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— In this issue



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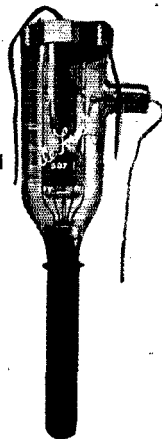
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AMATEUR RADIO

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MAY
1932

VOLUME XVI
NUMBER 5

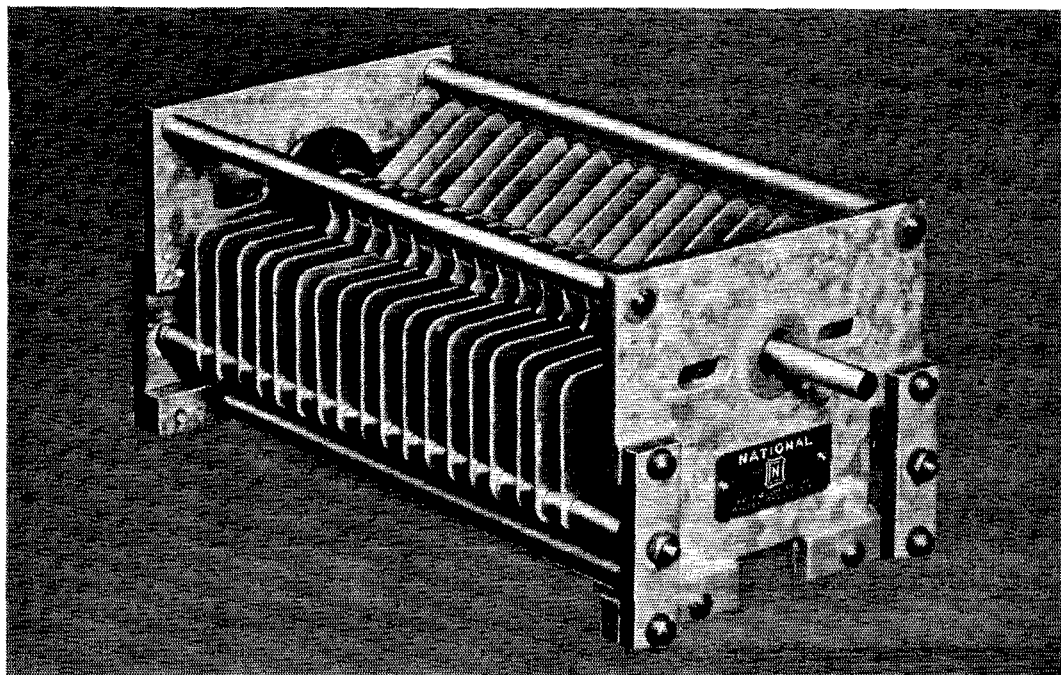
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Advertising Offices 55 West 42d Street, New York City
Editorial Offices 38 La Salle Road, West Hartford, Conn.

Subscription rate in United States and Possessions and Canada, \$2.50 per year, postpaid; all other countries, \$3.00 per year, postpaid. Single copies, 25 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

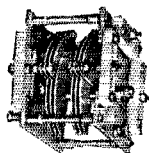
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial 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 world 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. Correspondence should be addressed to the Secretary.

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EDITORIAL

BOARD MEETING

THE A.R.R.L. Board of Directors holds its annual meeting in Hartford on May 13th and 14th. There is still time to convey your suggestions for the improvement of amateur radio to your director. He is entitled to your views, he needs them to round out his own opinions, and he is *your* appointed spokesman before the Board.

"P. A."

We were just engaged in writing something for this page on the matter of sportsmanship in the 'phone certification when an announcement arrived from the Radio Division that, after April 15th, mail examinations for the unlimited privilege will be discontinued and applicants must appear in person before an examining officer. We were urging that the 'phone bunch be more sporting about handing around the questions and answers to new applicants, pointing out that the supervisors were complaining to Washington and that prominent individual amateurs and clubs were protesting both to us and to the Government that these conditions were so prevalent that "the examination didn't mean a thing." Our thought was to point out that such tactics always had a characteristic curve like a boomerang and inevitably led to trouble. Well, it seems they have.

The new ruling requires applicants to appear personally before an examining officer of the Radio Division either at the district headquarters, a sub-office, or a city visited by an examining officer. It is very much to be regretted that the whole 'phone group now suffers this inconvenience through the rank abuse of a few.

The League, of course, is of the idea that amateur privileges should be obtainable by mail, even if only provisionally as in the case of the basic temporary operator's license. The League has been in frequent contact with the Radio Division about this problem, our suggestion of a cure being the preparation of many sets of examination questions so that the test couldn't be so readily short-circuited. In fact we offered our coöperation in the preparation of up to ten sets of questions—so that the exam would be a more honest test of whether the applicant had the agreed qualifications. But the Radio Division writes: "After giving this matter considerable thought, the Division believes that the only way to eliminate the troubles that have been experienced on this question would be to discontinue entirely the giving of such examinations by mail."

It's for our Board to decide whether the League will protest this ruling, and as the Board will be in annual session shortly after these lines appear in print, the question is being held for the directors' consideration. Meanwhile it seems that the whole fraternity ought to see in this occurrence some sort of a warning that unfair practices always bring their penalties.

Oh, yeah, the question on shock excitation flooded us, too; we've taken it up wid Radiv. Whew!

SPEAKING OF OPERATIONS

The Radio Division also announces that after April 15, 1933, renewals of temporary amateur operator's licenses will not be issued. Holders of this class of license will be expected to pass the regular amateur examination during the one-year term of the temporary and, failing to pass, the "temporary" will be cancelled. This strikes us as being fair enough, for we all know that the "temporary" has been abused and that many an absolutely unqualified punk has been hiding behind one of them, stalling along and avoiding examination. Our Board has tried for several years to stop this abuse, and we ought to be glad to see it coming now. Our examination is so easy that anybody unable to pass it hasn't any right to try to operate.

Something will have to be arranged, of course, for the Chair Warmers Club and other fellows who honestly can't get out to meet the examining officer, and before the time is up Headquarters will see what can be done for them.

The Radiv has become right industrious recently, and after July 1st will permit operation of amateur stations only by holders of amateur operator's licenses. The holders of commercial licenses must take out an amateur first class license by July 1st if they want to operate an amateur station. No such person will have any difficulty with the exam, surely. The ham license can hang in the shack, the commercial license on the commercial job. Sounds like a good notion to us, and it's really a splendid idea to require every operator of an amateur station to qualify as an amateur operator. It makes the ham status mean more; incidentally, it simplifies certifying for unlimited 'phone and makes it unnecessary to tote a single ticket back and forth between the job and the haywire collection.

"APPROVED BY A.R.R.L."

Perhaps some of you fellows have received a copy of the catalog of a well-known New York

mail-order house containing an advertisement of a new frequency meter by a prominent manufacturer and bearing in bold type the legend "Approved by American Radio Relay League (QST) as one of the most reliable instruments for use as a wave meter." If you did, you probably thought it a queer piece of business.

So it would be if it were true. Such things may be all right in commerce, and personally we wouldn't mind receiving \$10,000 for endorsing our favorite make of false teeth or something, but it has always been a rigid policy of our League to refrain from lending its endorsement to the product of any manufacturer, regardless of its merit. The catalog maker simply used our name without our consent.

AUTOMOBILE RECEIVER LAWS

Just why radio ordinances should possess such a fatal attraction for city and state attorneys we don't know, but it is evident that they do. With our illustrious A.R.R.L. general counsel as a notable exception, lawyers as a rule may know much about law but they know little about radio. Perhaps it's all hooked up with that side of human nature which positively compels a small boy with a handful of beans to stick them in his nose and ears.

At any rate there has been a mild epidemic of automobile-receiver ordinances in recent months. These measures, obviously aimed to thwart criminals in localities where police radio systems have been installed, specify that no short-wave receiver shall be installed in an automobile unless a permit has been secured from the authorities. Generally speaking, these have been no cause for amateur concern. Experience in a number of cities showed that the required permit was easily obtained by a bona-fide amateur. So long as this was the case there was no advantage to be gained by making a fuss over these ordinances, particularly since it was probable that such policies, properly administered, did fall within the police powers of a municipality.

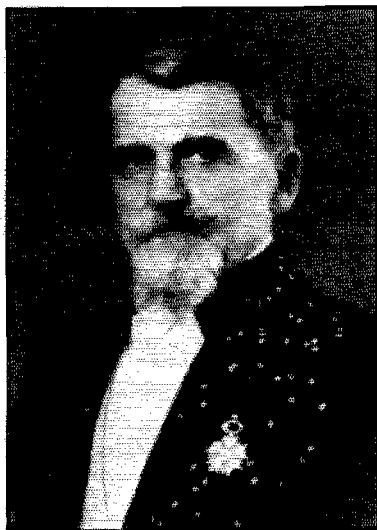
Lately there has been a change in the picture. One city has practically refused to issue permits, even though the ordinance provides for them. One of the two states which has such a law has made it difficult to get permits by surrounding the process with 30,000 meters of red tape. This won't do at all! Amateurs don't have occasion to install receivers in cars very often, but they must be able to do it when they need to for bona-fide amateur work. The League, therefore, is now moving to see to it that the rights of amateurs are not infringed, and our general counsel is deep in a study of ordinances of this type. In the meantime amateurs should keep Hq. informed, but need feel no concern.

THE PASSING OF A FRIEND

Sad news came from France in middle February of the death of General Gustave A. Ferrié,

distinguished head of French military radio. General Ferrié was a pioneer, witnessing Marconi's early experiments in 1898, and in 1900 organizing the French military radio service, of which he remained the chief through all these years. Reaching retirement age in 1930, the laws of the land were amended to permit him to continue.

But he was more than a brilliant administrator. A research worker in his own right, he made many contributions to the art. He was the president



of the International Scientific Radio Union (U.R.S.I.) and for many years the recognized leader of international cooperation in radio scientific circles. He designed the Eiffel Tower station, FL, in its time the most famous station in the world. Best of all, perhaps, he was known as the head of the French delegations to international radio conferences. A distinguished figure, the perfect flower of France, he was always the dean of the visiting delegations, to which position he brought an incomparable skill and grace. Many nations honored him in life, our own government awarding him its Distinguished Service Cross. On his death-bed France presented him with the Grand Cross of the Legion of Honor.

We know, better than most people do, how ardently General Ferrié was interested in amateur radio. He knew its value better than his government did, and there was many an occasion when we were aware of more sympathy from him than he could admit officially. It is interesting to recall that our very first transatlantic message, when amateurs first worked "two-way" across the pond on that eventful night when Schnell and Deloy clicked, was one of greetings and respects from President Maxim to General Ferrié. With his passing we have lost a great friend.

K. B. W.

A Compact Receiver

A Portable In Which Idle Space Is Put to Work

By George Grammer, Assistant Technical Editor

ALONG about this season of the year the young ham's fancy generally turns to portable sets. This being so, we can't resist the temptation to add another one to the family. True, it's not exactly a new variety, because there is nothing startling about the electrical design. But it represents both an expansion and condensation of the ordinary portable: an expansion because it contains three tubes instead of the usual one or two as well as a battery supply adequate for several months of operation, and a condensation because there is hardly more than a single cubic inch of the 300-odd within the cabinet that is not "holding something" when the set is packed up for a journey.

In brief, within a cabinet measuring approximately $8\frac{1}{2} \times 6 \times 6\frac{1}{4}$ inches there is contained a baud-spreading ham receiver consisting of a regenerative detector with two audio stages, a pair of headphones, a 30-foot antenna and a 10-foot ground lead. When the lid is fastened down at the beginning of a trip there's no need to pack along the box of accessories required by so many "portable" receivers.

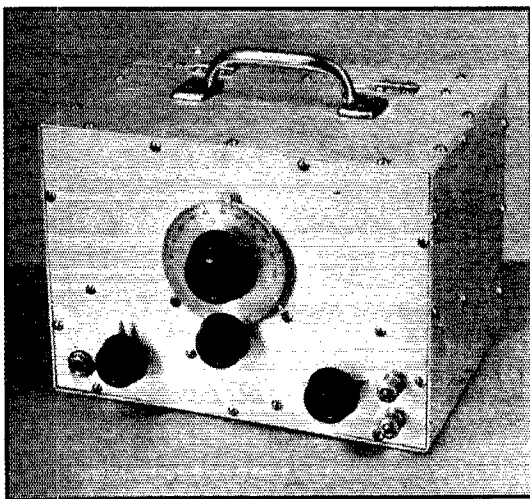
Although primarily a portable, the receiver also will give a good account of itself in the fixed ham station. Space and weight considerations preclude the possibility of carrying enough "B" batteries to make screen-grid detectors or r.f. amplifiers a practical proposition, but in spite of that the set brings in the DX very nicely on a few feet of wire. And then, of course, the complete shielding makes it quite effective as a monitor.

In the construction of this sort of set it is neces-

sary to pay more attention to details than in ordinary receivers, where there is usually room to spare. Fractions of an inch cannot be lightly disregarded. The shape of the box was in this instance dictated by the size of the standard 22.5 volt "C" batteries to be used as "B" supply, and after a good many different layouts were sketched on paper this one appeared to give the best space factor, as well as permitting a satis-

factory panel layout for the controls.

The box and panel are made from $\frac{1}{16}$ -inch sheet aluminum. The joints at the corners are formed of $\frac{1}{4}$ -inch square brass rod, suitably drilled and tapped to permit fastening the aluminum pieces solidly in place. A single U-shaped piece forms the sides and back of the box. It is bent so that the $6 \times 8\frac{1}{2}$ -inch panel just fits snugly in the opening of the U. The depth is $6\frac{1}{4}$ inches. The back is made in two pieces, the upper, which is fixed permanently in place, being $8\frac{1}{2} \times 3\frac{1}{4}$ inches, and the lower, which is hinged, $8\frac{1}{2} \times$



READY FOR A TRIP

Believe it or not, there is a detector and two step receiver inside. A water-proof cover of black oilcloth or similar material can easily be made by the OW, RM, or YL to protect the set during transit.

$2\frac{3}{4}$ inches. The hinged portion can be swung open to permit insertion of the "B" batteries. An L-shaped piece of aluminum inside the box, measuring $8\frac{1}{2}$ inches wide, $3\frac{1}{2}$ inches horizontally and 3 inches vertically (outside dimensions), forms a compartment isolating the "B" batteries from the rest of the set and is also used as a shelf for the "A" battery and miscellaneous material as well as a back-stop for the sub-panel of the receiver. The top is also made in two pieces; one, at the rear, $1\frac{1}{2}$ inches wide and $8\frac{5}{8}$ inches long, and the hinged part $4\frac{3}{4}$ inches wide and $8\frac{5}{8}$ inches long. The extra eighth inch on the width is needed to make the top pieces rest on the sides of the box instead of fitting inside, as do the panel and back pieces. Extra square brass braces are used wherever mechanical rigidity seems desirable, as well

as at the corners. Quarter-inch nickel-plated 6-32 screws are used throughout for joining braces to cabinet pieces. A nickel-plated handle is fitted to the hinged top for carrying and to facilitate opening the lid.

Fig. 1, together with the various photographs, should clear up any points about the box con-

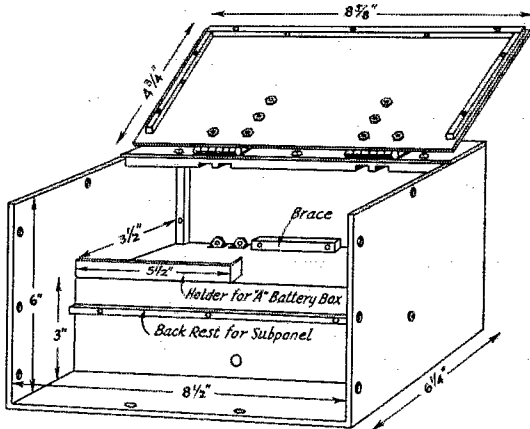
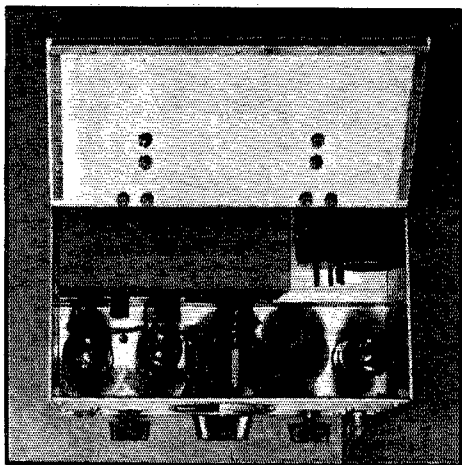


FIG. 1 — A SKETCH OF THE INSIDE OF THE BOX

Showing the principal dimensions. The piece of brass rod serving as the back-rest for the sub-panel also helps brace the G-shaped piece of sheet aluminum forming the "B" battery compartment by means of a screw through the side of the cabinet at each end of the rod. The hole for the B-plus lead is in the vertical part of the L near the bottom of the box. The horizontal part of the L is fastened to the top back piece by a small brace formed of brass rod.

struction which may be in doubt. Getting everything to fit nicely is not always as easy as it looks, but if the pieces are measured off accurately and



THE COMPLETELY ASSEMBLED SET

The "A" battery is contained in a cardboard box just back of the receiver proper. Two binding posts mounted on the side of the container take care of the battery connections. All the accessory equipment can be crowded into the remaining space.

trimmed carefully an acceptable job can be turned out without the expenditure of too much time or energy.

