUL M. SEGAL,
Its General Counsel

March 31, 1954

FEED-BACK

In "Modifying the S-40 for S.S.B. Reception" (April *QST*), a 47,000-ohm grid leak should have been shown from Pin 1 to ground in Fig. 4B.

SS Results

(Continued from page 66)

W3ESM....1710- 45-19-B- 6
W3ZQ.....70- 7- 5-B- 1
W3GRF.....54- 6- 3-A- –
W3RRT.....36- 4- 3-A- 2
W3FQE.....9- 3- 1-A- 1
W3QAZ (W3S QAZ VKG)
1199- 24-17-A-12

Southern New Jersey

K2CSC....19,074- 145-44-A-33
W2FYT....14,190- 172-43-B- –
W2LS.....7038- 69-34-A-17
K2BWR....6075- 75-27-A-16
K2BQW....2160- 41-18-A-12
W2ROW....576- 19-16-B- –
W2GND....189- 9- 7-A- 2
K2CWJ.....98- 7- 5-A- 2
W2GVB.....12- 2- 2-A- 4
W2ZQ (W2S JWA NDO QVD KN2CLD)
10,804- 146-37-B-20

Western New York

W2ICE....35,100- 270-65-B-25
W2OTW....21,546- 171-42-A-10
W2PJM....10,384- 118-44-B-10
W2ROM....6864- 89-39-B-15
W2VEY....2795- 41-23-A- 8
K2BZC....1752- 37-16-A-10
W2VIU.....646- 20-17-B- 5
W2RLN.....341- 16-11-B- 8
W2FXA.....126- 7- 6-A- 1
W2GVJ (W2GVJ K2BUD)
7515- 84-30-A-16

Western Pennsylvania

W3VKD....51,204- 379-68-B-30
W3SYW....2772- 41-24-A- 9

CENTRAL DIVISION

Illinois

W9NDA....116,070- 530-73-A-40
W9YWI....40,869- 240-57-A-38
W9FVU....19,296- 134-48-A-27
W9CPK....16,113- 133-41-A-27
W9RYU....15,525- 118-45-A-17
W9LQF....14,094- 131-36-A-29
W9AVJ....13,700- 141-50-B-10
W9TPA.....5542- 82-34-B-17
W9GRV.....5148- 66-39-B- 5
W9RER.....4368- 52-28-A- 8
W9SMG.....2015- 46-17-A- 8
W9CGC/9.....700- 27-14-B- –
W9JYJ.....660- 21-11-A- 9
W9IDO.....561- 17-11-A- 4
W9KFL.....550- 25-11-B- 3
W9MXJ.....72- 6- 6-B- 1
W9WNT.....54- 6- 3-A- 1
W9KMN.....48- 4- 4-A- 1
W9DMY (W9S AOU DMY FQY)....9384- 136-46-A-30
W9ZSI (W9S TQL ZSI)
5175- 59-30-B- 7

Indiana

W9JVN....44,022- 255-58-A-35
W9KDV....27,000- 250-54-B-27
W9QYQ....8778- 105-42-B-14
W9CNG....4288- 67-32-B- 8
W9NTA....2600- 65-20-B- 8
W9RZS....2432- 38-32-B-11
W9CC.....798- 20-14-A-11
W9QMT.....510- 17-10-A- 2

Wisconsin

W9ACQ....29,680- 283-53-B-35
W9VBZ....23,700- 160-50-A-31
W9TPT....18,676- 163-58-B-20
W9MGT....11,750- 128-47-B-31
W9WWJ....5402- 76-37-B-16
W9VZL....3564- 81-22-B-15

DAKOTA DIVISION

North Dakota

WØNPR....23,328- 162-48-A-22
WØKZZ....19,845- 137-49-A-24
WØJWL....17,878- 118-51-A-34
WØNGO.....528- 22-12-B- 4

South Dakota

WØPRZ....107,201- 497-73-A-30

Minnesota

WØAJS....20,352- 128-53-A-28
WØTIV.....2448- 35-24-A- 9

DELTA DIVISION

Arkansas

W5TTG....56,730- 306-62-A-40
W5ZBC....3456- 49-24-A- 6

Louisiana

W5KC.....2340- 40-20-A- 3

Mississippi

W5WZZ....7654- 93-43-B-15
W5YBH....2081- 39-19-A-10

Tennessee

W4VUA....49,938- 289-58-A-39
W4VFL....32,219- 224-57-A-30
W4SZE....12,388- 163-38-B-31
W4UWC....11,970- 106-38-A- 8
W4SNZ....8600- 103-43-B-17
W4TYV.....45- 5- 3-A- 5
W4UIO.....27- 3- 3-A- –
W4OEZ.....2- 1- 1-A- 1

GREAT LAKES DIVISION

Kentucky

W4KZF....69,564- 341-68-A-32
W4CDO....8484- 101-42-B-14
W4SUD.....520- 20-13-B- 1
W4ANQ/4 (W4S ANQ YFA)
108- 6- 6-A- –

Michigan

W8ZXC....8853- 114-39-B-23
W8PVI....3052- 54-28-B-14
W8DUS....2424- 52-24-B- 3
W8GTI....1680- 40-21-B- 3
W8FLL....900- 23-20-B- 4
W8BGY....180- 10- 6-A- 1
W8NOH/8....135- 8- 6-A- 1
W8MLR (W8S MLQ MLR MNZ)....43,446- 284-52-A-33
W8VQD (W8S IFO VQD)
41,616- 290-72-B-39
W8KAU (W8S JGN KAU)
31,928- 240-45-A-32
W8GLK (W8S GLK JBT OSG)
160- 10- 8-B- 1

Ohio

W8AJW....70,686- 357-66-A-34
W8HQH....43,680- 260-56-A-25
W8JSW....24,174- 159-51-A-36
W8DPA....24,120- 269-45-B-34
W8BIM....17,172- 160-36-A-19
W8HQK....14,304- 153-48-B-32
W8JSH....12,222- 98-42-A-17
W8GKQ....10,710- 119-45-B-19
W8SRF....10,149- 100-34-A-16
W8PCR....8541- 73-39-A- 9
W8RWZ....7228- 97-44-B-12
W8IDQG....6840- 76-30-A-15
W8NLL....6324- 70-31-A- –
W8ZAU....6045- 72-28-A-10
W8PNJ....5496- 56-33-A- 9
W8FNX....5450- 58-30-B- 9
W8MUF....2111- 34-21-A- 8
W8JQJ....1910- 34-19-A- 8
W8IWP.....756- 21-12-A- 5
W8GRT.....324- 12- 9-A-17
W8EQG.....192- 8- 8-A- –
W8KYZ.....126- 7- 6-A- 3
W8DNJ.....72- 12- 6-B- 1
W8AEU.....15- 5- 1-A- 2
W8HFE/M....6- 2- 1-A- 1
W8KZM (W8KZM WN8OJQ)
17,280- 145-40-A-25

HUDSON DIVISION

Eastern New York

W2SZ*....31,570- 288-55-B-40
W2GSB (W2OKG K2S BZQ CYS)....16,646- 205-41-B-36

N.Y.C.-L.I.

W2SKE....45,356- 334-68-B-15
K2AAA....38,115- 236-55-A- –
W2BQM....20,160- 168-40-A-25
W2KJG....12,144- 128-32-A-24
K2AED....6255- 70-30-A-23
W2JZX....3432- 66-26-B-13
W2SNA....2550- 50-17-A- 9
W2BWC....2100- 50-21-B- 3
K2AAO/2....1728- 36-24-B- 7
W2EQG.....611- 24-13-B- –
K2CMV.....363- 11-11-A- 2
W2KTF.....48- 6- 4-B- 1
W2NUC.....36- 4- 3-A- 1
K2CQP.....28- 11- 1-A- 2
W2DBI.....3- 1- 1-A- –
W2YKQ (W2S RVW YMM K2ESH)...864- 24-12-A-15

Northern New Jersey

W2JKH....42,570- 258-55-A-37
W2JJI....30,378- 250-61-B-33
W2YOG....3146- 61-26-B-10
W2EQS....2508- 57-22-B- 8
W2VIR....1092- 28-13-A- 4
W2JIY.....616- 28-11-B- 5
K2CBB.....189- 9- 7-A- 2
K2CRE.....27- 3- 3-A- –

(Continued on page 134)

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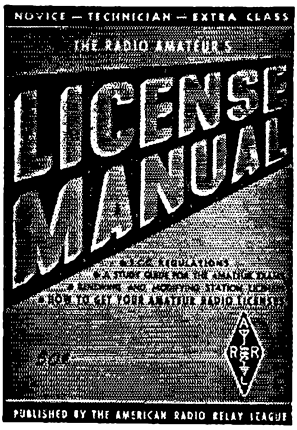

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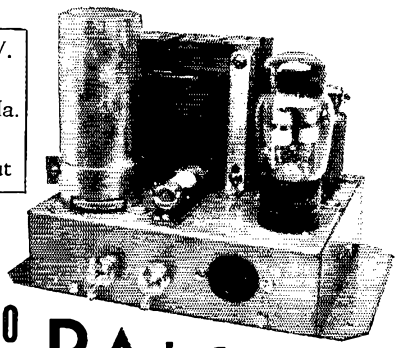