And now for the receiver itself. All parts are supported on the front panel, so that when the panel is taken out the entire set is ready for inspection or repairs. The panel size, as we have mentioned before, is $8\frac{1}{2} \times 6$ inches. The sub-panel, which is $8\frac{1}{2}$ inches long by $2\frac{5}{8}$ inches deep, is fastened to the panel $2\frac{1}{2}$ inches from the bottom by means of a piece of brass rod running nearly the length of the panel. Four wafer-type sockets are mounted on the sub-panel, as shown in the rear view of the set. The centers of the holes for the two end sockets are seven-eighths of an inch in from the ends of the sub-panel; the centers of the other two are each $1\frac{3}{4}$ inches from the centers of the end holes. From left to right in the rear-view photograph: the first socket is for the detector tube; second, (five-prong) for the plug-in coils; third, first audio tube, and fourth, second audio tube.

The circuit of the receiver is shown in Fig. 2. All the grounds shown are connections to the metal chassis of the set. The arrangement of the detector circuit is quite conventional; the antenna is inductively coupled to the grid circuit, and a resistor is used to control regeneration. The detector is transformer-coupled to the first audio stage. Resistance coupling is used between the first and second audio stages — lack of room prevents the use of a second transformer.

Resistance coupling gives ample signal strength, however, and there is no tendency toward audio howling, which might result if two transformers were mounted together in the small space.

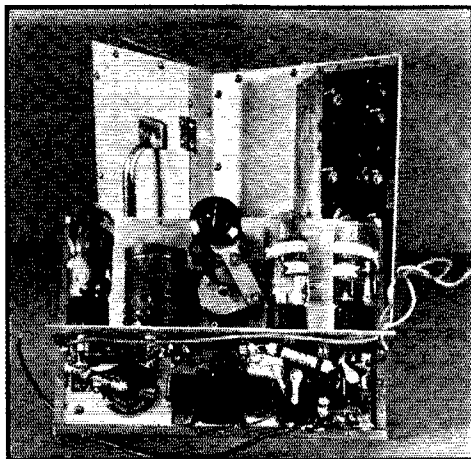
The filaments of the tubes are wired in series. It will be noted that neither end of the "A" battery is grounded. The negative terminal of the battery is connected to one side of the detector filament and the other detector filament terminal is grounded through the filament rheostat. The first audio tube picks up its filament current from the frame of the set, and the circuit then follows through the second audio tube filament, the filament-control jack and back to the positive terminal of the "A" battery. This arrangement is used so that the drop through the first audio tube filament can be used as bias for the second audio tube. Bias on the first audio tube is undesirable, since the plate voltage is low because of the drop through the resistor, R_1 . Biasing the second tube does not affect the signal strength and reduces the plate current, which is desirable for a portable set.

Since space is limited, small components must be used. For this reason, and for the benefit of those who may wish to duplicate the construction, the names of the makers are given in most instances. Other makes may be substituted, of

course, if they will fit in the available space. Both the rheostat and the regeneration control resistor are midget affairs, the former made by Yaxley and the latter by Frost. The audio transformer is one presumably made for broadcast replacement purposes — incidentally, we sympathize with the BCL who has to listen to a set containing one like it, because there is an extremely pronounced hump in the region of 1000 cycles that is helpful for c.w. — and its overall dimensions are $2\frac{1}{2} \times 2\frac{3}{4} \times 1\frac{1}{2}$ inches. It is held to the front panel, as shown in the photograph, by two small machine screws. The audio by-pass condenser across the regeneration control resistor, a Carter layer-built midget, is slipped in between the audio transformer and the sub-panel and held in place by the wiring.

Although the parts are pretty well crowded at the audio end of the set, the r.f. wiring is in a comparatively clear space. The fact that the coil socket is mounted directly alongside the detector tube makes short leads almost unavoidable. The machine screw holding the rear end of the detector socket is an inch long, and the grid condenser, C_3 , a small-size Aerovox, is mounted on it, held away from the sub-panel by a number of washers. This type of condenser is provided with mounting holes through the bakelite case, which

grid condenser and the other to the negative filament post on the detector tube socket. The plate by-pass condenser, C_4 , is mounted flat on



THE "WORKS"

The complete receiver is supported by the panel, therefore the entire outfit can be lifted out of the box for inspection. This photograph also shows a rear view of the cabinet and the "B" battery compartment.

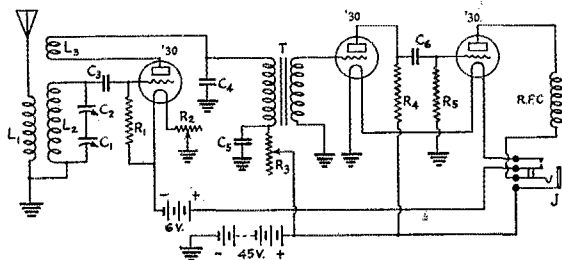


FIG. 2 — CIRCUIT OF THE PORTABLE RECEIVER

- C_1 — 100- μ fd. midget variable condenser.
- C_2 — 50- μ fd. midget variable condenser.
- C_3 — 250- μ fd.
- C_4 — 500 μ fd.
- C_5 — 0.1 μ d.
- C_6 — 0.01 μ d.
- R_1 — 30 megohms.
- R_2 — 30-ohm rheostat.
- R_3 — 100,000-ohm variable resistor.
- R_4 — 50,000 ohms.
- R_5 — 1 megohm.
- T — Audio transformer, 3-1 ratio.
- J — Filament control jack.

COIL DATA

	3500 kc.	7000 kc.	14,000 kc.
L_1	6 turns	6 turns	5 turns
L_2	34 turns	16 turns	7 turns
L_3	8 turns	6 turns	4 turns

All wound with No. 22 d.s.c. wire without spacing between turns.

make it possible to mount the condenser on metal without shorting the connections. The grid leak, R_1 , an IRC pigtail resistor, is held in place by its leads, one of which is soldered to one side of the

the under side of the sub-panel, directly above the audio transformer. It is the same type of condenser as is used at C_3 .

Coming now to the audio side, the audio coupling condenser, C_6 , is mounted vertically at the rear of the sub-panel between the two tube sockets. A small angle made from brass strip bent in the form of an L is held to the sub-panel by a short machine screw, and the condenser, a Pilot Isograd, is fastened to the angle by a screw through the mounting hole in the bakelite case. The other mounting hole in the case is fitted out with a machine screw and soldering lug, which serves as a terminal for all the B-plus leads. A 12-inch piece of rubber-covered stranded wire is also soldered to the lug and forms the connection to the positive terminal of the "B" battery when the set is in the box. The regeneration control resistor, although not visible in the photograph, is of course mounted on the panel — and insulated from it — underneath C_6 . Coupling resistor R_4 , a resistor similar to the grid leak, R_1 , is also underneath C_6 in the photograph. It is also held in place by its terminal wires, and connects between the B plug terminal and the plate of the first audio tube. Grid leak R_5 , on top of C_6 in the photograph, connects between the grid side of C_6 and ground. A midget filament-control jack is mounted in the lower right-hand corner of the back of the panel. It is also insulated from the panel.

The one remaining piece of apparatus under

the sub-panel is the radio-frequency choke, RFC, which is a Silver Marshall 277 with the case removed. This choke is just about the right size to fit in the remaining space behind C_6 . The hole in the center of the form is plugged up with a

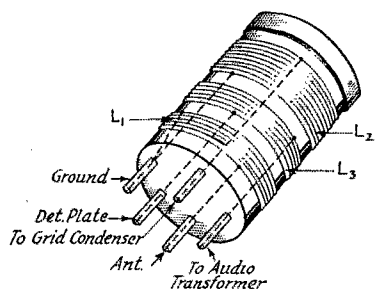


FIG. 3—HOW THE CONNECTIONS ARE MADE TO THE PINS ON THE COIL FORM

piece of dowel, and a soldering lug fastened down with a short wood screw at each end to make connections to the two ends of the winding. A piece of friction tape is wrapped around the choke form to prevent possible short-circuits. The choke is held in place by the wires soldered to its terminals.

Band spreading is obtained by means of a small condenser in series with the main tuning condenser. This is the most convenient arrangement for a portable set, since the auxiliary condenser can be shorted out and the tuning condenser then will cover a comparatively large range of frequencies with each coil. The tuning condenser, C_1 , is a 100- μ fd. Pilot midget, mounted directly on the panel. The band-spread condenser, C_2 , is a 50- μ fd. Pilot midget, and is mounted on a piece of brass strip which is held solidly in place by the two machine screws in the stationary plate assembly of C_1 . The mounting strip therefore connects the rotary plates of C_2 to the stationary plates of C_1 . C_2 is mounted with its shaft facing toward the rear of the set, and the small knob allows easy adjustment. A short piece of wire run through a hole in the sub-panel connects the stationary plates of C_2 to the appropriate lug on the coil socket. One of the end rotary plates of C_2 is slightly bent inward at one corner so that when the plates are turned full "in" the condenser short-circuits itself.

The dial on the tuning condenser is a General Radio 502-A, a three-inch metal dial equipped with a friction vernier drive. The knobs on the rheostat and regeneration control are also G.R. products, matching the dial in appearance.

When the set is inserted in the cabinet the rear end of the sub-panel rests on a piece of square brass rod which is fastened horizontally to the vertical partition in the box at an appropriate height. The rod has two holes drilled and tapped in it to permit fastening the sub-panel to it, thus

strengthening the assembly. The B plus lead from the receiver is pushed through a small hole in the vertical partition through to the rear of the battery compartment, where it may be fastened under the connection post on the "B" battery.

The coils are wound on National 5-prong forms, all with the same size wire. The grid coil, L_2 , occupies the space at the top of the form; next in order is the tickler, L_3 , and last the antenna coil, L_1 , at the bottom. Although the spacing between windings on the form is not critical, some builders insist on such information, so here it is: 3500-kc. coil, $\frac{1}{8}$ -inch between adjacent windings; 7000-kc. coil, $\frac{1}{8}$ -inch between grid coil and tickler, $\frac{1}{4}$ -inch between tickler and antenna coil; 14,000-kc. coil, $\frac{1}{4}$ -inch between adjacent windings. As always, the important thing about the coils is to get the number of turns on each so proportioned that the bands will be spread with the right setting of C_2 , and so that oscillation will be smooth over the entire range. This may require a small amount of cut-and-try work, but is easy enough to do. After the right combination on each coil is reached a coat of coil "dope" should be applied to make the windings stay where they belong.

In making the connections between the coil ends and the pins in the coil form base, any convenient arrangement of pin connections may be used. In this layout the shortest leads—the most desirable separation of adjacent leads—are obtained by using the connection scheme shown in Fig. 3.

The "A" battery consists of eight flashlight cells connected in series-parallel to make a 6-volt battery. The cells are connected together by means of short pieces of wire soldered to the cases and top pieces. Although making up a battery of this sort is a little more bother than the simple purchase of a "C" battery such as is used for most portables, the made-up battery is less expensive and has a considerably longer life. The cells are placed in a box home-made from a piece of stiff cardboard. They fit snugly and do not get out of place when the set is moved. A small piece of bakelite containing two binding posts is mounted on the set side of the box and the terminals of the battery are brought out to the posts. Two flexible rubber-covered wires from the set come up through the sub-panel and can be fastened under the binding posts when the receiver is in the cabinet. The box containing the "A" battery sits on the shelf inside the cabinet, as shown in the top view, and is held in place by a piece of aluminum angle bolted to the shelf.

But few constructional points remain to be cleared up. One caution—be careful that all wires or projecting terminals on parts are carefully insulated from the cabinet. Sometimes the fit is rather close, especially in the part of the receiver that is near the bottom of the cabinet. To prevent short-circuits a piece of cardboard

should be pasted on the bottom of the cabinet in the sub-panel compartment so that when the set is inserted nothing can touch the metal. Likewise, a piece of cardboard or corrugated board should be cut out to fit inside the lid of the "B" battery compartment so that when the lid is fastened down the battery terminals cannot come in contact with the case.

The space remaining inside the cabinet after the "A" battery is in place does not look large, but it can be made to contain all the necessary accessories. A pair of Brandes headphones will go in without much difficulty by taking the ear-pieces off the headband, rolling up the cord and sitting them on the shelf. The two extra coils also can be fitted in the headphone compartment and the space around the detector tube. The headband itself can be squeezed in in back of the tubes — it may be necessary to take off the fork-shaped pieces, because of the awkward shape of the headband, but it can be done. A pair of the new "feather-weight" phones fits in even more readily. The antenna and ground wires should be of small-diameter and flexible — so-called loop wire is excellent — and can be rolled up and stuffed into any remaining cranny. Then when the lid is down and fastened with the four small screws which hold it in place the set is all ready to go — and nothing more is needed.

The receiver has been in almost daily use ever since it was built, and has made a trip from the Atlantic to the Pacific and back, without a single failure to perform when turned on. It has always given a good account of itself, and has, in fact, been used as the regular receiver in our personal station for several months. Although not giving as loud signals as sets with screen-grid detectors and r.f. amplification, it shows no hesitation in pulling in foreign amateur signals on a small indoor antenna, and has proved to be quite reliable. With average use of two or three hours a day, the "A" battery has a conservative life rating of about three months, at a cost of eighty cents per set of flashlight cells. The "B" battery should outlive two or three sets of "A" batteries, since the total current drain from it is only about one milliamper. At the end of five months the original battery in the set still tests up to the full 45 volts.

A receiver of this sort is an exceedingly handy gadget to have around the station. It is always ready to go should the need arise; it can substitute for the regular receiver at an instant's notice; it can be used as a monitor simply by taking off the antenna and ground connections; and finally, it is not expensive to build.

New Rectifier for Meters

THE necessity for a measuring device which would give accurate readings on a.c. voltages over the audio-frequency range brought about the

development of the copper-oxide rectifier voltmeter which has been widely used for such measurements; experimenters will be interested to know that a rectifier unit is now available which will convert a d.c. milliammeter into an a.c. voltmeter, which, with the addition of suitable resistors, can be made to cover several ranges.

The new rectifier consists of four copper-oxide elements arranged in the conventional bridge rectifier circuit. Since a d.c. meter is used, the readings are proportional to the average, not r.m.s., values of the a.c. wave. The calibration chart furnished with the rectifier is, however, plotted in terms of r.m.s. values, so that the readings correspond with those obtained by ordinary a.c. instruments. The current-carrying capacity of the rectifier is 15 milliamperes. It is ordinarily used with a 0-1 d.c. milliammeter, giving a 1000-ohms-per-volt meter, which takes little power from the circuit being measured and makes calculation of multiplier resistances for various ranges easy.

The rectifier is a tiny affair, measuring less than $\frac{1}{2} \times \frac{3}{8} \times \frac{1}{4}$ inches, is furnished with flexible leads, and may be mounted directly on the milliammeter with which it is to be used. It is made by Leo Taussig, 32-45 37th St., Astoria, N. Y.

Hudson Division Convention

Newark, New Jersey, May 21, 1932

A big Hudson Division Convention will be held at the Newark Athletic Club, Newark, N. J., May 21st, under the auspices of the Northern New Jersey Radio Clubs. Further information may be obtained from D. C. Akers, 82 East Broad St., Bloomfield, N. J.

Strays

G6OT now comes forward to claim membership in the H.A.M. fraternity. His name is H. A. M. Clark.

NOTICE TO HOLLAND AMATEURS

The Sales Department of N.V.I.R. conducted by Mr. J. L. Thissen, Nassaustraat 36, Venlo, Holland, has expressed its willingness to handle the A.R.R.L. membership-QST subscription entries of Holland amateurs. This applies to both new entries and renewals. Dutch amateurs will be spared the business of sending international remittance by taking advantage of this service so kindly offered by N.V.I.R.