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MIDWEST DIVISION

Iowa

WØOBX	19,062-	177-54-B-32
WØBFW	17,618-	135-45-A-34
WØNEX	799-	24-17-B- 5

Kansas

WØREP	53,676-	284-63-A-35
WØZKO	25,839-	160-54-A-16
WØDMS	3538-	42-28-A- 5
WØAER	3150-	42-25-A- –
WØMEF	24-	4- 3-B- 1

Missouri

WØBCF	57,936-	418-71-B-30
WØOMG	41,193-	301-69-B-29
WØIYJ	4800-	66-25-A-14
WØFLN (W5WTQ OHA)	WØs AJE 13,450-	140-50-B-30

Nebraska

WØEHF	27,968-	222-64-B-14
WØGYM	12,870-	145-45-B-15
WØCQX	12,213-	89-46-A-14
WØKGA	63-	7- 3-A- 3

NEW ENGLAND DIVISION

Connecticut

W1AW[3,4]	22,366-	213-53-B-12
W1MRJ	15,222-	179-43-B-32
W1ZDP[4]	705-	24-15-B- 3
W1YYM[4]	684-	19-12-A- 1
W1EOB	126-	9- 7-B- –
W1WPO[4]	12-	2- 2-A- 1
W1MHF	2-	1- 1-B- –

Maine

W1GKJ	13,932-	129-36-A-21

Eastern Massachusetts

W1JEL	62,112-	327-64-A-40
W1VYI	30,702-	240-43-A-36
K1FCH	15,226-	166-46-B-19
W1OTH	15,035-	131-39-A-22
W1JNX	14,652-	132-37-A-24
W1QON[5]	7668-	109-24-A-16
W1MKW	4185-	79-27-B-17
W1AQE	3744-	52-24-A- 4
W1PKV	3105-	45-23-A-10
W1RWO	672-	28-12-B-10
W1YQF	594-	17-12-A- 5
W9VJD/1	540-	19-10-A- 3
W1QDX	450-	15-10-A- 3
W1PNW	263-	13- 7-A- 6
W1WTJ	252-	12- 7-A- 2
W1MEG	120-	8- 5-A- 1
W1VWQ	6-	2- 1-A- –

Western Massachusetts

W1QWJ	6300-	75-28-A- –
W1UKR	5712-	68-28-A-16
W1MNG	3844-	62-31-B- 6
W1MVF	147-	7- 7-B- 1
W1CJK	105-	7- 6-A- 2
W1PHU	75-	5- 5-A- 3
W1JYH	72-	6- 4-A- –
W1WFL	48-	4- 4-A- 3

New Hampshire

W1BFT	37,584-	232-54-A-16
W1HRI	32,136-	206-52-A-30
W1AQ	23,625-	175-45-A-23
W1WS	3000-	100-20-A- 5
W3VEI/1	2280-	42-19-A- 4
W1NHJ	552-	23-12-B- 3

Rhode Island

W1TRX	32,450-	278-59-B-39
W1SGA	2968-	53-28-B-11
W1VXC	1170-	26-15-A- 5
W4CVO/1	270-	15- 9-B- 2

Vermont

W1RNA	10,188-	142-36-B-19
W1AXN	6633-	101-33-B-17
W1BEO	4805-	78-31-B-11

NORTHWESTERN DIVISION

Alaska

KL7AON	28,740-	242-60-B-35

Idaho

W7DMZ	29,520-	248-60-B- –
W7NGA	18,816-	129-49-A-28
W7SGS	540-	15-12-A-14
W7TYG	180-	10- 6-A- 3

Montana

W7NPV	37,479-	203-62-A-39
W7SWW	240-	16- 5-A- 9

Oregon

W7OVA	13,608-	126-36-A-21
W7JLU	189-	11- 9-B- 1

(*Continued on page 136*

Washington

W7EYD	32,076-	200-54-A-21
W7HAD	13,786-	113-61-B-14

PACIFIC DIVISION

Hawaii

KH6AWM	70,819-	536-67-B-35
KH6IJ	208-	13- 8-B- 1
KH6WW	2-	1- 1-B- –

Nevada

W7JUO	23,584-	176-67-B-18
W7QHH	15,269-	131-39-A-32

Santa Clara Valley

W6WLI	10,164-	121-42-B-26
W6MKM	8112-	85-32-A-20
W6NTQ	5904-	63-32-A-11

East Bay

W6BXE	31,800-	265-60-B-36
W6IDY	29,952-	234-64-B-29

San Francisco

W6CBE	33,062-	271-61-B-28
W6MOX	18,183-	162-38-A- –
W6ATO	6804-	82-42-B-12
W6UOM/6	2-	1- 1-B- –

Sacramento Valley

W6SUP	57,664-	424-68-B-40
W6GVM	4488-	67-34-B-10

San Joaquin Valley

W6GQZ	3542-	77-23-B-15

ROANOKE DIVISION

North Carolina

W4HUW	42,160-	340-62-B-32
W4ZWF	8022-	96-42-B-12
W4TEW/4 (W4s TEW YDY)		43,988- 290-51-A-32

South Carolina

W4ZVY	11,223-	132-43-B-17

Virginia

W4HQN[6]	102,460-	520-66-A-39
W4ESK	65,520-	366-60-A- –
W4LIM	33,737-	224-51-A-25
W4FV	25,984-	232-56-B-26
W4KMS	17,343-	141-41-A-26
W4VUF	13,860-	132-35-A-30
W4LLU	10,220-	146-35-B-14
W4IYC	9866-	100-49-B-14
W4YTZ	8943-	137-33-B-21
W4PRK	8048-	100-29-A-14
W4UIE	7028-	128-28-B- 8
W4IQG	5250-	63-42-B- 8
W4RSR	5115-	78-33-B- 7
W4ZRS	4757-	78-21-A- 6
W4ZV	3929-	50-27-A- 7
W4OZA	3456-	66-27-B- 5
W4TFA	1794-	40-23-B- 4
W4VRT	1502-	39-13-A-10
W4RJW	780-	26-13-A- 2
W4CLD	690-	23-15-B- 3
W4RTV	624-	16-13-A- 1
W4MZR	450-	15-10-A- 2
W4ITK	336-	16- 7-A- 6
W4BSM	315-	15- 7-A- 2
W4PNK	297-	11- 9-A- 1
W4IMP	272-	17- 8-B- 2
W4OSB	252-	14- 6-A- 4
W4TVX/4	132-	11- 6-B- 2
W4URM	120-	8- 5-A- 3
W4YUK	120-	8- 5-A- 1
K4WAH	9-	3- 1-A- –
W4YKX	6-	2- 1-A- –
W4YMP	6-	2- 2-B- 1
W4IWW	3-	1- 1-A- –
W4RYQ	3-	1- 1-A- –
W4CRG (W4s CRG FJ)		3- 1- 1-A- –

West Virginia

W8PQQ	15,043-	154-49-B-13
W8QHG	3486-	42-28-A- 5

ROCKY MOUNTAIN DIVISION

Colorado

WØYMP	25,652-	177-49-A-29
WØBWJ	24,867-	154-54-A-40
WØRJN	24,021-	159-51-A-29
WØICR	15,792-	114-47-A-17
WØOYS	15,453-	101-51-A-21
WØFMV	6660-	61-37-A-13
WØERR	2277-	52-23-B- 8
W6UAA/Ø	2145-	34-22-A- 6
WØWLN	2024-	36-19-A-21
WØFZQ	330-	15-11-B- 3
WØSYA	243-	9- 9-A- 2
WØAEE	240-	15- 8-B- 3

Utah

W7QWH..17,472- 170-52-B-15
W7QDM.....36- 4- 3-A- 1
W7QDJ.....3- 1- 1-A- 1
W7TMK (W7s LCC QPO QVN RCP RGG) 6120- 90-36-B-34

Wyoming

W7PKX....5220- 60-29-A- 6
W7QPP.....147- 8- 7-A- 5
W7HRM.....2- 1- 1-B- –

SOUTHEASTERN DIVISION

Alabama

W4WOO...34,286- 204-57-A-40
W4WOG.....27- 3- 3-A- 1
W4LEN (W4s LEN PKA) 4095- 47-30-A- 7

Eastern Florida

W4AYX....2688- 65-21-B-24
W4WHP....2619- 51-27-B- 9
W4VTJ....2553- 37-23-A- 9
W2JWJ/4....48- 4- 4-A- 3

Western Florida

W4NN....24,795- 220-57-B-26

Georgia

W4SOV...57,456- 309-63-A-37
W4YTO...25,398- 167-51-A-33
W4KSZ....19,710- 150-45-A-14
W4WLX (W4s SCU WIX) 3888- 48-27-A-11

West Indies

KP4UY.....3- 1- 1-A- –
KP4EE (KP4EE W2DVT) 21,398- 161-45-A-22

SOUTHWESTERN DIVISION

Los Angeles

K6BWD..30,000- 200-50-A-40
W6OKD...17,010- 129-45-A-19
K6AHL?...12,000- 125-32-A-21
W6PFZ....6045- 79-26-A-29
W6MYG....5762- 84-23-A-17
W6NJU.....2729- 54-17-A- 7
K6BEQ.....792- 24-11-A-10
K6BFK.....18- 6- 1-A- 2
W6SQY (W6s HJK SQY) 774- 22-12-A- 6
W6NST (W6NST K6ATN) 120- 11- 4-A- 5

San Diego

W6GWZ.....545- 22-11-A- 5

Santa Barbara

W6DLR.....3- 1- 1-A- –

WEST GULF DIVISION

Northern Texas

W5SFW...68,832- 482-72-B-40
W5TLY...38,430- 219-60-A-29
W5BLU.....104- 6- 6-A- 1

Oklahoma

W5SV8....18,571- 192-49-B-31
W5ORH....7014- 85-42-B- –

Southern Texas

W5YGL...71,181- 363-66-A-37
W5UBN...66,402- 330-68-A-40
W5RSN...26,565- 247-55-B-28
W5WJB....2862- 53-27-B- 9
W5YSC (W5YSC WN5ZNN) 96- 8- 6-B- 3

New Mexico

W5SQI....26,828- 183-49-A-33
W5SUY.....2- 1- 1-B- –
W5GEM (W5s BYG UDM UUN YGR) 29,475- 200-50-A-39

CANADIAN DIVISION

Maritime

VO6U.....133- 10- 7-B- –

Quebec

VE2CB.....6278- 80-27-A- 9
VE2JL.....990- 28-12-A- 4

Ontario

VE3BVI...18,365- 189-33-A-37
VE3NG.....2988- 84-12-A-28
VE3HE.....672- 28- 8-A- 9

Saskatchewan

VE5AJ.....32- 4- 4-B- –

Alberta

VE6EO.....2880- 74-20-B-15
VE6DU.....888- 19-16-A- 7

[1] W9OHU, opr. [2] W1SFQ, opr. [3] W1WPR, opr. [4] Hq. Staff, not eligible for award. [5] W1OLP, opr. [6] W4NTZ, opr. [7] W6NWJ, opr.

Correspondence

(Continued from page 67)

everything below this frequency, and by the time it reaches the 'speaker, there's nothing left. When I lick this problem I'll let you know.

— *Herb Younger, W6OJA*

NOTE FOR SWLS

P. O. Box 3450
Johannesburg, So. Africa

Editor, *QST:*

I feel constrained to write on the subject of the nuisance value of SWL cards and reports. If only these listeners would understand that a DX station laying down a strong signal and in contact with another ham is bound to know how his signals are arriving, and as such is not in the least bit interested in SWL reports. It is conceivable that a DX station which is putting in a barely audible signal when the band is open might be interested in a report card. I think I can correctly say that SWL cards for well-known DX stations are routed direct to the wastebasket unless they are accompanied by an International Reply Coupon, in which case most hams will acknowledge the report. Lately the SWLs seem to have got the idea that if they send their card by air mail they run more chance of collecting a QSL in return. If they had any sense they would send their report by ordinary mail and utilize the postage saved to enclose a reply coupon, and if you could give publicity to this suggestion I think you would save the SWLs a great deal of heartburn. . . .

— *Arland Usher, ZS6Z*

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.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) 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 25th 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 for sale 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.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(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.

SUBSCRIPTIONS. Radio publications. Latest Call Books, $3.50. Mrs. Earl Mead, Huntley, Montana.

QSL's-SWL's Meade WØKXL, 1507 Central Avenue, Kansas City, Kans.

WANTED: Cash or trade, fixed frequency receivers 28–42 Mc. W9VIV, Troy, Ill.

QSLS, SWLS. High quality. Reasonable prices. Free samples. Write to Bob Teachout, W1FSV, Box Q124, Rutland, Vermont.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

QSLS-SWLS, 100, $2.85 up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSLS "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSLS. Custom-made or stock! State which. Samples, 10¢. C. Fritz, 1213 Briargate, Joliet, Illinois.

ATTENTION Bargain hunters! Dozens of real trade-in values including Collins, Vikings, Nationals, Hallicrafters, Elmac, Gonset, RME, Morrow, Harvey-Wells. Write for free bargain bulletin. Complete stocks, all leading brands. We trade and sell on time. Burghardt Radio Supply, Watertown, South Dakota.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

QSLS-SWLS, samples, 10¢. Malgo Press, 1937 Glendale Avenue, Toledo 14, Ohio.

DON'T Fail! Check yourself with a time-tested Surecheck Test. Novice, $1.50; General, $1.75; Amateur Extra, $2. Amateur Radio Supply, 1013 Seventh Avenue, Worthington, Minn.

CALL Letters: 25 cents a set. Dress up your rig, car, etc. For samples, write to Robert Connick, Nickcon, P.O. Box 272, Cincinnati 1, Ohio.

WANTED: Bargains in transmitters, receivers, laboratory and test equipment, power supplies, miscellaneous gear and parts. What have you? Please state price desired. Harold Schonwald, W5ZZ, 718 N. Broadway, Oklahoma City, Okla.

QSLS. Taprint, 205 South, Union, Miss.

MICHIGAN Hams! Amateur supplies. Store hours 0800 to 1800 Monday through Saturday. Purchase Radio Supply, 005 Church St., Ann Arbor, Michigan. Phones 8696 and 8262. Roy J. Purchase, W8RP-Leroy Reichenberger, W8LJD-Edmund E. Gunther, Jr., W8HMW.

WANTED: Early wireless gear, books, magazines and catalogs before 1925. W6GH, 1010 Monte Drive, Santa Barbara, Calif.

VAN SICKLE is the place to buy new or used equipment. Johnson-Viking, Eldico and Sonar Wired or Kits in stock. Big Trades. Easy Terms. W9KJF, 1320 Calhoun St., Ft. Wayne, Ind.

WANTED: Pentron Model 748 wire recorder radio phonograph, in gud condx. Also beam rotator. WØVQC, Virgil, South Dakota.

TUNING shafts for ARC5, 274N, ARN7, ARB, RU16, $2.00; MC211A, 35¢; MC136, $2.50; 274N racks and mountings, $1.00; BC348 potentiometers, $2.00. All new. L.I. Radio, Box 474, Montrose, Pa.

QSLS. Amateur radio's favorite QSL printer. Samples catalog, 25¢ refunded. Stronberg, P. O. Box 151, Highland Sta., Springfield, Mass.

FOR Sale: BC-348 receiver, extra audio stage, S-meter and noise limiter, balanced ant. input and ant. trimmer. In new condx: $65.00. W. A. Duke, P. O. Box 464, Springfield, Tenn.

QSLS? QSLS? State-map? Rainbow-map? Cartoon? Largest variety QSL samples, 20¢. Sakkers, W8DED, P. O. Box 218, Holland, Michigan. (Callbooks, $3.50).

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. QSL Press box 71, Passaic, N. J.

NOVICE crystals — 80, 40, and 15 meter — $2.75. 2 meter, $3.50. New, plated, and hermetically sealed. ½ in. pin spacing. Within 3 KC of requested frequency on fundamental. McNay Crystal Labs., W8ELB, 644 Probasco St., Cincinnati 20, Ohio.

WANTED: Any complete and perfect, or complete and excellent membership copies of *QST* published in period 1919 to 1925, inclusive. These contain Operating or Traffic Department Reports. Also want Special League Bulletin published May, 1919, entitled "Getting Together Again," sometimes called "Midget Issue of *QST*." Sumner B. Young, WØCO, R.R. 3, Box 94, Wayzata, Minn.

NEED: R5A/ARN-7 Bendix compass receiver and BC788 altimeter; BC-348 Receiver and parts; Advise at once price, condition. Also buyer of all surplus aircraft electronics. Write James S. Spivey, Inc., 1406 G St., N.W., Washington 5, D. C.

POSTCARD brings you free information on our new Amateur Desk Signs and money-saving club purchase plan. Hawkins Distributing Co., Paquatuck Terr., East Moriches, N. Y.

WANTED: AN/ART-13 transmitter and/or parts. Robert Wegelin, 410 Cedar Street, NW, Washington, D. C.

QSLS. High quality, samples 10¢. Dortch, W4DDF, Jocelyn Hollow Rd., Nashville, Tenn.

QSLS. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Fanwood, N. J.

ELECTRONIC Technicians. For permanent positions with Sandia Coporation. Armed Forces acquired radar or electronic experience desirable; trade school certificate with minimum five years experience. Versatility, capability and willingness to work most essential. Sandia Corporation, a subsidiary of the Western Electric Company, operates the Laboratory under contract with the Atomic Energy Commission in Albuquerque, New Mexico. Excellent working conditions and liberal employee benefits, including paid vacations, sickness benefits, group life insurance and a contributory retirement plan. No housing shortage in the Albuquerque area. For further information write to Section (2), General Employment Division, Sandia Corporation, Sandia Base, Albuquerque, New Mexico.

WANT: AN/ARC-1's, AN/ARC-3's, BC-610E's and components. Write to B. Spivey, 7013 Rolling Road, Chevy Chase, Md.

DX LOG of awards, the information you have been looking for. Contains the official rules for more than 30 awards with check lists to record your progress. DXCC covers nine pages alone. Only one non-DX award, WAS, which has space for five bands. Contains also postal data, countries cross-index, list of banned countries and other valuable information. The prepaid price to any country is only one dollar, U. S. funds. By air mail to U. S. and possessions $1.25. Send check or cash now to: E. C. Frierson, W4RKJ, Hobby Publishing Co., Easley, S. C.

WANTED: IRE and *QST*, 1925 through 1933; BSTJ up through 1946, April 1948, April 1951; RCA Review June 1947. George Maki, W6BE, 1417 Pacific, Santa Barbara, Calif.