New Tubes for Class B Audio

The Type '46 Amplifier and Type '82 Rectifier

By George Grammer, Assistant Technical Editor

ONE of the really "tough" things about the Class B audio amplifier (and modulator) has been the necessity for designing the input circuit so distortion would be minimized in spite of the fact that over part of the cycle the driver tube was furnishing power and over the rest of it it was not.¹ This is particularly discouraging when the tubes used as Class B amplifiers have comparatively low voltage-amplification factors; tubes, for example, such as the Type '10. A second disagreeable feature has been the necessity for providing a low-resistance and constant-voltage bias source, requiring, usually, the use of dry batteries.

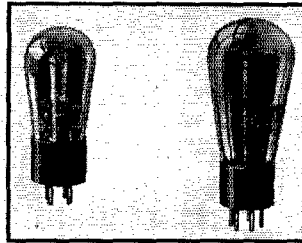
With the introduction of the RCA 46 (that's all there is to the number—no 2's or 8's to be lopped off) these two bugaboos of Class B audio are wiped off the slate. For the 46 is a tube which operates *without grid bias*. Its amplification factor and static plate impedance are so high that with 400 volts on the plate and zero grid bias the plate current is only 6 milliamperes. Furthermore,

the tubes in a typical Class B set-up will develop 20 watts of audio output continuously, and by slightly reducing the load resistance the output can be increased to 26 watts, practically equivalent to that available from a pair of Type '10's. This last rating, however, is only for intermittent operation—about the type of service one would

have with a 'phone transmitter. Both outputs can be obtained with only 400 volts on the plates. These are not the only interesting features of the 46, however. The tube has *two* grids, although strictly speaking it is a three-element tube. For Class B operation the two grids are connected together (terminals are brought out separately from each grid to the standard 5-prong base) giving a high- μ , high-impedance tube. But by connecting one of the grids to the plate and using

the other as a control grid the 46 will function nicely as a Class A amplifier, developing 1.25 watts of undistorted power output with 250 volts on the plate. One 46 as a Class A amplifier will drive two 46's as Class B amplifiers, to full output. A desire to keep down the number of types of tubes required for the Class B amplifier is the reason for this rather unique design.

The 46 is the same size physically and has the same type of base as the '47 pentode. The filament is oxide-coated, taking 1.75 amperes at 2.5 volts. It is expected that the tube will be in the hands of dealers some time during April. Although at this writing no samples are available for test, we anticipate some interesting r.f. uses, particularly in frequency multipliers, as well as its obvious application to modulation in ham 'phones.



THE 82 AND 46
New tubes for Class B audio
amplifiers.

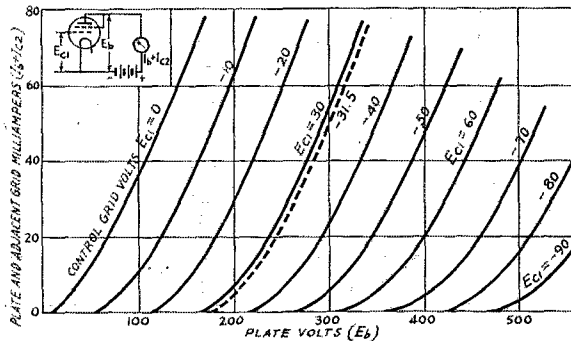


FIG. 1—PLATE CHARACTERISTICS OF THE TYPE '46
WHEN USED AS A CLASS A AMPLIFIER

since grid current begins to flow at very small signal voltages, the driver tube is working into a more or less uniform load at all times. Two of

¹ For technical details of Class B audio amplifier and modulator operation, see Barton, "The Class-B Modulator," *QST*, Nov., 1931; Lamb and Grammer, "High-Power Performance From the Small 'Phone Transmitter," *QST*, Dec., 1931.

THE TYPE '82

Before listing the ratings of the 46 we want to say something about another new tube being produced as a companion to it, the Type '82—a full-wave mercury-vapor rectifier. The necessity for a plate supply with extra-good regulation for Class B audio amplifier is well known; the 82, with a constant tube drop of 15 volts for all reasonable load currents, takes care of the rectifying portion of the power supply. Unlike the

TYPICAL CLASS B COMBINATIONS

DRIVER STAGE					TRANSFORMER		OUTPUT STAGE WITH 2-46's*				
Tube Type	Number Used	Plate Volts	Grid Bias	Signal Volts RMS	Peak Power Eff.**	Voltage Ratio (Primary 1/2 Sec.)	Plate Volts	Load Plate to Plate	With Signal		
									Av. Plate Ma.	Av. Grid Ma.	Output Watts
46	1	200	25	15.3	72	2.4/1	300	7800	38	8.0	11.5
46	1	200	25	15.3	54.5	2.4/1	400	6000	55	7.9	19.5
46	1	250	33	21.5	79	2.2/1	300	3500	64	10.5	16.0
46	1	250	33	21.5†	74	2.2/1	400	5300	68	9.0	26.0†
'27	1	200	15.5	10.8	41.5	4.4/1	300	17,000	18.5	5.6	5.0
'27	1	200	15.5	10.8	...	4.4/1	400	17,000	20.5	4.4	6.7
'27	1	250	21	14.2	43	5.5/1	300	17,000	20.5	4.5	6.0
'27	1	250	21	14.2	39	5.5/1	400	19,000	23	3.7	7.7
'27	2†	250	21	27.0	53.5	4.4/1	300	6400	42	8.0	12.5
'27	2†	250	21	27.0	58	3.7/1	400	7000	52	8.0	19.5
'45	1	250	50	34.0	65	2.8/1	300	5200	53	10.9	16.0

* Grid voltage = 0.
Total distortion = 5%.
** Efficiencies measured at 60 cycles.

† Not for continuous operation.
‡ Push-pull connection.

Perryman Type '80-M described in *QST* about a year ago, however, it is *not* interchangeable with the Type '80. The filament of the 82 operates at 2.5 volts, instead of 5 volts, and takes a current of 3 amperes. It cannot, therefore, be plugged into your broadcast set to replace a defunct '80.

The following tentative ratings and characteristics give about all the information needed about the tube:

Filament voltage, 2.5 volts.

Filament current, 3.0 amp.

Maximum a.c. voltage per plate, 500 volts (r.m.s.).

Maximum peak inverse voltage, 1400 volts.
Maximum continuous d.c. output, 125 ma.

Maximum peak plate current, 400 ma.

Either choke or condenser input to the filter may be used provided the ratings listed above are not exceeded. Choke input is recommended.

The 82 is the same size and will have the same type of base as the 201-A.

TYPE '46 RATINGS

As pointed out above, when the 46 is operating as a Class A amplifier the grid nearest the plate is

tied to it, thus becoming, in effect, part of the plate itself. Under these conditions the operating conditions and characteristics are as follows:

- Plate voltage, 250 volts max.
- Grid voltage, -33 volts
- Amplification factor, 5.6
- Plate resistance, 2380 ohms
- Mutual conductance, 2350 micromhos
- Plate current, 22 ma.
- Load resistance, 6400 ohms
- Max. undistorted power output, 1.25 watts

The load resistance given above is the optimum value for maximum undistorted power output.

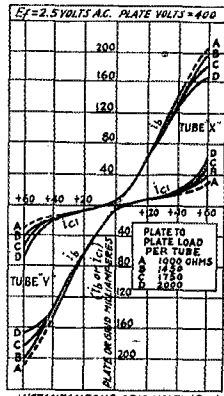


FIG. 2—DYNAMIC CHARACTERISTIC OF TWO TYPE '46'S IN PUSH-PULL AS A CLASS B AMPLIFIER WITH FOUR VALUES OF LOAD RESISTANCE

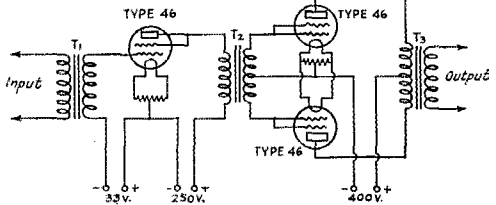


FIG. 3—A TYPICAL AMPLIFIER CIRCUIT USING ONE 46 AS A CLASS A DRIVER AND TWO 46'S AS CLASS B AUDIO AMPLIFIERS

Transformer T_1 is the usual audio amplifying transformer connecting the driver stage to the preceding audio amplifier. The interstage coupling transformer, T_2 , should have a voltage ratio from primary to one-half of secondary of 2.2 to 1, as shown by the table. The turns ratio of the output transformer, T_3 , will be determined by the nature of the load into which the Class B tubes are working. The method of making these calculations is given in the second article referred to in Footnote 1. In this case it will be approximately 1:1 (total primary to total secondary) if the Class B amplifier is being used to modulate a pair of Type '10's with 500 volts at 100 mils.

When the tube is used as a driver for a following Class B stage the effective load resistance should be approximately twice this value.

Investigating the Directive Properties of an Amateur Antenna*

By S. L. Seaton, OA4U†

YOU, too, now may be able to tell why Australia is easier to work from your station than Africa, or some other place. Utilize only five minutes a day of your spare time.

When we put in the 7.5-watt here at OA4U to keep us busy till the 200-watt crystal set and power-equipment arrived, we did not expect to work any more than moderate distances at the most. To our intense surprise, however, the 3500 miles between the two countries proved to be no stumbling block at all. There must be a reason. After getting used to this delightful state of affairs and congratulating ourselves on our luck, we started out to find the why of it.

The layout here called for two directional antenna systems, one for the United States and the other for Australia. Now, to do justice to a directional antenna a field-intensity meter of some kind is necessary, but the only things available we had in the way of equipment from which to make one were a few "peanut" tubes, several old receivers, and a carpenter shop. However, the proper combination of these three produced a meter.

The first tests in connection with the project were, of course, on the meter. We had an antenna and a transmitter already working, as stated above,

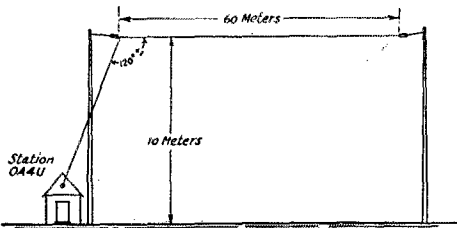


FIG. 1 — ELEVATION OF ANTENNA AT HUAN-CAYO MAGNETIC OBSERVATORY LOOKING EAST

The antenna operated at 14,285 kc., top part being three wavelengths long and lead-in portion one-half wavelength long.

* A Contribution of the Department of Terrestrial Magnetism, Carnegie Institution of Washington.

† Huancaayo Magnetic Observatory, Huancaayo, Peru.

so we started the transmitter and took the meter out in the yard to see what it would do! It was all right up to about three wavelengths from the antenna, but at greater distances it was not sensitive enough. What to do, what to do! The plate-meter was a voltmeter with the resistance removed and used as a milliammeter; it had a sensitivity of 1.5 ma. per volt on the scale and was the most sensitive thing on hand. However, there

was a Leeds and Northrup potentiometer in the atmospheric-electric laboratory and by using a 15,000-ohm resistance in the plate circuit of the tube in the meter, the voltage drop across this resistance could be measured with the potentiometer to a tenth of a microvolt. This was quite good enough for our purposes. Using this modification, satisfactory measurements of relative field intensity could be made as far away as 24 wavelengths.

On a map of the Observatory, a circle with a radius of 8.4 wavelengths (purely a random distance) was scribed from the center of the antenna. On this circle points were located about every 15° or 20° apart and numbered. The transmitter key was tied down; we went out

and set up the meter at the first location. The reading was made and we moved to the second location. The reading here fooled us, because the first location happened to be in the big loop indicated in Fig. 2, and when we found nothing in the way of energy at the second location, not knowing anything about loop until later, we were sure that the transmitter had stopped oscillating. Ever try to sprint 8.4 wavelengths over plowed ground at an altitude of 11,000 feet? Try it sometime; it's lots of fun. The transmitter was found "perking" merrily along, however, so we returned to business and finished the observations.

The method of making the measurements was first to determine the voltage drop across the resistance caused by the steady plate current with the meter detuned. Then the meter was tuned and the drop measured again. The ratio of the difference in the two readings to the distance



MESSRS. CAIRN AND SEATON WITH THE INTENSITY METER SET UP AT STATION 1

The tripod provides a convenient mounting.

from the antenna was then plotted on cross-section paper in the proper direction, and there resulted a plan view of the directional characteristic of the antenna.

TABLE OF OBSERVATIONS

Station No.	Reading	Zero	Dif.	Ratio
1	128.3	111.0	17.3	2.092
2	116.1	114.5	1.6	0.191
3	516.6	512.8	3.8	0.452
4	525.0	522.3	2.7	0.321
5	528.8	527.5	1.3	0.155
6	530.2	529.9	0.3	0.035
7	534.8	531.0	3.8	0.452
8	533.3	533.1	0.4	0.048
9	534.4	533.6	0.8	0.095
10	537.2	535.3	1.9	0.226
11	536.3	535.3	1.0	0.119
12	534.7	534.7	0.0	0.000
13	535.0	534.6	0.4	0.048
14	538.2	534.4	3.8	0.452
15	534.4	534.4	0.0	0.000

Since we were interested only in the relative amounts of energy in different directions from the antenna, a calibration of the meter for actual field-strength was not necessary. Provided all the measurements are taken the same distance from the antenna and the sensitivity of the instrument is not changed during the observations, no trouble should be experienced in obtaining reliable results. The difference in distance from the center of the antenna caused by the actual length of the antenna

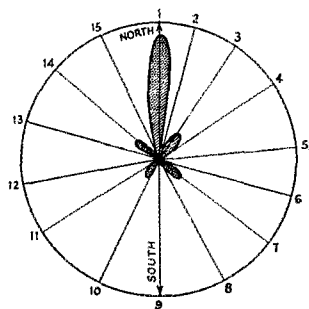


FIG. 2—RELATIVE FIELD-STRENGTH IN DIRECTIONS INDICATED FOR ANTENNA AT HUANCAYO MAGNETIC OBSERVATORY, THE ANTENNA ASSUMED TO BE A POINT IN THE CENTER OF THE DIAGRAM

The lead-in end of antenna is to the north and the antenna-line north and south.

itself was not found to matter much if the observations are taken at points over eight wavelengths away and the antenna itself is not over three wavelengths long.

Looking again at Fig. 2, we were not sure that the big loop was real, due to the presence of some overhead wires nearby. Later observations further away showed it to be there, however. The four small lobes are typical of single-wire systems

several wavelengths long¹ and the large loop is no doubt caused by the lead-in, which is at this end of the antenna. The distortion of the small lobes is caused by the guy wires on the two masts. These guy wires are partially grounded and not broken with insulators.

The power in the antenna was 15 watts. Repeat readings agreed within 5 per cent. With powers of 75 watts or more, a less sensitive potentiometer could, no doubt, be used. Probably a meter with a full scale range of one or two milliamperes, in place of the galvanometer, and a several-hundred-ohm rheostat with a graduated scale of some sort would do the trick. The voltage across the 15,000-ohm resistance is about 1 to 2 volts in this set-up, so about the same voltage across the potentiometer-resistance should do all right.

It will be an interesting job for Saturday afternoon or Sunday morning to measure the directional characteristics of your antenna. The whole thing was done here in an hour and a half after the "bugs" were gotten out of the meter. The results are surely worth while and in our case explained why we were able to work the States so easily when we little expected to do such a thing.

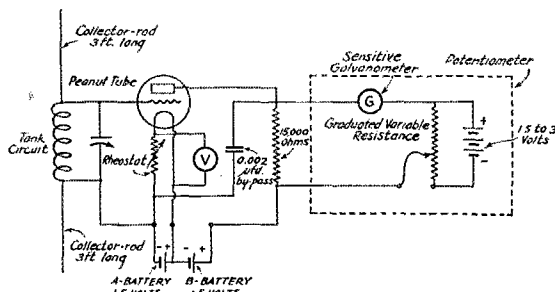


FIG. 3—SCHEMATIC DIAGRAM OF METER AND OF POTENTIOMETER

Of course, the meter was made for getting the directional antenna going, but the by-product was certainly enlightening.

Mr. Ledig, who is in charge of the Observatory, is responsible for the photograph and for permission to do the work. Dr. Cairns, second in command at the Observatory, assisted in the design of the meter and in the measurements. M. Bastides, the carpenter, made the wooden parts of the instrument. These gentlemen deserve generous credit for helping bring the experiments to a successful termination.

Strays

Since H. P. M. has invented silencers for everything from guns to babies, W5AGA suggests that he get busy on the CQ hound!

¹ P. S. Carter, C. W. Hansell and N. E. Lindenbland, "Development of Directive Transmitting Antennas," *Proc. I. R. E.*, Oct., 1931.