SURPLUS specials! RG-8/U Cable 100 ft. $5.95, 250 ft. $13.25, 500 ft. $25.00. Coaxial Connectors — PL-259 5 for $2.25, SO-239 5 for $2.00. New tubes — 807 — $1.65, 811A — $4.25, 812A — $3.50, 813 — $10.50, 866A — $1.48, 304TH — $8.75, 872A — $3.95, 24G — $1.85. Postage extra. Request free bulletin and visit our new store for thousands of bargains. Want to buy or swap: Selsyns, Synchros, Servo Motors, Amplidynes, RTA-1B Aircraft Radio. Lectronic Research, 719 Arch St., Philadelphia 6, Pa.

QSLS. Something different! Send $3.00 for 100 and be surprised. 24-hour service. Satisfaction guaranteed or send 10¢ for samples. Constantine, Bladensburg, Maryland.

CORRECTION! RK4D32 tube, brand new, $17.50 postpaid. W5AXI.

POSITION offered: Man with knowledge of publishing, advertising and printing business. Must be familiar with ham talk. Licensed amateur is preferred. Give full details of experience, education, etc. Location East Coast. Some traveling necessary. New division of established company. Confidential. P. O. Box 155, University Branch, Miami 46, Florida.

SELL converted Meissner 150-B 300 watt, ten thru eighty meters, AM/FM 'phone CW xmitter. New modulation xformer, xtal mike, etc. With Model EX Signal Shifter, all coils, tubes and spare 813 811 complete, F.o.b. Cambridge $195.00. Charles Walcott, W1SYV, 81 Sparks St., Cambridge, Mass.

PERFORATED Sheet Aluminum 18 gauge with 1/16" holes. Easily worked with hand tools or cut to your pattern. Perfect for shielding. One dollar per square foot. Minimum order four feet. Write for bulletin. Nortmann-Duffke Company, 2740 S. 32nd Street, Milwaukee 46, Wisconsin.

QSLS! Two colors, $2.00 hundred. Samples for stamp. Rosedale Press, Box 164, Asher Station, Little Rock, Ark.

WESTON Laboratories, Inc., of Littleton, Mass., will purchase, for cash, your BC-221 frequency meter or any of the following: TS-173, TS-174, TS-186, TS-323, TS-13, TS-35, TS-34, APR-4 receivers or tuning units. Write, giving full details.

FREE! Reflectorized aluminum call sign through special plan. Whitley, W2LPG.

FOR Sale: BC453 Q-5'r — $15.00; BC454, 80-meter receiver $12.00; BC455, 40 meter receiver $10.00; BC167A, 80 meter transmitter $14.00; power transformer, 800 volt d.c. at 750 m.a. — $8 00; power supply, complete mounted, unwired 800–900 volt d.c., 225 m.a. complete with 816 tubes, sockets, switches, etc., $20.00; RG-8-U coax cable, 8 cents per foot. Sell 100 foot lengths or 500 foot coil; Ground station transmitter for private airplane frequency (122.8 Mc), modified ARC4 complete with preamplifier, external power supply. 832 final. Quickly changed to 2 meters. Two channel receiver, directions to make tunable, $65.00; Army surplus headphones, excellent, $2.00. Dr. Charles H. Scheifley, WØNOD, Mayo Clinic, Rochester, Minn.

ELMAC: A-54H and PMR6-A transmitter and receiver brand new in factory sealed cartons, also power supplies, terrific discount. Spring housecleaning, used Morrow 3-band, Stancor ST203A with VFO, Mac, W4NJE, Box 246, Lewisburg, Tenn.

SELL — Clean-up sale, new transmitter parts: one Thor. T-1 5RO1 plate & fil; one Thor. T-49381 h.d. fil. 5V & 6. 3V; one Thor. T-48001 h.d. plate; one Thor. 11M76 125W. "Multi-match" mod; one UTC PA124 10V. fil; one Collins 1400VCT. 212ma. plate; two WE 15h. h.d. filter chokes; two Johnson 320mmf. 4500V. tuning condensers; two Hamm. MC 20s; one National 100D; Emerson 1725 to 40 rpm. 110VAC motor, worm gear built in. Many other new parts — National, Johnson, Ohmite, Miller, etc. 25% off net prices. Write for complete list & details. WØREG, Carl Fastje, Denison, Iowa.

FREE to ham photobugs. List of highest quality items. Newman, 261 East Burnside Ave., Bronx 57, New York.

VAN Sickle has S-53A, $65.00; NC-88, $98.00; NC-125, $165.00; SX-71, $199.00; HQ-140X, $219.00. All guaranteed like new. W9KJF, 1320 Calhoun St., Ft. Wayne, Indiana.

TRANSFORMER with chokes, 3140 vct, 700 ma. d.c. out. All Amertran, $25.00 F.o.b. W9LJH, Teutopolis, Ill.

75 WATT "power plus" transmitters, $59.00. Complete. Atlanta Electronics, Box 7114, Station C, Atlanta, Ga.

FOR Sale: Globe-King 400 transmitter, Shure 777 mike, coils for 80-20-10 xtals for 10 complete, $325.00. Meissner 150B, VFO with all coils, $275.00; Elmac mobile receiver PMR-6A, $85.00; Heathkit 5" scope, $35.00. F.o.b. Newark, N. J., Clark, W2OZD, 299 N.J.R.R. Ave., Market 3-2223, Little Falls, N. J.

SELL: Pair nearly new GE806s, $20.00 each; new 304TLs, $4.00; 4-125A, $15.00; 5 Ma. 3½" Burlington meters, $2.00 each; used 250TL, $5.00; 35T, $4.00; transformer 700 VCT 250 Ma, 5 v, 6.3 v, $3.50; Want: pair 4-250As. James H. Buck, W9ZDS, RFD 8, Ft. Wayne, Ind.

SELL: TBS50D and APS50 de-TVI'd, $119.00; Master Mobile antenna mount, 75 and 20 coils, $13.00; 6v. coax relay, $9.00; Gonset Tri-band, $29.00; 6v. Dynamotor 425 @ 275 Ma., $23.00; Meissner EX turret exciter, $39.00; BC221 with book, xtal, regulator supply, $89.00; VHF/152A, $49.00; R/9'er with 10 and 20 coils, $13.00; Eico unused VTVM, $29.00; RCA 5" scope, 160B, $49.00; Alliance HiR rotator and thrust bearing, $10.00; Super Pro BC1004 in cabinet with supply, $149.00; H. L. Folkerts, W2HFZ, 465 Ft. Lee Rd., Leonia, N. J.

SELL: BC348-N, RME 10-20 Converter, $110.00. WØATP, 9312 East Gregory, Hickman Mills, Missouri.

SWAP: Above average value in ladies or gents new diamond ring subject your inspection for clean TVI proofed 32V2. W5FPL 5918 Southridge, Houston, Texas.

HARVEY-WELLS DeLuxe with Harvey-Wells VFO and matching home built power supply. Used 25 hours perfect condition, $120.00. W5EIO, K. M. Jessup, 1813 Lynnhaven, Ft. Worth, Texas.

FOR sale 32V3 Collins Trans. with spare 4D32. Best offer ove $650.00 orig. carton. W2AES, 218 Commonwealth Ave., Massapequa, L. I.

HIGH power amplifier 600–750 watts. Pr VT-127As, RF, pr 100THs modulators. MB-150 tuning unit in grid; set of BC-610 coils, HD power supply, 2000VDC, 650 Ma., $350.00. Dynamotors, Vibrapack, HV power transformers, chokes. Panel meters, xtals. D. R. Gardner, W2GSS, 209 Knapp Road, Syracuse 4, N. Y.

FOR Sale: All are brand new: two 832As, $5.00 ea; two 250THs, $12.50 ea; 829B, $6.50; BD77 generator, 14 v. in, 1000 v. out, $20.00. Elvin Miller, R. 4, Elkhart, Indiana.

RME-69 receiver. In good condition, $60. Thomas Crow, W6HGW, 901 Robertson Way, Sacramento 18, Calif.

FOR Sale: SX-71, R42 speaker, $220.00; Viking I de-TVI'd, VFO, spare 4D32, $270.00. All in new condition and used only 10 hours. W3LAT, Ralph P. Adelman, Mars Theatre, Mars, Penna.

NC57, used less than 10 hours; looks as good as new, $65.00. No trades. Send in for list of gear and xtals to trade. Louis M. Blum, 2661 Dibblee Ave., Columbus 4, Ohio.

MAGAZINES: *QST*, 24 years, 1931 through 1953, with December 1943 missing. Radio 1938 through 1941. Some 1937. CQ, some copies 1947, 1948, 1949. Make an offer. Charles Miller, W2DPS, 10 Compton Road, New Hartord, New York.

QSLS. We've printed a million for hams all over the world. Samples 10¢, refunded. VYS Print, 1704 Hale Ave., Ft. Wayne 6, Ind.

YOUR call in attractive, modern, white, raised letters on black bakelite, 2 x 6½ inches: $2.50 postpaid. M. Weiman W2BCP, 4514 Ave. K., Brooklyn 34, N. Y.

VERY sweet baby mobile antenna satisfies XYL mobile antenna problem. Beautifully chromed, only 4 feet high. High Q weatherproof plug-in loading coils. Changes bands instantly. Top section resonates antenna to operating frequency. Becomes regular car whip when coil is removed. Perfect for Gonset, Elmac, Viking, etc. Bandswitching transmitters. Tiny but effective on all bands. Replaces regular cowl or fender broadcast whip. Easily installed in a few minutes. Coils available 75 through 10 meters. With mounting hardware and one coil, $12.95 each. Specify band. Other coils, $2.75 each. W6VS, Bill Davis, 225 Cambridge Ave., Berkeley 8, Calif.