A Linear Electronic Voltmeter

By J. L. McLaughlin*

THE electronic voltmeter to be described has the following features:

1. Direct-reading linear voltage scale.
2. Compensated grid, plate and filament supply. (50% change produces less than 1% error in calibration.)
3. Full scale range of 100 volts with a total grid-plate supply of 225 volts.
4. Interchanging tubes of the same make and type introduces a variation in calibration of less than 5%.

Electronic (or vacuum-tube) voltmeters may be grouped into two broad classes; the effective or r.m.s. type and the instantaneous or "peak" type. Paradoxically, the electronic voltmeter as we know it to-day is sometimes one of the most potentially useful and actually useless tools we have to work with in radio communication. Anyone who cares to look up the genealogy of the tube voltmeter will be disappointed to find that although much has been written on the subject, outside of a few papers and articles of merit the bulk of it is just so much repetition.¹

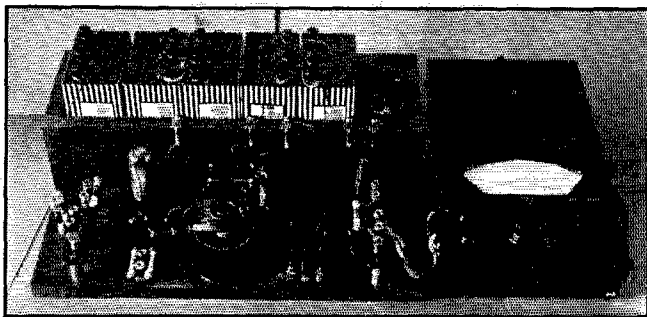
There are literally dozens of special types for particular jobs, no one voltmeter sufficing to cover the whole field of uses. Since space does not permit explanation of the maze of types and ranges, this article will be restricted to a description of one particular model that has been found very useful in working around transmitters and receivers, particularly a.f. amplifiers, speech input equipment and modulators.

This meter is of the r.m.s. type; that is, the plate-current meter is calibrated in terms of effective voltages of symmetrical wave form applied at the input (grid) terminals of the tube. Its calibration is, for all practical purposes, independent of frequency *but not of wave form*. Since it is calibrated on a.c. of sinusoidal wave form,

it will be in error when the a.c. being measured has a "lopsided" wave form. It is possible to compensate for this error to a sufficient degree by simply reversing the input leads to the voltmeter, the average of the two readings giving the correct answer *provided that the difference between the two readings is not excessive*.

In Fig. 1 is shown the circuit diagram of the voltmeter. It is recognizable as nothing more than the well-known automatic grid bias detector with the addition of an adjustable minimum grid bias control. Since this type of rectifier is ideally suited for use as the basis of a tube voltmeter, it is a wonder that nobody has suggested its use for this purpose before.

The object of the two 2 μ d. condensers is to



EXPERIMENTAL MODEL OF THE LINEAR ELECTRONIC VOLTMETER

The input connects to the jack-top binding posts at the upper left, the important resistor R being immediately below. The resistor for the other range plugs into a pair of holes in the baseboard, guarding against its being lost. The 0-200 microammeter connects to the posts at the lower right in normal operation and to the pair of posts immediately above when it is used for checking filament voltage. If a meter of this type is to be used near transmitting equipment it should be completely shielded to protect it against induced radio-frequency currents which might injure resistors, tube filament, etc.

by-pass circuit elements whose impedance is likely to change with frequency, such as the meter winding, grid potentiometer, etc. It is important that these condensers be non-inductive at the working frequency. A 10-meg. resistor is connected across the input terminals to keep the voltmeter in an operating condition at all times by providing a d.c. path from grid to filament.

The resistor R is the important unit deserving special attention. The accuracy of the meter will rest on the value of this resistor and its constancy over long periods of time and under changing temperatures. It is recommended that it be a *good* one with its calibration accurate to at least 1% and having a low temperature coefficient. The type shown in the photograph is not

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¹ Some good references: Van der Bijl, *Thermionic Vacuum Tube*, Chap. X, pp. 367-371; Jarvis, "Radio Receiver Testing Equipment," *Proc. I. R. E.*, April, 1929; Lubcke "Vacuum-Tube Voltmeter Design," *Proc. I. R. E.*, May, 1929; Jansky and Feldman, "A Two-Range Vacuum-Tube Voltmeter," *Journ. A. I. E. E.* Feb., 1929; Brown, *Radio Frequency Electrical Measurements*, Chap. VIII.

recommended where precision is demanded, but will be quite satisfactory where accuracies of within 5% will do. This resistor determines the working range of the instrument. For the Type '30 tube and a 0-200 microammeter, the resistor

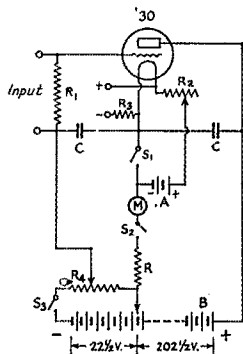


FIG. 1 — SCHEMATIC CIRCUIT OF THE LINEAR ELECTRONIC VOLTMETER

R — The important cathode resistor. It should have a value of 615,000 ohms for the 100-volt range and of 42,500 ohms for the 10-volt range. Non-inductive type resistors of high accuracy should be used for precise work.

*R*₁ — 10-megohm input resistor. Not critical.

*R*₂ — 20-ohm filament rheostat.

*R*₃ — 9500-ohm multiplier for using 0-200 microampere meter as filament voltmeter. Meter reads 2 volts at full scale.

*R*₄ — 50,000-ohm wire-wound potentiometer.

C — 2- μ fd. non-inductive by-pass condensers.

M — 0-200 microammeter.

*S*₁ *S*₂ *S*₃ — T.p.s.t. switch.

A — Filament battery, two dry cells in series.

B — Five 45-volt "B" batteries in series, 22.5 volts at negative end tapped off for bias adjustment.

required for any working range between 10 and 100 volts is shown on Fig. 3. For the 10-volt range *R* should be 42,500 ohms and for the 100-volt range 615,000 ohms. The 100-volt range is the most important of the two because it is as linear as a d.c. meter, the calibration holding and being less affected by lopsided wave form. The 10-volt range falls more into that portion of the tube's characteristic curve found poorer for good tube voltmeter work. For measurements below 2 volts there are other meters of more suitable characteristics.

The microammeter shown in the photograph is a Rawson with a 200-microampere low range. For precise measurements requiring an accuracy of better than 1% such an instrument is necessary because of its accuracy, long scale and the precision with which the reading can be made. The small Weston or Jewell 0-200 microammeter will prove quite satisfactory for most work. The absolute accuracy will depend on how well you can read the meter.

The photograph shows the layout of parts in an experimental model. On each end are mounted two pairs of G.R. binding post units, the tops of which take G.R. plugs. The pair on the upper left-hand side is the input and has the 10-meg.

resistor connected across it. The pair below takes resistor *R*, which is mounted on a G.R. plug. Over on the right-hand side, the top pair is used to check the filament voltage by connecting it to the microammeter, a 9500-ohm resistor in series between one side of the plug and the negative side of the filament making the meter a voltmeter with a range of 2 volts. The lower right pair takes care of the microammeter when it is connected normally in the plate circuit.

To operate, the filament voltage is adjusted to 1.6 volts (approximately, it's not critical); next, the grid bias potentiometer is adjusted to bring the pointer on the meter to 10 microamps — no more, no less! Then the zero adjustment on the microammeter is turned until the meter reads "zero." *These adjustments must be made accurately.* The full scale can now be used for calibration. Fig. 2 shows a calibration and this will hold good within 5% of any meter built like the one shown — provided resistor *R* is within 1% of the values given. If the meter can be calibrated on a.c. with accuracy greater than this figure, all the merrier!

Unlike most tube voltmeters, this one's calibration is independent of small changes in grid,

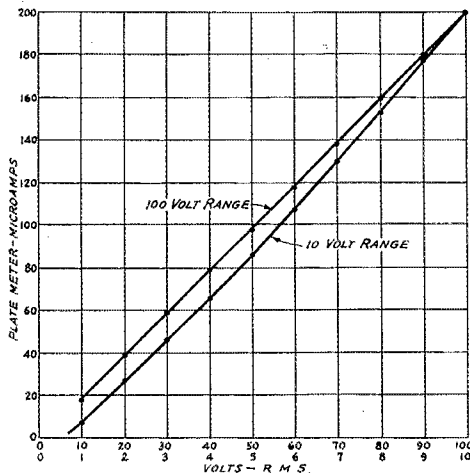


FIG. 2 — TYPICAL CALIBRATION CURVES FOR TWO RANGES

plate and filament voltages. A 50% change in grid-plate voltage will change the calibration by less than 1% on the 100-volt range and by less than 2% on the 10-volt range. The filament voltage can change plus or minus 25% without introducing an error of more than 1/2 of 1%. These figures are quite dependable provided, however, that the potentiometer is so adjusted that the meter reads zero with no a.c. voltage across the input terminals. This is the only critical adjustment necessary; and the absolute accuracy will, to a marked degree, depend on the precision

(Continued on page 21)

A New 6-Volt Output Pentode

IN RECENT months the automobile radio set has been given a good deal of attention by set designers and tube makers; witness the introduction of the series of 6-volt heater-type tubes. At first the "B" supply for such receivers

torted power output than the '38, with approximately two-thirds of the signal voltage required by the latter.

On page 21 are the ratings and characteristics of the ER-LA.

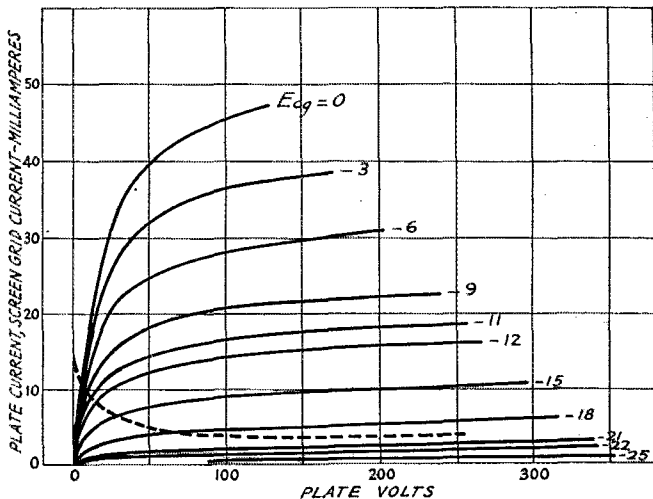


FIG. 1 — AVERAGE PLATE CHARACTERISTICS OF THE TYPE LA PENTODE

Screen-grid voltage is 165 volts. The dashed line is the screen-grid current for a control-grid bias of -11 volts.

consisted solely of dry batteries; lately, however, various devices have been developed which take power from the car battery and transform it into "B" power for the set. Since the efficiency of these "B" substitutes usually is comparatively low, the car battery often is loaded up to the limit, and it is necessary therefore to get just as much audio power from the receiver as possible with the "A" and "B" power available.

For this reason a more efficient output tube is something worth having. Eveready Raytheon engineers have been working on the problem and have developed a new 6-volt pentode which will bear the type designation LA. It has a directly-heated cathode of the same rating as the heater in the Type '38, but its characteristics are more like those of the '47 than the '38. For a given plate and screen voltage the LA will give from 10% to 40% more undis-

torbed power output than the '38, with approximately two-thirds of the signal voltage required by the latter. In general, the bias for this sort of operation will be

The family of plate curves for a screen voltage of 165 volts is shown in Fig. 1.

The curves shown in Fig. 2 bring out an interesting point about the operation of pentodes in push-pull. It is well known that the second-harmonic output of a single pentode can be made zero by proper choice of load resistance, although the third harmonic is considerably greater than with a triode of similar output rating. Offhand, then, there would seem to be little to gain by operating pentodes in push-pull from the standpoint of reduced harmonics, because the push-pull connection balances out only the even harmonics.

If two pentodes are operated with a self-biasing resistor of the proper value, however, and if the proper choice of load resistance is made, the third-

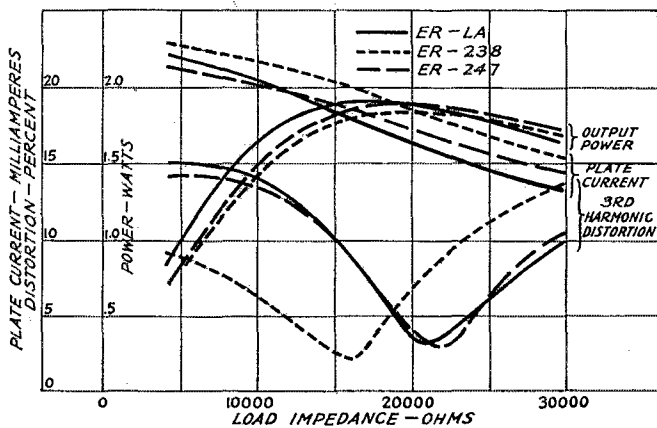
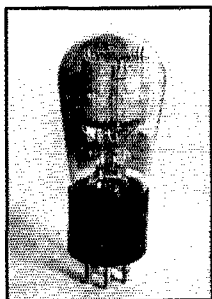


FIG. 2 — PLATE CURRENT, DISTORTION AND POWER OUTPUT VS. LOAD IMPEDANCE

For two pentodes in push-pull with self-bias, operated partially Class B, as explained in the text. These curves show very clearly the reduction of the third harmonic when the proper load resistance is used. Curves for three different types of tubes are shown. The plate supply voltage is 180 volts in all three cases.

greater than the correct value for Class A amplification, so that the tubes are operating semi-



THE EVEREADY
RAYTHEON LA PEN.
TUBE

Class B. The grids are not allowed to go positive, however. The plate current fluctuations are not great, so there is little variation in the load on the plate supply. The power output is slightly less than that obtainable using the tubes in push-pull as Class A amplifiers; but the greater operating economy and smaller distortion make this type of operation worth while. The bias resistor should be 900

ohms for two LA pentodes with 165 volts on the plates and screens.

Filament voltage.....	6.3 volts d.c.
Filament current.....	0.30 amp.
Plate and screen-grid voltage.....	135 165 volts max.
Control grid voltage.....	-9 --11 volts
Plate current.....	12 17 ma.
Screen-grid current.....	2.5 3.5 ma.
Amplification factor.....	100 100
Mutual conductance.....	1900 2100 microhms
Power output.....	700 1200 milliwatts
Load impedance.....	9500 8000 ohms

The LA pentode should fit nicely into amateur receivers using a six-volt battery for "A" supply. It has the standard 5-prong base. The '38, it will be remembered, has its control grid connection brought out on top, requiring the use of a grid clip, but the elimination of the indirectly-heated cathode in the LA makes this extra connection unnecessary. The tube cannot be used with a.c. filament supply, however, except possibly for loud-speaker operation.

— G. G.

A Linear Electronic Voltmeter

(Continued from page 19)

of the initial adjustment; on how well the meter is set and reset to the original operating point of 10 microamps.

If the "B" battery be reduced to as low as 185 volts, the calibration will remain correct within $\frac{1}{2}$ of 1 per cent, without grid current flowing at any input in the range. At 100 volts "B" the calibration will be out by 1%. With no battery connected the calibration will be out 10%. Below 184 volts "B," grid rectification supplies the extra current necessary to operate the meter. In other words, under normal operating conditions the tube functions as a three-element plate detector; and under sub-normal conditions, as a two-element rectifier. Since the great virtue of an electronic voltmeter is its ability to measure

voltages without drawing power from the device to which it is connected, it is advisable to see to it that grid current flows at no point within the range. As long as the battery reads more than 185 volts no grid current will flow.

Tests made with 12 Type '30 tubes of the same

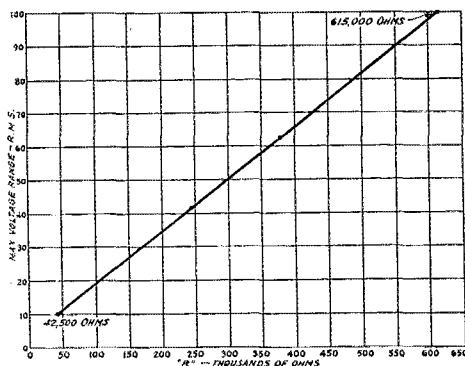


FIG. 3—VOLTAGE RANGES USING 200-MICRO-AMPERE FULL-SCALE METER WITH VARIOUS VALUES OF RESISTOR "R"

make show a maximum deviation in calibration of 4% and an average of 1%.

In conclusion, it may be stated that the absolute accuracy at all times depends on the tube used, resistor R and the ability of the operator to set the meter to 10 microamperes.

Strays

W8ESJ is a student at the University of Michigan, where students who drive cars must have not only a state license tag but a university tag as well. Having by chance drawn the state license 733373, W8ESJ made a special request at the Dean's office for a certain university tag number and this request was granted. You're right, fellows — the number was 73.

The OW at W4ALD thinks that No. 5 of the "Amateur's Code" should be changed to read "unbalanced" and take out "never!"

In connection with the article on silvering quartz plates in the March issue, W9BOR calls our attention to the fact that solutions containing both silver and alcohol should be disposed of at once, as a fulminate of silver is formed after a few hours which is highly explosive.

In a wireless story in the *Elks Magazine* we read that the ship in distress "had not sent out the conventional three dashes, three dots, and three dashes, which would have called nearer vessels to her aid." That's what comes of trying to be "technical."

The Bloomfield Radio Club's "Five-Meter" Field Day

By Leroy Spangenberg, W2AIP-W2ZZBP*

THIS is an account of an expedition of those intrepid members of the Bloomfield (N. J.) Radio Club, who, over the week-end of Washington's Birthday, migrated from comfortable firesides into the wilds of Northern New Jersey, there to endure the hardships of honest-to-goodness "buddylugging" and cold weather, all in the interest of amateur radio — "without pecuniary interest."

Shortly after the appearance of the 56-mc. dope in *QST* (July and August, 1931), the members of the Bloomfield Radio Club became extremely active in this band. Lectures and demonstrations were featured at club meetings and

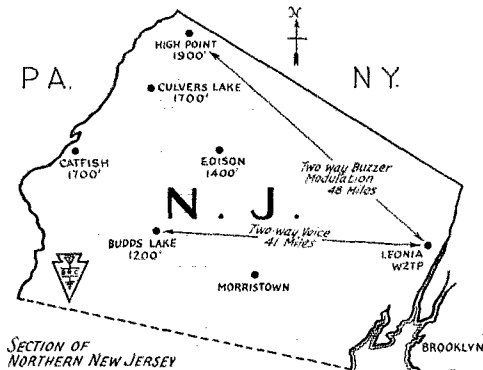


FIG. 1—THE SECTION OF NORTHERN NEW JERSEY IN WHICH THE 56-MC. TESTS WERE HELD
Reliable two-way voice communication was maintained over distances up to 41 miles.

finally, to meet the demand for more extensive "five-meter" experiments, plans were laid for a cooperative program between the New Jersey State Department of Conservation and Development and the Bloomfield Radio Club, whereby the state forest fire lookout towers situated at high elevations throughout New Jersey might be used for test purposes. As a result of the tests, the state would learn of the practicability of using low-powered ultra-high frequency 'phone sets as a means of communication between towers and between the field and towers during actual forest-fire fighting. The Bloomfield Radio Club, on the other hand, would profit by observations which could be made admirably from carefully selected elevated points.

* Technical Dept. RCA Institutes, Inc., 75 Varick St., New York City.

Now, to go on with the story. Eleven stalwart and selected men who appeared physically capable of withstanding the rigors of a hard grind made their way by motor to Culvers Lake, Sussex County, N. J., where the operating headquarters was established. Upon arrival, the bulk of equipment (which well overtaxed the holding capacity of a good-sized bungalow) was unloaded and the real work of the party commenced. After a blessed silence which lasted only as long as the supper hour, the five-meter rigs, five in all, were tested and serviced as necessary in preparation for the next day's activity. Also, a portable 3.5-mc. crystal-controlled transmitter was set up to contact the listening stations in the metropolitan area, giving them modifications in test procedure and schedules if necessary. This accomplished, we donned all available clothing, tumbled three in a bed, and through cold torture awaited the passing of the remaining hours of black, frigid, self-inflicted punishment.

Came the dawn, none too soon, and camp hummed with the activity of the various crews arranging their burdens for long hikes over rough and sometimes steep mountain trails. With breakfast over, the crews scattered, not hit or miss, hither and yon, but toward definite destinations with definite instructions with a definite purpose in view. Such was the thoroughness of the plans laid by President Cobb to insure a successful demonstration and meaningful observations.

LOCATION OF STATIONS

High Point, N. J., the first test station in operation, was manned by Tom McCann, W2AFB-W2DNDV and John Dunham, official photographer of the trip. As the name suggests, this station was located at the highest natural predominance in the State at an elevation of about 1900 feet above sea level and about 600 feet above the surrounding terrain; a truly excellent location for any ham's station.

The transmitter which, together with the receiver, was mounted in a Ford cabriolet, employed grid modulation with two Type '36 automobile receiving tubes connected in the conventional push-pull oscillator circuit and was fed by a 200-volt "B" battery. The output of these tubes was inductively coupled to two 4-foot (quarter-wave) feeders which in turn energized an 8-foot (half-wave) vertical antenna of telescoping brass tubing mounted on the trunk rack



A FIELD DAY IN THE MAKING — BLOOMFIELD RADIO CLUB MEMBERS OUT TO PROVE THAT 56 MC. CAN DO THINGS

Left — Larson and Cobb unpacking and inventorying apparatus at Culvers Lake. Center — Lugging batteries to one of the station sites. Right — Unpacking for the night at Culvers Lake "Headquarters."

at the rear of the machine. A super-regenerative receiver of the now famed *QST* type was used with an antenna strung around the roof of the car.

Consistent contact with all of the other test stations proved to be a simple matter with a plate input of only 3 watts. The reports were R9, R8 and occasionally an R7, but always with good modulation. It was from High Point that we believe a distance record for two-way five-meter communication was established. With buzzer modulation, Tom McCann was able to work, for a considerable period of time, W2TP at Leonia, N. J. — a distance of approximately 48 miles. 'Phone, however, was impossible over such a distance with a low plate power input; but Musterman, W2TP, with two Type '10 tubes was heard at all times with an R9 signal at any point of Sussex County.

It was observed, while at High Point, that the automobile transmitter had no directional effect; that is, there was no reported difference in signal strength whether the car was facing toward or away from the receiving station, indicating that there was no appreciable absorption or re-radiation from the body of the car. Aside from the vertical antenna, this station was equipped with a directive antenna comprising two "U" frames separated from each other by one-quarter wavelength. Although great difficulty was encountered in turning the antenna frame about in the high winds, it was fairly definitely established that

distinct maxima and minima of signal strength occurred as the antenna was rotated with the feeder wires connected and the transmitter operating. So much for High Point — let's be on to test station number two.

Culvers Fire Tower, located to the Northwest of our headquarters at Culvers Lake, is at an elevation of about 1700 feet above sea level and far too high above the surrounding country for the comfort of soft-bodied pen-pushing hams. This station was put into operation by Frank Kaltman, W2AFQ, and the writer, with the assistance of a kindly fire warden who bore the brunt of the burden by toting, without so much as a grunt, half a dozen heavy duty "B" batteries and other weighty accoutrements to the bald, wind-swept summit.

This station used a pair of grid-modulated Type '12 tubes in push-pull, and the usual sort of receiver. A peculiar complication, which should be of interest, developed in the transmitter as a result of the use of a common plate supply. During the course of operation, it was observed that the transmitter radiated from six to eight carrier waves simultaneously and that each carrier had about the same amount of modulation. Furthermore, the carriers were all removed from one another by a definite frequency. The transmitter was taken off the air because of the QRM it was causing, but it was concluded at a technical meeting afterwards that the superaudible



FURTHER GLIMPSES OF THE 56-MC. OUTING

Left — Mears, McCann, and Cobb at Culvers. High Point was within eyeshot of this station. Center — Griffin operating on (not in) Budd's Lake Tower. Right — W2VK, a particularly neat station atop the Palisades.

frequency of the receiver oscillator was feeding back through the "B" batteries and so producing the freakish operation.¹ This is something which the "five-meter" men had better watch out for, for it is indeed a very annoying and baffling situation. Of course, at a fixed location one usually has a separate power supply for transmitter and receiver, but operators of portable stations may encounter this difficulty.

This station communicated regularly with all other test stations until it was put out of operation. W2VK, a low-powered portable station atop the Palisades, N. J., was heard with an R8 signal. So to test station number three.

Edison Fire Tower, located just East of Ogdensburg, N. J., is in the center of a group of iron ore deposits where Edison once experimented with the magnetic extraction of iron ore. It was thought beforehand that these deposits would have a bad effect upon 56-mc. transmission. This was quickly proved incorrect, for W2ZZAW, manned by Gil Mears, W2VQ, and F. D. Webster, was far more consistent in laying down a good signal than were any of the other stations. It was originally planned to operate the equipment from inside the 60-foot steel fire tower but, because the lock was frozen, it became necessary to work from the car used for transporting the apparatus. This station, a really fine specimen of ham workmanship, received its transmitter plate supply from an aviation dynamotor driven by one 12-volt storage battery. Signals from Edison were generally R9, R8, at any other test points, although the signals did not penetrate to the listening stations in the city. District fire wardens visited the station and were very pleased with the demonstration.

Catfish Fire Tower, located just west of Blairstown, N. J., was the most distant from the metropolitan area; a distance of about 60 miles air line. The transmitter employed a pair of pentodes, plate modulating a pair of Type '12's. Although the outfit worked exceptionally well, we learned very forcibly the difference between portable equipment and that thought to be portable. The tower is the farthest from the base and most in-

¹ Probable explanation: The interruption-frequency oscillator, operating at about 100 kc., say, modulates the high-frequency oscillator via the common power supply and produces side-band frequencies of the h.f. carrier plus and minus the 100-kc. i.f., together with other side-band frequencies of the h.f. carrier frequency plus and minus the various harmonic frequencies of the i.f. This, incidentally, is the argument against the frequently proposed idea of modulating a low radio frequency with a voice frequency and then using it to modulate the transmitter's carrier frequency. There's no escaping side-bands. — EDITOR.

accessible from the nearest road. The station was put into operation with the assistance of some Boy Scouts who, that day, certainly did their good turn. W. A. Cobb, W2CO, Perc. Daggit,

W2FB and Ole Larson served at this point. W2BBO, Brooklyn, N. Y., was heard over a distance of about 75 miles.

Budd's Lake Fire Tower, at Budd's Lake, N. J., only a few miles from the transatlantic telephone receiving station at Netcong, was operated by Griffin, W2AOE, and Sanford, W3ANP, of the Morris Radio Club. Another record is claimed by this station. *Two-way voice communication was established with W2TP at Leonia over a distance of about 41 miles.* The power supply, taken from a dynamotor, supplied two Type '12's which fed into all sorts of antennas, including 8-foot wires and the steel frame of the tower (which did not work very well!). It was planned to elevate the receiving antenna to a height of 1000 feet with hydrogen-filled aviation balloons. Unfortunately,

after carrying the heavy pressure tank of hydrogen to the scene of action, the balloons (which were probably made eons ago) burst, as did the spirits of the operators.

After dismantling the stations, weary steps were laid in the direction of Morristown, N. J., and the banquet of the Morris Radio Club, where



A TYPICAL SIXTY-FOOT OBSERVATION TOWER OF SIMILAR TYPE TO THOSE MADE AVAILABLE TO THE NEWJERSEY AMATEURS



ON A 56-MC. OUTING — MEMBERS OF THE BLOOMFIELD RADIO CLUB WHO CONDUCTED THE UNIQUE AND HIGHLY SUCCESSFUL FIELD DAY

They are (left to right) Kaltman, W2AFQ; Ole Larson; F. D. Webster; Perc. Daggit, W2FB; Griffin, W2AOE; Cobb, W2CO; Mears, W2VQ; Spangenberg, W2AIP; McCann, W2AFB.

reports were made and data correlated. There it was learned that Earl Dannals, W2GG, with a 56-mc. receiver aboard, swooped down over the Budd's Lake Tower, gesticulating that he had been hearing their signals above the roar of his ship's motor. There it was learned that McCann and photographer Dunham had become lost in

(Continued on page 29)

'Phone-C.W.T. QSO Party

Week of May 15th—21st Inclusive—Prizes for Highest Scores!

BRASSPOUNDERS and 'phone men, attention! How many 'phone stations can any key-pounding amateur radio operator QSO in this one week? How many c.w. telegraph stations can any amateur behind a microphone contact in the same period of time?

A one-week informal 'phone-c.w. QSO contest is proposed to find these things out. The results of the contest-party will be reported in *QST* which will give prominence to the several highest-scoring 'phone and c.w. telegraph stations and mention to every participant who reports. Each

later after the contest is over, or written down at the time if the other operator gives the information over the air).

(5) Report of signals which were exchanged, if any.

Write your name, address and call at the top of each sheet of your report, please. At the end add up your "score," add the number of Sections, and multiply the two to give the grand total which you claim in the contest. Within seven days of the close of the QSO contest mail your results to A.R.R.L., 38 LaSalle Road, West

REPORT OF C.W.T. STATION W2ZXY LOCATED AT _____ IN THE _____ A.R.R.L. SECTION

Date and Time (Local)	Frequency Band	Station Worked	Section	Signal Reports Exchanged	
				(Stn. Wkd.)	(My Sigs.)
May 15th 4:20 p.m.	3500 kc.	W4WS	Eastern Florida	QSA5 R6 Mod. good	QSA4 R5 d.c.
4:32 p.m.	"	W4TM	Tennessee	QSA4 R4	QSA3 R3
4:50 p.m.	"	W4ASQ	Eastern Florida	QSA5	QSA5 d.c.
5:15 p.m.	14000 kc.	W9LD	Missouri	QSA5 R7	QSA4 R8
Claimed Score: 4 stations worked in 3 Sections = 4 x 3 = 12 (total score)					

Form for Reports to A.R.R.L. on 'Phone-C.W.T. QSO Party Showing How Work Should Be Tabulated

two-way contact properly reported will count *one*. The sum of all these points will be multiplied by the number of A.R.R.L. Sections * worked to give the final score.

All brasspounders and 'phone men are invited to take part. Every 'phone-c.w. contact counts toward the score. 'Phone-'phone and c.w.-c.w. QSO's do not count and should not be entered in the report to A.R.R.L.

To take part: Get on the air on any of the bands assigned for your type of operation by the F.R.C. Work all the c.w. stations you can raise, if you choose to use 'phone. Work all the 'phone stations you can raise, if you choose to pound brass in this contest.

Reporting: Keep a special tabulation of QSO's to constitute your report, showing in order from left to right:

- (1) Date and time of QSO.
- (2) Frequency band used.
- (3) Call of station worked.
- (4) The A.R.R.L. Section * in which this station is located (this can be filled in

Hartford, Conn. All 'phone and c.w. station results will be mentioned in *QST*, so be sure to report, whether the number of QSO's is large or small.

Contest starts: May 15th, 0000 C.S.T. (May 15th, 2 a.m. A.S.T., 1 a.m. E.S.T., 0000 C.S.T.; May 14th, 11 p.m. M.S.T., 10 p.m. P.S.T.)

Contest ends: May 21st, 2400 C.S.T. (May 21st, 2 a.m. A.S.T., 1 a.m. E.S.T., midnight C.S.T.; May 20th, 11 p.m. M.S.T., 10 p.m. P.S.T.)

The contest starts at midnight (C.S.T.), Saturday, May 14th, and ends at midnight (C.S.T.) Saturday, May 21. QSO's before and after this one week period shall not be counted.

Satisfactory evidence of off-frequency or extra-legal operation by any participant, 'phone operation, 3900-4000 kc., without operator's license properly endorsed for unlimited amateur radio-telephone operation, c.w. telegraph station operation with broad "a.c." etc., will be considered grounds for disqualification and/or other suitable penalty. Correspondence from individual

(Continued on page 89).

* See page 5, this issue, for a complete list of the 69 A.R.R.L. Sections.

Canada-U. S. A. Contest Results

By E. L. Battey, Assistant Communications Manager

THE first A.R.R.L. exclusive Canada-U. S. A. Contact Contest, held from January 15th (6 p.m.) to January 17th (midnight), went over with the proverbial "bang" and was thoroughly enjoyed by "VE" and "W" participants alike. The purpose of the "test" was to determine which Canadian operator could work the most stations in the greatest number of A.R.R.L. sections throughout the United States and insular possessions, and similarly to find out which U. S. operator could pile up the highest number of contacts with "VEs" in the most sections, handling traffic with as many stations worked as possible, in the stipulated time, 54 hours. Aside from the competitive angle, the contest offered the opportunity for friendly rag chews, exchange of traffic, and a general period for "VE-W" contacts with "good fellowship" as the "keynote."