MOBILE operating station for sale. Bandswitching 10-watt 5-through-160 transmitter (6N7 modulates 5763). Morrow 75-20-10 converter. Philco 9-tube radio. TNS noise suppressor. Mallory 200 Ma. Vibrapack, dash control unit, panel meter (S-meter, modulation, crystal and band indicator), RCA microphone. All plug-in, relay-controlled. E. S. Winlund W1KIJ, 80 Timber Trail, Wethersfield, Conn.

FOR Sale: Pilot FM tuner, like new, $22.00; Heathkit G2 audio generator, square and sine waves, in very gud condx, $22.00; BC-453, Q5'er, very gud, it works, $15.00; 35-watt 12" auditorium speaker, self-powered, $15.00; logarithmic resistor, Daven, LR501, new, never used, $50.00; RCA 3" scope, 155A, very gud condx, $45.00; Would like to sell all these as soon as possible and no reasonable offer refused. Harry L. Smith, W3WWW, Betterton, Md.

150 Watt CW xmitter, $95.00; Meissner Deluxe signal shifter, $40.00; Hallicrafters R46, base reflex speaker, $15.00. All are in excellent condition. T. E. McBride, W7STA, 3330 N. 27th Ave., Phoenix, Arizona.

URGENTLY need AN/APR-4 items. New high prices. Littell, Far Hills Branch, Box 26, Dayton 9, Ohio.

SELL: NC-125 receiver and speaker; Admiral 16" TV, Triplett tube-tester, model #3413, all in excellent condition. Charles Horn, 325 E. 163rd St., New York 51, N. Y.

QSLS: 150, $2.00. Samples 10¢. Credited. Bob Garra, W3UQL QSL Service, 414 Mahoning St., Lehighton, Penna.

SELL: Collins 32V2 recently factory-improved to 32V3, except shielding with line filter, $475.00; 75A1 receiver with Collins speaker, $260.00; APT 85 1000 Mc. Surplus transmitter unpacked, $50.00; #5 selsyns, $10.00 pr.; ARC-4 2-meter surplus, unpacked, $20.00; BC645, unpacked, $10.00. All sales F.o.b. Rock Island, Illinois. Frank F. Wingard, W9EWH, 4517 13th Ave., Rock Island, Ill.

ALUMINUM tubing, square, rectangular, and solid aluminum. Write for circular to Handy Tool, Inc., P.O. Box 142Q, Tilton, N. H.

WILL sell or trade: 2 Mar 11 transmitters, complete with all intercoms; 3 BC620 transceivers; 2 BC620 power supplies. Our club needs a good receiver. Albert Carpenter, WN8ORM, Blossomland Amateur Radio Assoc., 2503 Langley Ave., St. Joseph, Michigan.

QST 1936 through 1944 complete, plus 41 odd copies 1921–1939. Whole lot only, $40. Also old Kennedy 220 receiver and 525 amplifier. In wonderful condition, $45.00. New RK-4D32, $15.00. W2AEB, I. C. Grabo, 90 Lakewood Ave., Cedar Grove, N. J.

SELL: 25-watt Hammarlund AM transmitter, five bands, shock-mounted, wooden cabinet, NC-57; BC-1068 for two meters; BC-406. Nelson Bigelow, 712 Louisiana, Lawrence, Kansas.

SELL: Hammarlund 400X, like-new. Weston meters 0–50 Ma, etc. R. Long, 933 E. Broadway, So. Boston, Mass.

FOR Sale: Collins 32V2 transmitter, low pass filter, excellent condition, $450.00. Local area preferred. Joseph S. Michane, W2ZMG, 2436 Mountain Ave., Scotch Plains, N. J.

VIKING Mobile with VFO, in perfect condition, used briefly at home, price $120. W8AJS.

SELL: Simpson 27 200 microamp meter, unused, $3.50; 15 minute timer, 2½ diam., unused, $2.50; alum. transmitter cabinet, all vents screened, 17¼" x 12½" by 13" deep, no panel, $6.00; rectifier power unit for RAL7. Unused 3 Kv. 110v gas driven generator, $399; miscellaneous hi-volt filter condensers. George C. Miller, W2IAH, 362 High Street, Perth Amboy, N. J.

MENDE German rcvr, best offer over $35.00 takes it. TRF rcvr, best offer over $18.00. WN5BOF, Kassner, 115 N. Clark Rd., El Paso, Texas.

SELL HRO-50, in excellent condition, A, B, C, D, AA, AC coils, $260.00. New PE-103, $25.00. Want: SW3 or RME-84. Ray Rinaudo, R.F.D. 1, Box 185, Acampo, Calif.

HI, Fellas! Useful and beautiful: Neckties with your handle, call and antenna towers handpainted in contrasting colors. For prices write to Henry Schanding, W3RRF, R.F.D. #2, Harrington, Delaware.

WANTED: ART-13, TCS, BC-348, HQ-129X, SX-71, NC-183, etc. Write for free list of ham bargains. Farr Electronics, Box 273, Lexington 73, Mass.

FOR Sale: 221 P in 221AL case, $50.00; Collins 310C-2, $70.00; 453, $15.00; 459, $15.00; 342D, $60.00. Frequency multiplier as per '53 Handbook, $25.00; 829 B, $7.00. All items are in excellent condition. Stamped envelope brings full description. W3YCN, Worton, Maryland. Money orders only.

VERTICAL antennas. Square aluminum construction. Fully adjustable 10-40. Ham's dream. Write W6MRR, Norm Theobald, Roban Laboratorics, 618 Cherokee, Los Angeles 4, Calif.

URANIUM. Big samples. Radioactivity guaranteed. One dollar. No stamps. E. E. Fletcher, W5WRS.

QSLS. Quality with economy. Samples, 10¢. W4AYV, Stinnette, Jr., Umatilla, Fla.

NC-125 with speaker, for sale: $100. W2CKQ. Meditz, 1326 Decatur St., Brooklyn 27, N. Y.

VIKING II, Viking VFO, $270; S-40B, $70. All in good shape, with manuals. Louis Champion, Rt. 1, Box 45, Templeton, Calif.

FOR Sale: Collins 1 Kw transmitter. Original cost $3500. Sell for $1150. F.o.b. Write for details and list of other radio bargains. Arthur Faske, 1751 St. John's Place, Brooklyn, N. Y.

BARGAIN! 80-40 10 W. xmitter (11–53 *QST*), $11.00; Meissner 3BK rcvr, $6.00. Both for $15.00. Joel Anderson, W1YZY, R.F.D. #1. Terryville, Conn.

SWAP: Hammarlund Super Pro, for a good tape recorder. William Reynolds, 104 King Street, Pottstown, Penna.

WANTED: SX20R, SX17, SX23, NC57, NC240D and other old receivers. C. R. Gerst, 2674 W. 25th St., Cleveland 13, Ohio.

COLLINS 32V3 transmitter, like new, $600.00. Robert E. Gallaway, W5LBD, Box 323, Uvalde, Texas.

SX24 and speaker, $65. CML broadband 2-meter converter, $15.00; parts for 250-watt transmitter, including complete set of B&W 500 watt coil and base, $30.00. Walter F. Walsh, W2BTE, 368 Durham Ct., Union, N. J.

FOR Sale: National NC100X with speaker, 900 volt power supply, Polaroid camera, flash, and exposure meter. Make me a reasonable offer. R. L. Weigel, 1507 West St., Utica, N. Y.

FOR Sale: Gonset 3-30 Mc. converter, in good condition. Has been used very little, $25.00. H. G. Caldine, W2GOC, Box 1362, Rome, N. Y.

SELL: Eldico low pass 52-72 ohm low pass filter, $5.00; Heath SG-6 signal generator, in new condition, $10.00; Eldico electronic key with built-in monitor, $15.00. R. H. Bedell, W2HFM, 60 Lindgren, Merrick, N. Y.

FOR Sale: National NC-173 w/speaker, in gud condx, $128.00; Harrison antenna coupler, $15.00; PE-103A, new, never used; with extra brushes and plug for output, $27.00; BC459, $6.00. First money order and F.o.b. at George J. Wagner, W3PHU, 120 Phillips St., Speers Hill, Charleroi, Penn.

TRADE or sell: Selsyns 2J1GI, used, $8.00 pair. ARC5 1415 Kc lf's, $2.95 per set; Heath VTVM V6, new, $26.00; TC1P tube-tester, new, $36.00; Eico #1040, new, $25.00; PE101C, converted, new, $5.00; Tech manual BC221, new, $1.50; 178 issues of *QST*, 44 issues of CQ; all plus postage. Need: Tech manual BC348N, Command receivers, xmitters, BC348's, or what have you? M. J. Marshall, 455 Washington Ave., Dumont, N. J.

TWO 4E27A (5-125B) used, guaranteed, $9.00 each; 2, new RCA 828s, $3.00 each; good 805, $1.00; GE Pyranol, 6000V, IMF capacitor, new, $2.00; new F15V filter, $2.00; 540-0-540 250 Ma. transformer, new, $3.50. All are F.o.b. No. Plainfield, N. J. Joe Harms, W2JME, 225 Maple Ave.

TR-75TV (80–40), S-38C, $40.00. Write Michael Neidich, K2ENN, Anstice St., Oyster Bay, L. I., N. Y.