THE HIGH SCORERS

Many high scores were reported, the most outstanding in both the "VE" and "W" groups being VE3GT's exceptional total of 11,340! This represents contacts with 114 stations in 35 sec-

worked. If any amateur traffic (in regulation A.R.R.L. form), regardless of the number of messages, was handled during a QSO, two points were added to the score. Second QSOs with stations already worked did not increase the score in any way, unless during such second QSOs traffic was handled, when none had been previously exchanged. In such cases the two points were added. The total number of points made by QSOs and message exchanges were (1) in the case of "VE" participants multiplied by the number of A.R.R.L. sections worked, and (2) in the case of U. S. A. participants multiplied, first by the number of sections worked and then multiplied by 9, since there are approximately nine times as many U. S. A. sections as Canadian sections to be worked; this latter multiplication factor of 9 was added merely to get "VE" and "W" scores on an equal basis. The result of the multiplication as outlined gives the final score.

Elsewhere in this article will be found a complete list of scores of all entries, showing also the number of stations worked and the number of sections represented by the contacts made. Stations marked with asterisks were not partici-

THE TEN HIGHEST CANADIAN PARTICIPANTS

VE3GT.....	11340	VE2CQ.....	5709	VE4CV.....	3480	VE4IS.....	3230	VE2DR.....	3144
VE2DF.....	6161	VE3AU.....	4089	VE1BV.....	3427	VE3ZQ.....	3178	VE3BC.....	2842

THE TEN HIGHEST UNITED STATES PARTICIPANTS

W9BVI.....	3600	W4EJ.....	3060	W2ABT.....	2115	W4NN.....	1944	W3CDK.....	1890
W9EF.....	3510	W6CAL.....	2808	W1BFT.....	1998	W5BZT.....	1935	W9OT.....	1845

tions. Congratulations, VE3GT. Next highest for both groups is VE2DF with a score of 7161, made by 91 contacts in 33 sections. VE2CQ, 5709, and VE3AU, 4089, also rate higher than any single "W" participant.

The leader in the "W" group is W9BVI with 3600 points! He contacted 30 "VEs" in five Canadian sections (Quebec, Ontario, Alberta, Saskatchewan, British Columbia). Second highest "W" is W9EF, who made a score of 3510 on the strength of QSOs with 25 stations in six sections (Maritime, Quebec, Ontario, Alberta, Manitoba, Saskatchewan).

SCORING SYSTEM

The method of scoring was very simple. Canadian and U. S. operators alike counted 1 point for each station (in the other country)

pating, their reports being submitted merely to confirm contacts made throughout the duration of the contest. Since this was a contest "between operators," scores made at stations where more than one operator was on duty are divided by the number of operators. In these cases the number of operators is shown in parenthesis with the call. Calls are arranged by sections so that entrants may compare their work with that of other operators in their locality.

HIGH LIGHTS

To VE3GT goes the distinction of contacting the most sections during the contest. He worked stations in 35 sections. He also worked all 9 "W" districts, and contacted more stations (114) than any other operator. No U. S. A. operator succeeded in working all 7 "VE" sections. W6CAL,

W8DPO, W9EF, W9ACL and W9CFN each worked 6 sections. Fifteen "Ws" contacted 5 sections. Reports were received from 56 "VEs" and from 139 "Ws". 175 "VEs" were worked and heard during the 54 hours of the contest. It is estimated that approximately 400 different "W" stations were worked by the various "VEs". Practically everyone "heard more 'VEs' than ever before." VE3GT worked 76 different "Ws" in the first 24 hours, handling traffic in nearly every instance. He was on the air 46 of the 54 hours. A local competition was held in Toronto with prizes offered to the three highest scoring operators. The result was a high degree of interest and a keen spirit of competition between operators in that city. W9BVI sums up the comments of many when he says, "I was successful in contacting more Canadians in the three days of the contest than I had previously worked in my ten and one half months on the air. The most outstanding point in the contest was perhaps the willingness of the Canadians to help us out, even those who were not in the contest themselves. I had noticed, previous to the contest, that VEs were always willing to talk and not to cut QSOs short with a '73'; but it isn't until you work in a contest like this that you can really realize what a fine group of hams there are in Canada. I am certainly for more 'W-VE' contests." The usual amount of "grief" was experienced all around; tubes blew, apparatus burned, skip skipped, QRM and QRN crashed . . . but enough of the gloomy side; every ham has his troubles. Here's a good one. VE5HP says, "One fellow didn't know what a VE was!" Low power was not a serious handicap in this contest. VE4AI used only 180 volts of "B" batteries, but he had a lot of fun. VE3SA used one Type '12A with 300 volts on the plate. W9CFB had only one Type '45 with 180 volts, but he led his section! VE3AU has a word to say relative to his reactions at the close of the competition: "On January 16th in nine hours of operating I worked 41 stations, twice as many as I've ever contacted before in one day. I found the 'Ws' always ready to cooperate by taking messages through terrific QRM, or, as was the case in several instances, offering to report to A.R.R.L. to help out, even though they were not participating. Also, I heard more Canadians than I ever knew existed." W4AJX says the best 7-mc. VE signal came from VE1BV. Apparent ignorance of the existence of the contest on the part of some amateurs seems to indicate that "too many amateurs don't read QST — they just look at the pictures." All work was done on the three most popular of amateur bands, 3.5, 7 and 14 mc. Opinions regarding which was the best band during the contest naturally vary since conditions are never identical at any two different QTH's. The more aggressive participants divided their work between the three bands, but 3.5 mc. and 7 mc. were the favorites. VE3GT worked all

A.R.R.L. sections inside a 1000-mile radius from Toronto, except Virginia and Vermont. The list of VEs heard and worked during the contest is of "call book" proportions. Many participants are still trying to figure out what impulse causes so many Ws to answer directional "CQ VE."

CANADIAN SCORES — CANADA-U. S. A. CONTEST

Station	Number Stations Worked	Number Sections Worked	Score
MARITIME			
VE1BV	69	23	3427
VE1AE	40	18	1152
VE1BW	30	16	768
QUEBEC			
VE2DF	91	33	7161
VE2CQ	87	33	5709
VE2DR	49	24	3144
VE2CO	46	24	2352
VE2CU	39	20	1520
VE2BB	29	19	1311
VE2AA	27	17	1003
VE2AC	18	15	750
VE2EK	4	3	12
ONTARIO			
VE3GT	114	35	11,340
VE3AU	55	29	4089
VE3ZQ	(2) 91	28	3178
VE3BC	(2) 74	29	2842
VE3CP	50	21	2646
VE3GL	65	28	2352
VE3GX	51	23	2277
VE3CD	42	21	2184
VE3LM	34	21	2142
VE3BV	39	21	1953
VE3IJ	37	19	1653
VE3IR	22	15	780
VE3DW	24	14	728
VE3RF	20	15	720
VE3YH	18	11	352
VE3WX	15	11	341
VE3HB	11	8	232
VE3PN	12	9	198
VE3HW	11	10	190
VE3DD	10	9	162
VE3CA	11	6	126
VE3MR	6	6	84
VE3SA	2	2	4
SASKATCHEWAN			
VE4CV	46	30	3480
VE4HU	22	15	840
VE4BF	25	16	688
VE4AI	18	10	480
VE4BB	13	12	396
VE4FL	16	11	330
VE4JR	12	8	176
MANITOBA			
VE4IS	63	34	3230
VE4DK	43	29	2668
VE4DJ	24	16	768
VE4FP	1	1	1
ALBERTA			
VE4DT	40	20	1920
VE4BZ	28	14	966
VE4DX	18	8	256
VE4DR	8	5	110
BRITISH COLUMBIA			
VE5HP	43	11	803
VE5AG	23	13	663
VE5FG	22	10	380
VE5AC	17	11	341
VE5AL	16	10	320
VE5EH	13	9	171
MAINE			
W1APU	15	3	1080
W1CFG	13	3	1053

U. S. SCORES — CANADA-U. S. A. CONTEST

Station	Number Stations Worked	Number Sections Worked	Score	Station	Number Stations Worked	Number Sections Worked	Score
MAINE—Cont.							
W1EF	12	3	972	W4EJ	26	5	3060
W1AFA	10	3	756	W4AL	12	4	720
W1APX	7	3	567	W4MR	8	3	216
W1BOF	5	3	405	W4AAE	2	1	54
W1CRP	5	2	234				
EASTERN MASSACHUSETTS							
W1BFR (2)	13	3	365	W4NN	24	4	1944
W1CHR	3	3	135	W4AJX	13	5	1485
W1CCA	3	2	54				
W1AWO *	1	1	9				
WESTERN MASSACHUSETTS							
W1AZW	8	2	324	W5BZT	15	5	1935
W1AUQ	5	2	270	W5JV	6	3	432
W1CCH	4	2	180				
W1AFU	3	2	90				
CONNECTICUT							
W1BEO	4	2	180	W5BSG	11	5	1125
W1CTI	3	2	162				
W1PF	1	1	27	W5BPM	1	1	27
W1AFB *	1	1	27				
NEW HAMPSHIRE							
W1BFT	28	3	1998	W5BTD	1	1	27
W1IP	3	1	81				
RHODE ISLAND							
W1BGA	8	3	432	W6CAL	18	6	2808
W1AAD	1	1	9	W6AZX	6	3	432
				W6CZK	4	2	144
				W6ADK	3	2	90
VERMONT							
W1AXN	2	2	72	W6CLP	11	4	1116
W1ATF	2	1	54	W6FFU	10	4	900
				W6BIP	5	2	270
				W6DJQ	4	3	270
NEW YORK CITY—LONG ISLAND							
W2AOY	13	4	1188	W6EXQ	9	5	1035
W2API	12	3	702	W6EAK	7	4	684
W2AJG	15	2	666	W6EDW	1	1	27
W2COK	10	2	432				
W2BGO	6	2	324	W6BJF	11	5	1215
W2BQK	5	2	270				
W2CBB	5	3	243	W6CTP	8	5	720
W2WTF	3	1	54				
W2AQQ	1	1	27				
W2CUU *	1	1	9				
NORTHERN NEW JERSEY							
W2ABT	17	5	2115	W6UO	1	1	9
W2AGO	6	3	432				
W2BCH	3	3	189	W7LD (2)	9	3	311
W2ADD *	1	1	27	W7WY	4	2	144
W2WY *	1	1	27	W7RT	2	2	108
				W7ART	1	1	27
EASTERN NEW YORK							
W2BAF	5	2	234	W7AAT	8	3	648
EASTERN PENNSYLVANIA							
W8UV	15	4	1476				
W8CVS	13	3	945	W7JY	5	1	81
W3BFA	7	3	459				
W3AKU	6	3	432	W7AMF	2	2	72
W3AAO	7	4	324				
W3ZZD	4	3	324				
W3BEY	2	2	72				
W3AGV	1	1	27				
W8CWO	1	1	27				
MARYLAND—DELAWARE—DISTRICT OF COLUMBIA							
W3BND	7	3	513	W8ERZ	12	2	576
W3HC	2	2	72	W8DHU	6	2	288
W3BGI *	1	1	27	W8ETH	3	3	243
				W8BEN	4	2	108
				W8BLO	5	1	63
				W8BMS	3	1	63
				W8ECF	2	1	54
SOUTHERN NEW JERSEY							
W3CDK	20	5	1890	W8AYO	11	4	1044
W3UT	4	2	180	W9CWR	3	3	243
				W9HK	4	2	216
VIRGINIA							
W3FE	11	3	675	W8DTN	4	3	216
W3CFL	4	2	216	W8PP	3	1	81
				W8EGX	2	2	72
				NORTH CAROLINA			
				EASTERN FLORIDA			
				NORTHERN TEXAS			
				ARKANSAS			
				OKLAHOMA			
				SOUTHERN TEXAS			
				SAN FRANCISCO			
				SAN JOAQUIN			
				LOS ANGELES			
				ARIZONA			
				SAN DIEGO			
				NEVADA			
				WASHINGTON			
				MONTANA			
				IDAHO			
				OREGON			
				WESTERN NEW YORK			
				MICHIGAN			

Station	Number Stations Worked	Number Sections Worked	Score
OHIO			
W8BMK	7	2	342
W8BGS	4	3	270
W8EFW	3	3	135
W8EBY	1	1	27
WEST VIRGINIA			
W8DPO	11	6	1350
WESTERN PENNSYLVANIA			
W8KD	5	1	135
ILLINOIS			
W9EF	25	6	3510
W9FFQ	12	5	1440
W9AGQ	5	3	297
W9ACU	2	1	54
W9EQW	1	1	27
WISCONSIN			
W9OT	15	5	1845
W9ESZ	10	3	648
W9BOP	3	3	189
W9HMS	4	2	180
W9IH	1	1	27
IOWA			
W9CFB	15	4	1404
W9BCJ	12	4	1008
W9ACL	9	6	918
W9DPO	1	1	27
KANSAS			
W9CFN	12	6	1836
W9GKT	3	2	162
W9FXY	4	2	72
INDIANA			
W9ABB	12	5	1350
W9DHM	7	5	765
W9BXT	2	1	54
NORTH DAKOTA			
W9EGI	7	4	756
W9EVQ	8	5	630
W9DGS	4	3	324
MISSOURI			
W9AOG	5	4	540
W9FSU	2	2	108
W9GHH	3	2	90
NORTHERN MINNESOTA			
W9BVI	30	5	3600
KENTUCKY			
W9DDQ	4	2	216
NEBRASKA			
W9DGL	2	2	108
COLORADO			
W9DQD	2	2	72
SOUTHERN MINNESOTA			
W9FNK	2	1	54

'Phone-C.W.T. QSO Party

(Continued from page 25)

participants (as well as Official Observers), protesting any irregularities observed, signed by an individual complainant and attesting to the exact date, time, frequency, matter transmitted (for identification), and the improper operation, is invited, to make impartial action possible where a sufficient quantity of evidence from different sources can be weighed.

The prizes: Four high quality quartz crystals, ground to any frequency in the 1750-kc. or 3500-kc. band selected by the four winners, will

be donated by the Staff at WSYA, the radio station of the Pennsylvania State College (Department of Electrical Engineering). The two highest-scoring amateur operators of 'phone stations, also the two highest-scoring operators of c.w. telegraph stations, will receive these crystals. These crystal prizes will be a precision job, tested oscillators, ground to the highest standards. Whether you operate a 'phone or telegraph station, give the QSO Party your attention. Operate as much time as you can spare the week of May 15th-21st. Swap QSLs. Keep a record of your work. Send in your score, large or small, so your work can receive full credit in QST. Try to win a prize!

Here's a new type of contest — one designed to produce new QSOs for you; one which should result in new friendships, new acquaintances among neighboring hams; also one that may be productive of new records, QSLs, better understanding of the problems of our fellow amateurs, and at any rate, a heap of fun in rolling up scores and testing the range and reliability of our stations. Mark the whole week on your calendar, draw up a simple sheet for the tabulation of QSOs to-day, and be on the job when the starting date rolls around. Don't forget to report results in full to A.R.R.L. promptly at the end of the contest! — F. E. H.

The Bloomfield Radio Club's "Five-Meter" Field Day

(Continued from page 24)

the wilds of Sussex, only to be straightened out by Mears, who observed their antics through glasses from the lofty Edison Tower. At the banquet many other interesting stories of experiences were exchanged and, as always, the spirit of ham fellowship ruled supreme.

Strays

One of the cut-rate catalogs recently listed some "insulting compound," guaranteed to be handy around the shop. W9FVM thinks it should also be quite useful around the ham shack, especially when the BCL's raise a rumpus about clicks.

The fellow who likes to have out-of-town hams visit him should have his telephone listed in the local directory under his call as well as his regular listing. The usual charge for such listing is twenty-five cents per month. It can be listed as "Radio W6HAM" or as "W6HAM, Joe Doe, (address)." From personal experience we recommend the latter method; only the initiated understand it; the other begets calls from BCL's who want everything under the sun — for nothing. For uniformity, let's all use just call letters followed by name and omit the trouble-making prefix "Radio." — W6QX

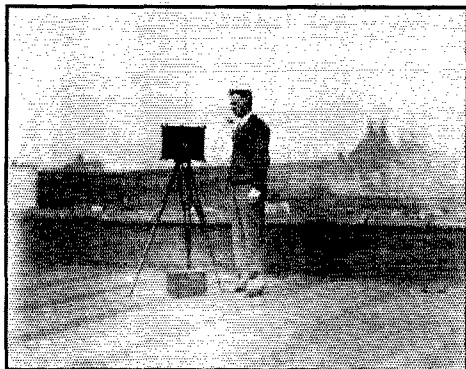
A Portable 56-Mc. Transmitter-Receiver

Rugged Construction in 5-Meter 'Phone Equipment

By Frank A. Gunther, W2ALS*

THE widespread interest in frequencies above 30 megacycles (10 meters) has prompted development of the 56-mc. transmitter-receiver that is the subject of this article. The development program was not projected to any great extent because the design changes over any period of time may be extremely rapid. However, an exceptional amount of care has been given to each step taken. After investigating performances of 56-mc. equipment in both this country and abroad, it was decided that the point to begin experimenting was exactly where the previously described *QST* developments left off; and that the suitable type of apparatus for communication on these ultra-high frequencies would be similar in design to that

1 1/8 inches. A cover can be fastened over it and within the cover can be carried the necessary light-weight microphone and headphones. The

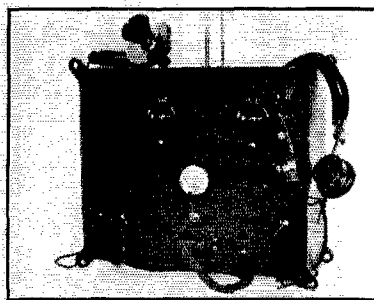


THE COMPACTNESS OF THE COMPLETE TRANSMITTER-RECEIVER UNIT MAKES IT EASY TO SET UP FOR DUPLEX OPERATION AT AN ADVANTAGEOUS POINT

Here we have the author in action on the roof with the famous New York skyline for a background.