SELL! Elmac A54, Gonset Triband converter and matching clipper, Master Mobile whip for 75 meter coil, $130.00; Hickok signal generator, 170X, $20.00. K2BDA, Weik, 331 Bergen St., Trenton, N. J.

SELL: Stancor poly-pedance xfrmers, A4762 driver and A3829 175-watt mod., $15.00 for pair; 20-meter 35W mobile station, complete, ready to operate, $65.00. Particulars. A. J. Siegler, W2HRH, 727 Brower Ave., Franklin Sq., L. I., N. Y.

FOR Sale: QSTs from September 1934 to December 1953. Best offer. W60KP, V. C. Vielleneve, 2313 Torrance Blvd., Torrance, Calif.

TRADE: Chanalyst, Hickok tube-tester, Jackson condenser tester and TalkaPhone. Want: Outboard motor and tape recorder. Floyd D. Howard, W5KUZ, 1422 Woodland St., West Monroe, La.

SELL: Excellent 50-watt xmitter; 3 band; *QST* diagram, less power supply, $17.00. Albert Sheppard, W4ZSC, R.F.D. 3, Griffin, Ga.

WANTED: Variable condenser National TMA-150-A. Fred Norton, 1450 Norman Ave., Muskegon, Mich.

ATTENTION — S-38B receiver, $35.00. Freight or express collect. W4WRV, 805 Broad St., Richland, Ga.

PAIR Elmac 4-125, $25.00; pair Eimac 4E27A/5-125B, $30.00; pair 805, $4.00. All postpaid. Whisnant, W9EBI, 2506 North Main, Mishawaka, Ind.

SX-25 receiver, in excellent condition, with matching speaker, $80.00. Sorry, cannot ship or deliver. John Wallace, W2LCU, 18 Third Ave., East Islip, L. I., N. Y.

VIKING I, de-TVI'd, Viking VFO, new condition, $190.00; Collins 75A2, with speaker, new condition, $325.00; NC-125 with speaker, new, $130.00; Harvey-Wells TBS-50C, Harvey-Wells VFO, de-TVI'd, like new, $100.00; BC-221 for $60.00; Vibroplex, $10.00. George Snyder, W3LSS, R.D. #1, North East, Penna.

SONAR SRT-120P, 1953 model, never used, complete with power supply, original price, $279.50. Can be had for only $165.00. Jerry Klein, 235 Lyons Ave., Newark, N. J. Phone WA-3-3025.

WANTED: Unrevised oscillator coil and switch assembly for BC348 J, N or Q. Blett, W8CBM, 19176 Forter, Detroit 35, Mich.

SELL: Mobile station. RCA transmitter 807 PA 40S. Gonset Triband. Whips. Best offer. W8RDZ, Lowenstein, 3287 Washington Blvd., Cleveland, Ohio.

URGENTLY needed: Bandspread dial for an SX-25. Minor, W5WSM, Rt. #3, Shawnee, Okla.

SSB? 2000 volt condensers. Offer ten C-D filters 1.5 μfd. Rating 750 VAC. $10.00 and postage. W2OLU, Johnson, 10 No. Tenth, Mt. Vernon, N. Y.

COMPACT 120 to 200 W. 'phone/c.w. xmitter. Must be de-TVI'd. Will pick up within 100 miles radius of Chicago. Write to Jay H. Smith, W9WTG, Hamilton & Roosevelt Rd., Elmhurst, Ill.

CLIPPER-speech amplifier via Handbook and 5514 modulator, UTC CMV-4 with 1500 VDC @ 280 mill supply, using Stancor PT8314. Also 2000VDC @ 300 mill supply using UTC S-49. Taylor tested T200. All inquiries answered. O. Nash, Star Route, Sanford, Mich.

FOR Sale: 6J6 tubes, bulk-packed, 400 per case, $150.00 case, or 40¢ broken quantity. W4KSW, Thorpe, Hickory, Va.

SELL: Gonset Triband, $21.95 and National Multiband 150, $14.25. W3IFH, Strite, 31 No. Grant St., Waynesboro, Penna.

TELETYPE: Sell Model 12 page printer, complete. 21A strip printer, PE-103 generators, walkie-talkie pogo-stick transceivers. W6DOU, Lemon, 1558 "B" Street, Hayward, Calif.

WANTED: Hammarlund BC779 or SP400X. Please state price and condition. For sale: Hallicrafters AM/FM tuner, S-31, $25.00; pair new 810s, $15; pair 812Hs, $10, new; Weston 3" round meters, $3.00 each: 0-15 VAC, 0-1 Ma; 0-100 Ma; 0-5 thermo-amps; Supreme 4" square meter, $5.00; black wrinkle cabinet, 14", $5.00. A. W. Speyers, W2CZA, 39 Lowell Ave., Summit, N. J.

SELL or trade: 813's, PE103, Pr. 811s, modulator, Meck xmitter, 1200 v. pwr. supply. Other parts. List on request. Want S.W. meter. WØSVA, Roselbein, 2619 So. Gaylord, Denver, Colo.

COMMUNICATIONS type generator, 6V, Ford, Jumbo, 60 amperes or more, fork mount, $35.00. C. Lee, W4PHJ, 827 Palatka Rd., Louisville 14, Ky.

COLLECTION of years going for a song! Meters, transformers, selsyns, rotators, variable and filter condensers, relays, hundreds of items. List for a 3¢ stamp. W9ERU, Hubbell, 2511 Burrmont Rd., Rockford, Ill.

SALE: HQ-129X with speaker, $140.00. Also RCA RCA 810, 866, HY75. Make an offer. D. G. Fuller, 210 Utica St., Tonawanda, N. Y.

WANTED: Workingman jeweler, will trade lady's finest quality diamond ring set, certified appraisal of $375.00 for commercially built multiband mobile transmitter and power supply, converter, antenna and coils, or complete mobile station. Will pay freight. John Brownston, W6LPN, 5629 E. Granero Way, Sacramento, Calif.

USED 5820 image orthicon tubes. $50.00 each. Fine for amateurs or experiments but resolution substandard for commercial TV. J. M. McDonald, W8HF, 140 West 9th St., Cincinnati 2, Ohio.

FOR Sale: Complete as furnished by Motorola, 50 watt 75 meter mobile transmitter, new, Motorola receiver, Gonset triband, control box, push-to-talk mike, all cables, with plugs. Premax antenna, in perfect condition, ready to install. First $200 takes. W1CPI.

WANTED: W. E. filter D165628. Sell Model 12 teletype, excellent, minus keyboard; toroids, 9 henry, centertapped. W6HFK.

FOR Sale: Harvey-Wells TB350-D, $95.00. Harvey-Wells power supply, $10. Also Millen 90810 VHF xmitter, $60.00. 2-meter beam, $15.00. If interested, write to Nick Quackenbush, WN3YEJ, 39 Butler St., Kingston, Penna.

WANTED: National HRO. Please state model and price. Robert Becker, 200 South Williams St., Westmont, Ill.

SWAP or sell: Sonar VFO-exciter NBFM modulator/phone-c.w. monitor, speech amplifier. 8 tubes, power supply. Also Webster "electronic memory" wire recorder. Latest model. Both in excellent condition! Want: Collins 310-B or what have you? All replies answered. K6DCA, 2422 8th Ave., Oakland, Calif.

FOR Sale: 250 watt all-band c.w. rig complete with Millen Variarm ECO and Antenna tuner. Furnished with 40 meter coils. Standard 19" panels mounted in sturdy wooden rack. All stages individually metered with brand new Simpsons. Consistent FB sig. rpts received. 807 buffers 811 final. Bargain for $115.00. Write P.O. Box #1225, Harrisburg, Penna.

WANTED! Extra Class ham, commercial tickets, wants full-time position, available June first. Box 175, Chelsea Square, New York 11, N. Y.

WANTED: Collins 32V2 for cash or will trade Collins 310-B1 and pay the difference. W4MZO.

WANTED: Hallicrafters receiver, S-76 or better; must be in perfect condition. Name your best price. R. G. Gerlach, W3UZM, 1029 Hoover Ave., Feasterville, Penna.

TOWER: 100-ft. steel, self-supporting, three-legged, $745.00. Details sent on request. H. C. Kauffman, W8IUB, 960 King Ave., Lorain, Ohio.

QSLS. If you're rich, in no hurry, and will buy anything, the "Super-speed special" is not for you. Samples 10¢. Robinson, W9AYH, Dept. D, 12811 Sacramento, Blue Island, Ill.

NC183D's, with speaker, $295.00, guaranteed A-1. Electronic Labs, 2444 "D", Lincoln, Nebraska.

FOR Sale: SX-43 rcvr, and speaker, in gud condx, $95.00; Astatic JT-30 mike with chrome stand, $8.00; 813, $4.00; 809, $2.00. W8MFD, Bobby Jones, 569 Wilkinson St., Cincinnati 6, Ohio.

SELL — Stancor ST-203-A transmitter complete with tubes — Perfect condition $31.00. A. H. Hardwick, W2VQ, Orange, N. J.

SELL: 40 w. 40/80 meter transmitter; NC-33 Receiver; Lettine 240; Write for details. S. Dubov, 3100 Brighton, 2nd Street, Brooklyn, N. Y.

BUILDING up shack: will offer generous allowance for certain used equipment toward purchase price of new Ford. Ross, K2GDO, salesman for Jerry Kantor, Inc., Lakewood, N. J.

FOR Sale: 30-50 Mc. Receivers Crystal Controlled. Spera, 3710 33 St., L. I., N. Y.