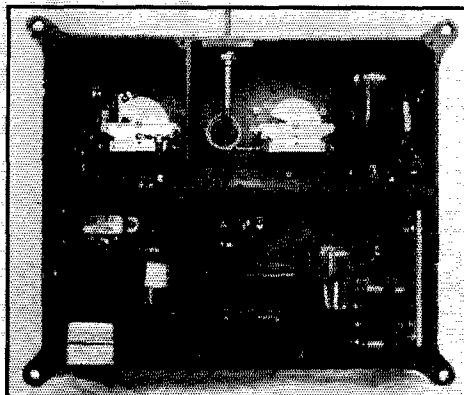
described in the July and August, 1931, issues of *QST*.

From this it was a short step to the design of a combination radiophone transmitter and receiver for duplex operation, the final result being the portable illustrated in the photographs. As can be seen, the foundation is one solid aluminum casting 14 inches long, 12 inches high and 6 inches deep. The total weight of the set including tubes and all accessories, but excepting the power supply, is exactly 20 pounds. So that the entire unit can be mounted on suspension cords, there is an "ear" on each of the eight corners. The casting is so designed that the front panel is recessed



BOTH 'PHONE TRANSMITTER AND SUPER-REGENERATIVE RECEIVER ARE HOUSED IN A ONE-PIECE CAST ALUMINUM CABINET, INSURING ADEQUATE SHIELDING WITH MECHANICAL RUGGEDNESS

The transmitter tank control is at the left, the receiver tuning dial at the right, regeneration control at lower right. The microphone plug fits the lower left jack, the 'phone plug that at the lower right and the power cable plug is in the center. The 0-100 d.c. milliammeter, below which is the transmitter filament on-off switch, indicates plate current of the oscillators and modulators. The rod antenna screws into receptacles in the top of the case. Ears at the eight corners permit mounting with shock-absorbing cords or springs in plane or automobile. A plate fastened to the front protects the panel equipment when the unit is not in use.



VIEWED FROM THE REAR, THE UPPER DECK CARRIES THE RECEIVING DETECTOR AT THE LEFT AND THE TRANSMITTING OSCILLATOR AT THE RIGHT

Below the detector are the interruption-frequency oscillator and the pentode audio amplifier. The modulator unit is in the lower right compartment.

* Radio Engineering Labs., Inc., Long Island City, N. Y.

various antenna systems employed are made of quarter-inch diameter solid brass rods. These are made into 12-inch sections, the ends of which telescope, four of these sections being fastened together to form one side of a half-wave 56-mc. antenna. The advantage of being able to take the antenna apart is that the sections can be placed in clip-type holders and fastened to the front cover along with the microphone and lightweight headphones when the outfit is disconnected.

A heavy duty plug-in cable connects between the transmitter-receiver and the power supply unit. The power source may be any one of several types best suited for the individual service for which it is being used; for portable operation batteries are used exclusively. Where installation will permit, a dynamotor is employed for plate supply of the transmitter tubes, the dynamotor being operated from a storage battery.

From the rear view it will be noted that the super-regenerative receiver is on the left-hand side and the transmitter on the right. The vertical partition dividing the two is actually a piece of the solid casting used to house the transmitter, thus insuring perfect shielding between the two units. The horizontal shelves are made of separate castings and are fitted in as the unit is constructed. The upper portion of the receiver section contains the tuning elements operating at ultra-high frequencies, the lower portion of the receiver housing the interruption-frequency oscillator and one stage of pentode audio-frequency amplification. A post on the front panel is furnished so that a separate receiving antenna can be used. The tubes employed are one Type '37 as the detector, one Type '37 as the low-frequency i.f. oscillator and one Type '38 pentode as the audio-frequency amplifier. In the upper portion of the transmitter section the ultra-high frequency oscillator equipment is mounted. Ordinarily two Type '01-A tubes are employed as oscillators, although other tubes having "UX" bases (such as Type '10's) can be substituted. The antenna lead-out connections come through the roof.

In the lower compartment of the transmitter are the two pentode Type '33 modulator tubes and associated equipment. The modulators likewise can be changed over to tubes of higher power, such as Type '47's. A filament switch on the front panel puts the entire unit into operation

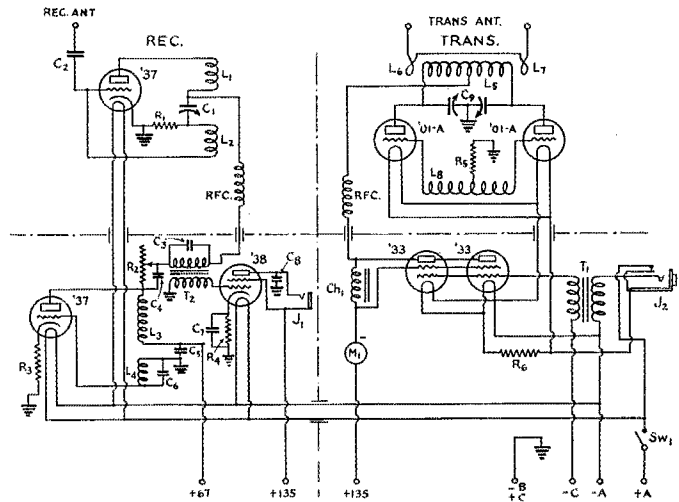


Fig. 1 — COMPLETE CIRCUIT OF THE PORTABLE TRANSMITTER-RECEIVER

- C₁ — Cardwell Type 404-B variable condenser.
- C₂ — Antenna coupling condenser, two 1/2-inch square aluminum plates, 1/4 inch apart.
- C₃ — .004- μ fd. fixed condenser.
- C₄, C₅ — 0.5- μ fd. fixed condensers.
- C₆ — .0025- μ fd. fixed condenser.
- C₇ — 0.5- μ fd. fixed condenser.
- C₈ — .001- μ fd. fixed condenser.
- C₉ — Cardwell Type 406-B with stator split and plates removed to give five stator and four rotor in each section.
- L₁, L₂ — Each seven turns of No. 16 enamel covered wire, 3/8-inch inside diameter, turns spaced the diameter of wire.
- L₃, L₄ — Similar to beating oscillator inductors described on page 25, July, 1931, QST, except coils are wound on bakelite former.
- L₅ — Five turns, 3/4-inch inside diameter, No. 12 wire, spaced diameter of wire.
- L₆, L₇ — One turn each, 1-inch diameter, No. 12 wire.
- L₈ — Six turns No. 14 wire, 1/2-inch inside diameter, spaced the diameter of the wire, center tapped.
- R₁ — 2-megohm grid leak.
- R₂ — 50,000-ohm variable resistor.
- R₃, R₄ — 2000-ohm flexible (connector) type fixed resistors.
- R₅ — 10,000-ohm 2-watt resistor.
- R₆ — 75-ohm voltage-drop resistor for modulators.
- J₁ — Headphone jack.
- J₂ — Microphone jack.
- T₁ — Microphone transformer, single-button microphone to grid of tube.
- T₂ — Audio transformer, 3-to-1 ratio.
- CH₁ — Modulation choke, 15-henry 110-milliamper.
- M₁ — 2-inch 0-100 d.c. milliammeter.
- SW₁ — Single-pole single-throw filament switch.

Note. — For further data refer to the July and August, 1931, issues of QST.

and a small two-inch 0-100 milliammeter registers the entire plate current drawn by the transmitter. The microphone jack at the input of the transmitter also controls the filament power of all the transmitting tubes. This insures that the power drawn by the transmitter is cut off when the microphone is taken out of the circuit. It is, therefore, possible to operate the receiver alone over long periods of time without fear of drawing upon the power supply too strenuously. Fig. 1

shows the circuit for the complete transmitter and receiver.

An aluminum plate covers the rear of the transmitter-receiver. It is so designed that when it is mounted a rubber gasket can be employed making the rear of the entire unit water proof. This point is of extreme importance inasmuch as the equipment under some conditions might have to be operated in an open field during bad weather; and it certainly would not be advisable to have water saturate any of the component parts of either the transmitter or the receiver.

In tests that were conducted it was deemed advisable to use extremely low power inasmuch as compactness and portability would be an important requisite. Therefore, the transmitter oscillators generally used are Type '01-A's and the pentode modulators are Type '33's. The filament power source for both transmitter and receiver is a single 6-volt storage battery and the plate supply of 135 volts is obtained from three medium-sized 45-volt "B" batteries. The "C" bias required, $13\frac{1}{2}$ volts, is tapped off from a small $22\frac{1}{2}$ -volt "B" battery block. The same power source also furnishes filament and plate supply for the receiver. Under these conditions the oscillator input power is normally 1.9 watts. Modulation of a high order can be had easily when the microphone is spoken into in a normal tone of voice. In fact one problem encountered was to secure a microphone that had very little sensitivity so that noises for several hundred feet around were not transmitted. Finally a microphone similar to the airplane anti-noise breast type was found satisfactory.

Some time was devoted in experimenting with various types of antennas, all systems working more or less satisfactorily. However, when using a single wire as an antenna in conjunction with a ground, tuned so that it operated on the third harmonic, exceptionally good results were obtained. This system functioned best when the antenna was in a vertical position. The wire was approximately 11 feet 6 inches in length.

Two units such as shown in the photograph were set up and communication at close range was immediately established, the voice signals being extremely strong over a consistent range of about six miles, and duplex radio telephone communication was established satisfactorily. Beyond this range, however, the signal strength fell off quite rapidly. The intervening territory between the two positions was of a flat nature more or less densely crowded with buildings three or four stories high. For reception in running automobiles it was found that shielding of the ignition system was not entirely necessary, although shielding in the usual manner did help materially when the point was reached where the signal strength fell to a low value.

Similar tests were made in an airplane which was flown over the same territory. The voice

signal was extremely strong and continued so up to a distance of about 25 miles with the altitude of the plane between 1500 and 2000 feet. Ranges greater than this were not attempted, but it is quite possible that the range of this equipment in aircraft could be extended up to and beyond 50 miles. The moment the plane descended towards the landing field the signal diminished and directly after dropped out completely.

To digress a bit, while developing this transmitter and during the experiments with it, the thought struck us regarding the amateur's position in the radio world to-day. We all know the part the amateur played in the development of wavelengths below 200 meters during the great "short-wave" movement, but the public and the servants it will send to future radio conferences are quick to forget deeds accomplished in the past. Therefore, amateurs can do nothing better than to look ahead into the future and start work on the job that is still undone. By persistent energy the amateur again can point out to the world that he is one who accomplishes and develops valuable necessities in the rapidly advancing art of radio communication. Amateur radio to-day is in a position, better than ever before, to show the world this ability. Instead of being just another one of the type who says, "Let George do it," each individual amateur could do his bit to develop or experiment on ultra-high frequency equipment and communication.

By collaborating with each other, through the medium of A.R.R.L. Headquarters and *QST*, ideas of immense value can be exchanged and it is quite possible that in several years the art of communicating at these frequencies can be thoroughly mastered. When mentioning these ultra-high frequencies, the "5-meter" band should not be the only one considered. Some forethought should also be given to the frequencies, as yet little regarded, above 60 megacycles. On frequencies of the order of 75 centimeters (the amateur " $\frac{3}{4}$ -meter" band), equipment can be reduced further in size and power. Antenna systems likewise may be constructed to pie-plate dimensions.

One advantage to the amateur in the part he can play in the development of these frequencies is that his experiments need not be costly, and necessary materials are usually at hand or easily obtained. Now is the time for amateur radio to broaden its knowledge and gain experience in communication in this field. It will not be very far in the future when a thousand and one unforeseen uses for communication of these frequencies will be unfolded.

The amateur's value to the world, and the chances of the amateur playing the big part in future radio that he has in the past, will depend considerably on his knowledge of and connection with development of ultra-high frequencies.

Standard Frequency Schedules

New Type Frequency Meter Coming

TWO months' experience with the modified Schedule C (14-mc. band) standard frequency transmissions that were inaugurated in March make it advisable to revert to the previous sequence of frequencies, dropping the 14,150 and 14,250 points. This is deemed necessary because of the small number of reports received on this transmission and because of the extreme difficulty in monitoring these two points at the transmitting stations. No wonder. The harmonics that have to be used are the 283rd and 285th of the 50-ke. multi-vibrator output. The other schedules remain the same as they became effective April 1st.

Speaking of harmonics reminds us that June QST will contain practical "dope" of interest to those who have found the usual type of frequency meter (including the dynatron) deficient in harmonic output when the instrument is shielded. A new type of frequency meter has been developed in QST's laboratory. It not only gives swell harmonics 'way up through the 56-mc. band when operating on 1750-ke. band fundamental but also is more stable in every way than other heterodyne type amateur-band meters that we have used. "Bob" Parmenter will give the constructional details and all about it in the next issue. In the meantime, keep your present frequency meter "on the line" with these s.f. transmissions.

DATES OF TRANSMISSIONS

Date	Schedule	Station
May 1, Sunday	C	W1XP
May 6, Friday	A	W1XP
	B	W9XAN
	B	W6XK
May 13, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
May 15, Sunday	C	W9XAN
May 20, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
May 21, Saturday	BX	W6XK
May 22, Sunday	BB	W9XAN
	C	W6XK
May 27, Friday	C	W6XK
May 29, Sunday	C	W1XP
June 3, Friday	A	W1XP
	B	W9XAN
	B	W6XK
June 10, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
June 12, Sunday	C	W9XAN
June 17, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
June 18, Saturday	BX	W6XK
June 19, Sunday	BB	W9XAN
	C	W6XK
June 24, Friday	C	W6XK
June 26, Sunday	C	W1XP

STANDARD FREQUENCY SCHEDULES

Time (p.m.)	Friday Evenings Sched. and Freq. (kc.)		Time (p.m.)	Friday & Sunday Afternoons Sched. and Freq. (kc.)	
	A	B		BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3600	7100	4:08	7100	14,100
8:16	3700	7200	4:16	7200	14,200
8:24	3800	7300	4:24	7300	14,300
8:32	3900		4:32		14,400
8:40	4000				

Saturday Mornings

Time (a.m.)	Sched. & Freq. (kc.)	
	BB	C
4:00	7000	
4:08	7100	
4:16	7200	
4:24	7300	

The time specified in the schedules is local standard time at the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time.

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

- 2 minutes — QST QST QST de (station call letters).
- 3 minutes — Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of W1XP is "G"; that of W9XAN is "O"; and that of W6XK is "M."
- 1 minute — Statement of frequency in kilocycles and announcement of next frequency.
- 2 minutes — Time allowed to change to next frequency.

ACCURACY

Although the accuracy of the transmissions is not guaranteed, those of W1XP are usually dependable to 0.001 per cent and those of W9XAN and W6XK to 0.01 per cent. The transmissions are checked frequently by the Department of Commerce monitoring stations; and the frequency standards used have been checked against the national standard maintained by the Bureau of Standards at Washington.

THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

REPORT BLANKS

Blanks for reporting on the S.F. transmissions will be sent postpaid upon request. Just send a

(Continued on page 36)

Five-Meter Airplane Tests Overwhelmingly Successful

East Coast Amateurs Stage History-Making Demonstration of 56-mc. Work

WE INSIST, for the first time in many years, that the printer drag out his rows of exclamation points and his bold-face type. They were given an airing for the Transatlantic triumphs, Transpacific Successes and Transcontinental 20-meter work and they are due for another one. Brilliant pioneer 56-mc. work has been accomplished. Amateur history has been made. With limitless enthusiasm and spontaneous coöperation, amateur 5-meter workers in this part of the country have set the pace for the rest of the world or we miss our guess. We demand some exclamation points — a fine upstanding row of them — to celebrate the one test in years that was successful beyond our most extravagant anticipations. Stack 'em right here —

At the moment of writing, two days after the first week of tests (and ten days after the "dead-line" for this issue of *QST*) it is impossible to present a complete report of the work. Logs are not all in. Page space does not exist. This copy may not even "make" the May, *QST*.