FOR Sale: Brand new PE-103 Dynamotor complete with filter in original unopened shipping crate $30.00. SCR-522 transmitter-receiver unconverted complete with tubes, cable connectors, PE-94-B dynamotor and BC-602-B control box. $35.00. Want large powerstat. Roy Morris, W4PXW, Box 138, Somerville, Tennessee.

FOR Sale: The hard to find BC-946-B. 520 Kc to 1500 Kc, hottest broadcast receiver yet built. New, in original carton $22.50. Wayne Phelps, W5OQK, 26 N. Wynden Dr., Houston 19, Texas.

ELECTRICAL and all types of fires put out quickly with the small but powerful Presto Fire Extinguisher. Guaranteed twenty years. $3.98 Postpaid. Keith-Kraft, W2OGS, Box 2, Fanwood, N. J.

FOR Sale: 2 new GE 814's — $5.00 each, 829B — $5.00, 1625s — $.50, 807 — $1.00, Power Supply parts — 600V @ 200 ma. (Stancor PC8414) with chokes and cnnd. — $13.50. 2 ODJ's — $1.00 each. Will ship. Roger Aden, W9UZP, Golden, Illinois.

FOR Sale: SX-25 Receiver $70, BC-453 new $15, RA-20 Power Supply for BC-342 $12, AX-4-125 Tubes, New $30 pair, SCR-522 Xmtr with Xtal, Tubes, Power Supply, Microphone, ready to operate $65, 600 watt Modulation Transformer $25, AN/ART-13 Driver and Modulation Transformer $15. Send for complete list of Ham Gear. Seidman, W2GNZ, 1535 Longfellow Avenue, New York, N. Y.

FOR Sale: Viking II. This transmitter was bought factory-assembled and has been in use for less than one year. It is guaranteed to be in excellent condition. Best offer received over $275 within 15 days from issue date of this QST takes it. Contact Bill Tisdale, W2KEL, 170 Ridgewood Road, Buffalo 20, N. Y.

WE are now in our new ultra modern building with fresh stocks to serve you. Bargains, with new guarantee: Gonset 10-11 converter $19.95; VHF-152 $49.00; HF 10-20 $59.00; S-72 $69.50; S-40A $75.00; RME-45 $99.00; HRO Senior $99.00; Lysco 600 $109.00; S-27 $109.00; SX-43 $129.00; S-76 $149.00; SX-71 $169.00; SX-42 $189.00; HRO-50 $275.00; 75A1 $275.00; 90800 exciter $22.50; HT-17 $32.50; EX Shifter $69.00; Globe Trotter or Globe Scout $69.50; TBS-50D $99.00; HT-9 $199.00; Globe King $295.00. We need used receivers. We give highest allowances for S-20R; S-40A; B; NC-57; NC-100; NC-125; SX-24; SX-25; HQ-129X, and similar receivers. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

COLLINS 32V1 for sale. Excellent condition with original packing case and manual. Best offer accepted. Also new 4D32, coaxial relay and carbon mike. Bernard McConnell, 551 W. 174 St., NYC, N. Y.

QSLs! "America's First Choice!" Samples 10¢. Tooker Press, Lakehurst, New Jersey.

SELL: Collins 32V2 with mike, low pass filter; $425. C. Lindemann W1MLM NBC-TV, 30 Rockefeller Plaza, NYC, N. Y.

COLLINS 30 K-1-75A2, $1400, New Surplus dynamotor filtered 12 Volts, out 500 Volts $15 & $25. BC 221 — $80, B.C. 348 R. $125. Hallicrafter S-22R $60. F.O.B. W1THM.

SALE: S-40 receiver $48; HRO-5-T $150; J50 watt phone-cw xmtr $190; Signal Shifter $40; WRL Globe Trotter $50; Ralph Queen, Route 7, Spartanburg, S. C.

SX-71 with R-46 speaker, new, latest models, in original cartons, $225.00. Latest model TBS-50D, Bandmaster Deluxe, with APS-50 and special Harvey Wells rack panel. All mounted in double copper shielded cabinet with recommended TVI filters. Can't be told from new, $150.00. Manuals with each. W1KJO, 29 Pine St., Bedford, Mass.

ROCHESTER, New York will be the headquarters for the Western New York Hamfest, Saturday, May 15. Full featured program starting at 1 P.M. See "Hamfest Announcements" elsewhere in this magazine. R.A.R.A., P.O. Box 1388, Rochester, N. Y.

FOR sale: 80 m V.F.O. using 802, $7.50; new unmodified BC696A with FT234 rack, $17.00; FT227A dual rack, $1.50; R44/ARR5 27 to 140 mc superhet with speaker and power supply, $45.00; .52 to 1.5 mc command rcvr. with built-in AC pwr. supply, $15.00; B.C. 655A, 17.5 to 160 mc target xmtr including 200 microamp meter, $15.00; 6V 3A, 6.3V 2A and 5V 3A triple fil. xfmr., $2.50; 10V 8A, 6.3V 5A dual fil. xfmr. $3.00; 68, 73 and 78V .5A tapped bias xfmr., $2.50; 350V 120 ma plate xfmr. $2.50; 550 V 250 ma plate xfmr. $5.00; W8NKK, 1240 Bedford, Grosse Pointe 30, Mich.

SELL: 32V2. Has been commercially de-TVIed by authorized Collins service agency. Also, Eico signal generator $10.00. Box 33, Dyker Station, Brooklyn 28, N.Y.

JOHNSON Viking II transmitters wired and tested, modified with RK4D32 final $339.95; also available with regular 6146s $319.95. Viking VFOs wired and tested $54.95. We trade and offer terms. Largest variety of used equipment in New England, write for latest list to Carl, W1BFT, Evans Radio, Concord, N. H.

SELL: Boehme automatic perforated tape keyer for Morse code with McElroy three-key tape perforator, $145. Dumont #241 Scope, $245. Collins 32V-3 $585, 32V-2 $485. 75A-1 $265. 75A-3 $425. 30-J Transmitter $350. AR-88-D $275. SX-42 $165. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston, 8, Mass. Richmond 2-0916, Richmond 2-0048.

HRO-7, $125; HRO Senior $50. Or best offers acceptable. Want 75A1. W2BXK 85 Livingston St., Brooklyn.

75 WATT xmtr kit for sale. 6AG7, 807–807 tube line-up. Complete instructions. $50 plus shipping. John Hopkins, Box 327, Brattleboro, Vermont.

BC 610E Complete all tubes, coils, remote cables, etc. Excellent Condx. Best offer over $300.00. W6GVY, c/o Woodward, 118 Greenoaks Drive, Atherton, Calif.

NEW crystals for all commercial services at economical prices; also regrinding or replacement crystals for broadcast, Link, Motorola, G. E. and other such types. Over 19 years of satisfaction and fast service. Eidson Electronic Company, Phone 3-3901 Temple, Texas

FOR sale I-222A Sig Gen Freqmeter 8–15, 150–230MC almost new $50.00 BC645A rec trans new $10.00 10 position push button tuner new $4.50 304th new $6.00 pair 803 new $6.00 W2IIQ, Demarest Crescent Ave, P.O. Ramsey, N. J.

SELL new transformer 600v 600ma to 2400v 300ma $15; new 80,40 ARC5s, rack, 24v. fil. transformer $20 one, $30 both; Diathermy outfit 300 watts rf, 500ma supply, meter, cased, make excellent final, best offer; Test set 4 Jewell meters $7; new 828 $8; small beam rotor $5; 10 or 20 Harmoniker kit $3 W2GWT, Penn Yan, N. Y.

HAMFEST — Plan to attend the Starved Rock Radio Club Hamfest June 6, 1954 at Boy Scout Camp Ki-Shau-Wau. Same place as last year. Follow "Hamfest" signs South from Junction Illinois routes 178 and 71 near Starved Rock State Park. Persons travelling route 51, turn East at Tonica, Illinois, follow blacktop road. This is our twentieth year of affiliation with ARRL. More details from W9MKS, Utica, Illinois.

TECRAFT 2 mtr. crystal converter, complete, factory wired and adjusted, never used $33; New LW-50 (p. 120 March QST) 2 mtr transmitter, factory wired, all tubes except final $40; new Elincor 2 mtr five element beam $6; Heath G-5 Signal Generator $10; Millen 2 mtr wavemeter $3; 60 watt Stancor polypedance mod. transformer $7. All FOB Cleveland, Ohio. W8SQS, 3826 Strandhill.

HICKOK Mod. 292X Signal Generator, new, in original carton $250.00; Hallicrafters S-82 FM Receiver $50.00; Policalarm Monitoradio Mod. M–51 $50.00; Motorola FMTRU-16V-30D 152-174 Mc. Mobile Unit complete, less crystals, $225.00. All equipment certified complete and in good working condition, none have been altered or rebuilt in any way. Will prepay postage to any point in U. S. or possessions. H. W. Hitchen, KL7PG, 2906 Alder Circle, Eastchester Br., Anchorage, Alaska.

WANTED: Surplus or used electronic equipment taken in trade for new Johnson Viking, Hammarlund, National, Elmac, Gonset, Harvey Wells, Central Electronics, Hallicrafters, Especially want ART-13, DY-17, BC-312, BC-342, BC-348, APN-9, BC-610, AR-88, BC-221, 32V, 75A, 310, test equipment, technical manuals, teletype, ARC-1, ARN-7, parts for these sets. Alltronics, Box 19, Boston, 1, Mass. Richmond 2-0048.

COLLINS 32V3 new never used just as shipped from factory will sacrifice $650.00 you come for it. If shipped $5.00 extra to pack. Also new Johnson Match Box, new, never used: $44.00. Vic Schleuder, WØBKX, New Ulm, Minnesota.

SWAP — Supreme AF-100 transmitter for communication receiver. King, Box 182, Crisfield, Maryland.

HOUSE cleaning, many new and new surplus parts are to be sold. Most parts were collected for a 1KW rig with 810's and 813 mods. Will send list to those requesting same and who can pick up the items as I cannot pack and ship anything. About $600.00 worth of parts to go at $341.70 with a larger discount on the entire lot. James Hanson, W1NQO, Haddam, Conn.

REAL bargains: New and reconditioned Collins, National, Hallicrafters, Hammarlund, Johnson, Elmac, Gonset, Babcock, Morrow, RME, Millen, Meissner, Lysco, others. Reconditioned S38 $29.00, S40A $69.00, S40B $79.00, S76 $129.00, SX71 $169.00, NC125 $129.00, NC183 $199.00, HRO50T1 $299.00, HRO60 $499.00, HQ129X $169.00, VHF152 $29.00, VHF152A $39.00, Meissner bandswitching VFO $49.00, Viking I $189.00, Gonset Tri-band $29.00, Hammarlund SP400X Super Pro $259.00, Collins 75A1, 75A2, 32V1, 32V2, many others. Shipped on approval. Easy terms. Write for free list and details. Satisfaction guaranteed. Henry Radio, Butler, Mo.

MOTOROLA 6V. Vibrapaks P-8115, Output 180V, 75 ma. Like new. Postpaid $12.50. Commercial Electronics Service, 6100 Lebanon Ave., Philadelphia 31, Pa.

QSLs! SWLs! See this month's 2-color Special — $3. See our 3-D card!! Free samples. Acme Printers, 707 W. 8th, Los Angeles, Calif.

SELL: Rack mounting 120 watt VFO all-band phone cw transmitter. Double conversion ham-band superhet, selectoject built in. Any reasonable offer all or part. Mendelson, 105 Leslie Street, Newark 8, New Jersey.

COMPLETE mobile rig nothing else to buy. All factory made. No junk. $120.00 Dr. Baker, Wood, Wisconsin W9VHX

FOR Sale: Browning Model MD-25A, FM modulation meter $275.00. C. E. Clark, W8KWZ, 610 8th, Marietta, Ohio.

FOR Sale: 1 Webcor Model 2010, brand new, in original packing-case: cost $207.00. Best offer over $150. M. Beha, WNØRED, O'Neill, Nebr.

FOR Sale: Gertsch Freq. meter FM-1, 20-480 mgs. Lampkin 205 mod. meter, 25-200 mgs. Both for $500. W6FUJ, 2546 34th Ave., Sacramento, Calif.

SELL: S-38C, $42.50; BC-454, with pwr supp, $20.00. Both in good condition. L. Abercrombie, WN9CLH, 417 Arnold Rd, East Peoria, Ill.

WANTED: Measuring and testing equipment and VFO. Ken Miller, W8LSA, 1108 Clearview Ave., Parma 9, Ohio.

FOR Sale: Collins 32V2 with low pass filter and spare 4D32 tube plus Collins 75A1 receiver, all for $750. F.o.b. San Pedro, Calif. O. F. Dedrick, W6NGK, P.O. Box 350, San Pedro, Calif.

ELMAC A54-H transmitter, excellent condition, used only in fixed station, 40 meters added, $69.50. Bonner, W4MXP, USS Cogswell, FPO, New York, N. Y.

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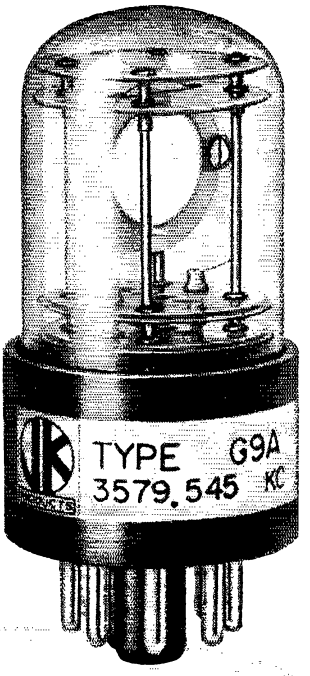
Speeding Electronic Progress through CRYSTAL RESEARCH

JK PRODUCTS

The new JK-G9A extends the advantages of glass enclosed crystals to the medium-frequency range between 1200 kc and 5000 kc, providing a superior crystal for many applications in VHF and UHF equipment, frequency standards and monitors, and other precise requirements. The crystal operates in a vacuum, free of contamination and protected from its environment. The unit has excellent mechanical ruggedness. The crystal plate is custom designed for each application and is capable of performance far beyond previously available types. The unit may be designed for maximum stability over a wide temperature range, or temperature controlled in the JKO7E oven. Approximate height, above chassis, 2.375". Maximum dia. of octal base, 1.260". Consult us on specific applications.



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The James Knights Company leads in the design of crystals for the most critical applications. If you have a frequency control requirement of any nature consult us early in your design. An early consultation lets you make full use of the newest JK developments. Our broad experience and constant research can undoubtedly aid you in choosing the crystal unit best suited to your application.

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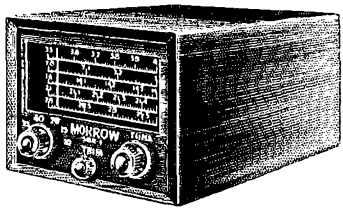


LATEST MODEL 5BRF CONVERTER

Designed specifically for use with the new FTR receiver described at right. Covers 80/75, 40, 20, 15 and 10 meters. Features separate Hi-Q coils on Poly forms for improved signal to noise ratio (automatically switched from front panel). Better than ½ mv sensitivity. Has temperature-compensated Clapp oscillator and mixer for high stability. Includes 3-gang tuning with separate coils for each band in RF, mixer and oscillator. With built-in BC trap. Uses: 6CB6 RF amp, 12AT7 mixer, 12AT7 osc, 6BA6 IF. Housed in compact steel case finished in medium gray; size 4" h, 5⅝" w, 7" d. Complete with tubes, mounting hardware, connecting cables and instructions. Plugs directly into FTR receiver. Shpg. wt., 5 lbs.

84 S 908. *Net*.....$66.59

MODEL 5BR-1 CONVERTER

For 75, 40, 20, 15 and 10 meters. Features tuned RF stage and built-in series noise limiter. Sensitivity, ½ microvolt. 1525 kc output. Uses: 6CB6 RF, 12AT7 mixer, 12AT7 osc, 6BA6 IF, 6AL5 ANL. Housed in gray steel case, 4" x 5⅝" x 7". Requires 6 volts at 1.5 amps and 200 volts DC at 20 ma. Complete with tubes, mounting hardware, cable and instructions. Shpg. wt., 5 lbs.

84 S 934. *Net*.....$73.45

MODEL 3BR-1 CONVERTER

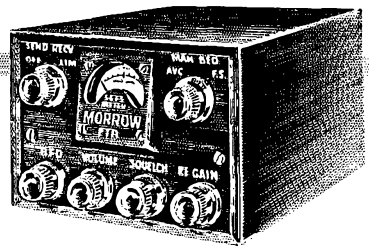
Designed for 10-20-75 meter operation. Features: built-in series noise limiter; tuned RF; AVC; 1525 kc output. Uses: 6CB6 RF, 12AT7 mixer, 12AT7 osc, 6BA6 IF, 6AL5 ANL. Gray steel case, 4" x 5⅝" x 7". Requires 6 volts at 1.5 amps and 100 volts DC at 16 ma. Complete with tubes, mounting hardware, cable and instructions. Shpg. wt., 5 lbs.

84 S 928. *Net*.....$63.65

GC-10 GENERATOR NOISE FILTER

Designed for 10-meter mobile use. Mounts on generator, attenuates noise caused by brush sparking. Simple to install, easily tunable. Shpg. wt., ½ lb.

84 S 933. *Net*.....$3.68



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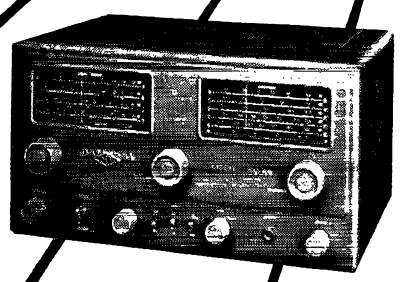
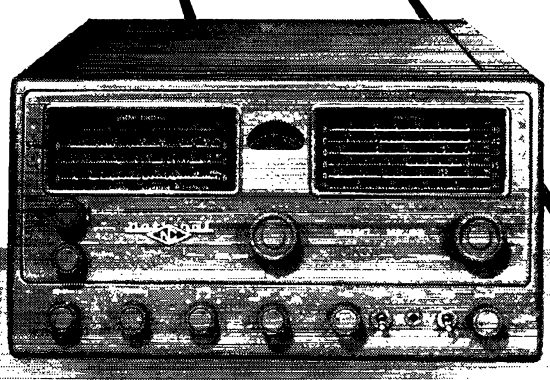


NC 88



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RCA-829B	750	120	200	1
RCA-5763	350	17	175	3
RCA-6146	750	90	60	2
	395	60	175	

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