Things started to happen, in accordance with the plans announced in the April, *QST*, at noon on April 2d, when Joseph Lyman, radio amateur

since the dark ages, Navy flier and owner-pilot of a small cabin 'plane, took off towards the fast scudding low clouds. With him was D. Keily, M.I.T. student and Army-Amateur together with Lyman's 64-mc. transmitter and super-regenerative receiver. Eagerly anticipating their take-off were some 200 amateurs in the Eastern States. And if ever a bunch of amateurs had their ears cocked it was this one.

During the three-hour flight to New York, Lyman and Keily expended just about as much power in talking as did their motor. And every syllable was followed on the ground. Until the receiver battery went dead between Waterbury and New York, W10XB was contacting stations without a moment's pause. Because of the desire to work as many different stations as possible, no signals were carried to the limit of their range. But even at that, two-way work was maintained over 60 miles with the 'plane at 2500 feet altitude. Rapid-fire 'phone contacts were the order of the day and most of the fellows rose to the occasion with some of the snappiest

operating it has ever been our pleasure to hear.

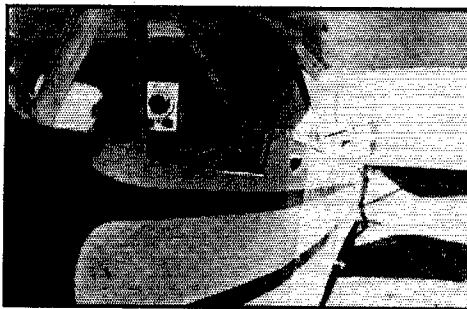
On the following day, Lyman made the return trip in clear weather and was able to fly at altitudes between 4000 and 8000 feet. On this occasion, clean two-way work was maintained at 115 miles and full contact was held with the ground for every moment of the flight. In the plane and at most of the ground stations, the transmitter power did not exceed a few watts. Notwithstanding this, signal strengths averaged R6 to R7 even at the greatest ranges. All in all, the tests constituted a beautiful piece of work, splendidly conceived and conducted by Mr. Lyman and the amateurs concerned with rare neatness. Not only for the work itself but for the weeks of painstaking preparation, Lyman deserves the greatest possible credit.

There is more to come, of course. Full details



MR. JOSEPH LYMAN, LEADER OF AN EXPOSITION OF THE BRILLIANT POSSIBILITIES OF 56-MC. PLANE TO GROUND COMMUNICATION

In his hands is the W10XB transmitter. Behind him is the half-wave antenna mounted on the fuselage of his cabin 'plane.



W10XB'S OPERATING SHACK: A SQUINT PHOTOGRAPH OF THE CABIN OF LYMAN'S PLANE

of the work of ground stations are not yet available. The second week-end of tests is yet to be held. In the meantime we present Lyman's own report, told in characteristically conservative fashion. Here it is:

Our Experiences on the Flight

By Joseph Lyman, W10XB

FIVE-meter work from an airplane! It can be done and it has been done — with amateur equipment. The results, in brief, follow; but the point which interests me most is that an airplane flying from Boston to New York and return, a distance of over 400 miles, could keep in constant communication with the ground, using only the smallest and lightest of five-meter radio sets. Of course it could never have been accomplished without nearly perfect coöperation given by the many amateur five-meter stations along the route. But there *was* coöperation, the air was thick with signals, and the tests were a success.

The first official five-meter relay was also undertaken and satisfactorily completed. On the way to New York, while the plane was still 40 miles from Hartford, a message was received from Mr. H. P. Maxim, there, addressed to Mr. Aylesworth, president of the National Broadcasting Company, New York. This message was "placed on file" until the plane was only 20 miles on the other side of Hartford, when it was picked up by W2VK, atop the Woolworth Building and 80 miles away. W2VK immediately delivered it to its destination. On the return flight a return message was taken while flying over Newark and delivered, in passing, to Mr. Maxim at Hartford. Rather unique types of amateur relaying?

Now comes the list of stations worked from W10XB while in flight.

Saturday April 2nd

Boston to New York (flying altitude 2000-3000 ft.)

Lv. 12 a.m. Ar. 3 p.m.

Station	Distance Worked	Station	Distance Worked
W1DNU ..	20 miles	W1ANC.....	10
W1OQ	20	W1HD.....	?
W1AUJ ...	30	W1BDW.....	?
W1SZ.....	40	W1AAW.....	20
W2VK....	60	W1AOX.....	?
W2CTP ...	20	W1ACK.....	?

Strangely, there were no stations which were heard and not worked. Many of the stations worked could undoubtedly have been held in contact for a good deal longer period but, as an effort was being made to work as many stations as possible in the limited time available, W10XB was forced to sign off a number of times even when much greater distances were assured. Before the flight I had anticipated working a larger number of stations over considerably shorter distances, but as soon as we got in the air and on the air, it was immediately apparent that the ranges to be expected were greater than I had hoped. Satisfactory communication could be had at all times up to at least 30 miles, while flying at an altitude of between 1000 and 2000 feet. As a matter of fact, I believe that no contact was broken because of getting out of range.

Credit for the most reliable station worked is hard to place. Almost all the signals were R6-7, no matter what the distance — the quality of the modulation being the real criterion of a station's worth. However, if credit must be placed where it is due, I think that the honors might be shared between W2VK, W2AOE and W1SZ, one working from the Woolworth Building and again from Summit, N. J., and the other from Selden Hill, in West Hartford, Conn. From my point of view W1CND, too, should receive extra credit. He allowed me to talk to my mother in Northampton through his station perched on top of Mt. Holyoke. He and W1SZ also maintained communication with W10XB all the way to Boston on the return flight.



THE STATION ON MT. HOLYOKE

Charles DeRose, W1CND, with his unusually neat transmitter and receiver. From this station, almost continuous 'phone communication was maintained with the plane, with Bristol, West Hartford, Manchester and Springfield, Mass.

Sunday April 3rd
New York to Boston (flying altitude 4000-8000 ft.)

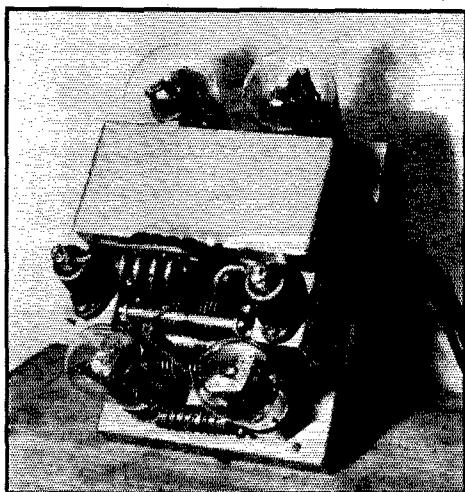
Lv. 11:30 a.m. Ar. 1:30 p.m.
W2ACN..... ? W1SZ..... 85
W2TTP..... 15 W1CND..... 85



W2TTP, W2AOE and W2ACN at W2VK on Woolworth Building

W2BMK	10	W1CDN	70
W2BIH	30	W1IO	20
		(500 ft. altitude)	
W2MK	?	W2AOG	?
W2ALS	15	W2CVL	?
W2AOE	115	W2APS	?
W2CDL	105		

So ends Mr. Lyman's story, jotted down in a hurry and rushed to us in response to frantic requests. Undoubtedly there will be more to tell about the tests when logs are received from all



THE W1CND TRANSMITTER, A VERSION OF THE TRANSMITTER DESCRIBED IN THE AUGUST, 1931, QST AND PROBABLY TYPICAL OF THE EQUIPMENT USED BY 56-MC. STATIONS IN THE TEST

ground stations. Without doubt, some record-breaking ground to ground two-way work was accomplished. The finest work of this nature which we know about so far was run off by Charles DeRose, W1CND, on Mt. Holyoke (1200 ft.) near Northampton and Harry Dreyer, W1ANC, on South Mountain (1000 ft.) near Bristol. These fellows worked with R8 signals at both ends during most of the week-end, the distance being almost 50 miles. DeRose deserves more than the usual credit for his persistent effort during the week preceding the tests. Just 524 mountain-side steps separated the road from the mountain house. DeRose lugged all manner of gear and batteries up and down the mountain side on a half-dozen occasions — and planning on repeating next week end!

Behind it all we must remember that 56 mc. working is not by any means new to the amateur. Amateurs the world over have been contributing to the technique of ultra-high frequency work for the last six years. And strangely, too, the actual 5-meter equipment described in QST's of six

years ago differs very little from that in use to-day. Reviewing the facts, we are inclined to believe that if there is any one factor in transforming the 56-mc. band from a piece of experimental territory to a communication band of high value it is QST's popularization of the super-regenerative receiver. Its instantaneous adoption by so many capable amateurs is at least one reason why such impressive work as that conducted over the last week-end is now possible.

At the same time, we must remember that even our present highly effective apparatus is very far from perfect. Improved transmission and reception must come soon. Glorious possibilities are ahead.

Standard Frequency Schedules

(Continued from page 33)

card or message to Standard Frequency System, QST, West Hartford, Conn., asking for s. f. blanks.

WWV 5000-KC. TRANSMISSION

The 5000-kc. transmissions of the Bureau of Standards station, WWV, are given every Tuesday from 2:00 to 4:00 p.m. and from 10:00 p.m. to midnight, E.S.T. The accuracy of these transmissions is now better than 1 cycle (one in five million). Information on how to receive and utilize the signals is given in pamphlets obtainable on request from the Bureau. Communications concerning these transmissions and reports on their reception should be addressed to Bureau of Standards, Washington, D. C.

— J. J. L.

Midwest Division Convention

Ames, Iowa, May 20th and 21st

AGAIN, the Campus Radio Club will be the host at this year's Radio Short Course and Convention to be held at the Engineering Building, Iowa State College, Ames, Iowa, May 20th and 21st. A good program has been worked out by the Committee. Director D. C. Faber of the Engineering Extension Service and A.R.R.L. Director Kerr are giving their full cooperation for this convention and every one interested in amateur radio is cordially invited to attend. Write to Campus Radio Club, Iowa State College, Ames, Iowa, for further information.

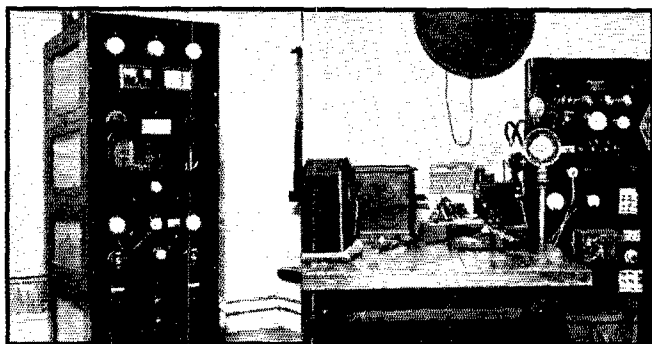
~~Strays~~

Ever wonder how much electrons are worth? The December *Electric Journal* says that at five cents per kilowatt-hour you can buy 230,000 million, million, million electrons for a nickel. But a pound of them would cost \$30,000.

AMATEUR RADIO STATIONS

W5AWP, Corinth, Miss.

THE professional-looking equipment in the accompanying photograph signs the call W5AWP on both 'phone and c.w., and is owned by William M. Essary, Corinth, Miss. The transmitter is of course crystal-controlled, starting out with a 250 oscillator on 3512 kc. Temperature control is used on the crystal. An 865 buffer follows the crystal stage and excites a 211-D final



W5AWP—A WELL LAID-OUT STATION, OPERATING CHIEFLY ON 'PHONE

The transmitter, at the left, is completely screened, with doors on the side to permit the operator to get at the apparatus on the different shelves. Control switches and speech amplifier are mounted on the rack at the right of the operating table.

amplifier. Separate power supplies are used for the oscillator and buffer stages and also to furnish grid biases for all tubes. The high-voltage supply, which takes care of the modulator, a 212-D, and the final amplifier, uses mercury-vapor rectifiers and a large filter.

The speech equipment is mounted on a panel, shown at the right in the photograph, and consists of four impedance-coupled audio stages. The microphone is a Universal Model KK double-button broadcast type. Control switches mounted on the same rack as the speech amplifier make it possible to operate the transmitter remotely.

The receiver consists of an untuned r.f. stage, a tuned r.f. stage, regenerative detector and two audio stages, the last being push-pull, operating a loud-speaker. The station also is equipped with a dynatron frequency meter which, however, is not shown in the photograph. The antenna is a current-fed Hertz, or "antenna-counterpoise," with the top portion about 45 feet from the ground.

Although the power of the transmitter is not

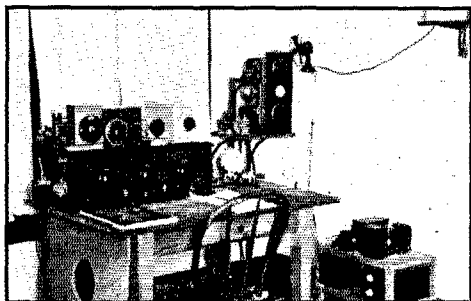
very great—the modulated amplifier is run at 800 volts—W5AWP's 'phone signals have been heard in Australia and New Zealand, as well as in every State.

W7JF, Seattle, Wash.

F. W. ANDERSON, 7409 32nd Ave. North-west, Seattle, Washington, received this call in March, 1931, when he decided to re-enter amateur radio after being out of it for three years. Following the receipt of the station license, many weeks were spent in delving into *QST*'s looking for a medium-powered outfit.

During the past summer, W7JF was busy trout fishing and brass pounding on an Alaskan passenger vessel, but not too busy to permit building a copy of Ross Hull's 75-watt m.o.p.a. described in the March, '31, issue of *QST*. Another 210 was added to make the oscillator push-pull, which furnished more excitation for the 75-watter and reduced frequency drift appreciably.

This January found crystal prices down to a tempting level, and consequently another shelf was erected over the master oscillator to accommodate a shielded crystal oscillator using a '45 tube at 200 volts, and '47



COMPACT STATION ARRANGEMENT AT W7JF

The transmitter is crystal-controlled, ending up with an 860. The power supply is built into a frame at the right of the operating table.

pentode doubler working on 350 volts. After hearing rumors upon rumors about the efficacy of

a pentode as a crystal tube, and after reading the latest *QST* article on the subject, the 245 was supplanted by a '47 pentode also working at 350 volts. More output was soon evidenced from that stage. The plate voltage on the two 210's is 600 volts, and sufficient output is obtained to excite the 860, which has a plate voltage of 2200 d.c. at from 75 to 90 mils. R.f. chokes are used profusely and help quiet the neighbors. The frequency used is 7014 kc. Operation in the 14-mc. band is possible by resorting to the m.o.p.a. with the juggling of a few plug-in coils.

The operating table holds a d.c. dynamic speaker in a baffle, on the left; and an old h.c. receiver, from which the adenoids have been removed with high permeability transformers, takes the majority of table space. On its top sits the s.w. receiver, which is a breadboard affair using a '22 tuned r.f., a '36 detector and two '01-A's in the audio stages. Resistance control or regeneration is used. To the right of the receiver is a shielded monitor using a '30 tube. Above it is a frequency meter with a lamp indicator, useful for antenna tuning.

A husky key from an old navy spark transmitter is in use most of the time. The inevitable "bug" is put into play oftentimes, but discretion is used in avoiding the usual generosity with unnecessary dots.

The antenna is the favorite Zepp with a flat-top of 67 feet 9 inches, and 34-foot feeders bent at right angles 15 feet from the tuning condensers. Eleven-inch spacers are used.

In the short time that W7JF has been on the air, most W districts have been worked. Over a dozen VK and ZL stations and one PY have been raised. A QSO with a J1 station reported sigs R7.

Correspondence is invited from those who desire more details of the station, provided a stamped envelope is enclosed. Now that the transmitter has reached a level of satisfactory performance, a lot of DX and traffic is anticipated.

Strays

Col. Thad H. Brown, general counsel of the Federal Radio Commission, in March was confirmed as a member of the Commission, representing the second zone: Pennsylvania, Ohio, Michigan, West Virginia and Kentucky. He succeeds Judge Ira E. Robinson, who resigned to resume the practice of law in Washington.

Succeeding Col. Brown as general counsel of the Commission is Mr. Duke M. Patrick, for the past two years assistant general counsel in charge of court cases, in which work he has been notably successful.

When an old-timer comes back after a full fifteen years off the air, that is news. Guy E. Wilson, proprietor of one of the best and most well-known pre-war sparks, 9EP, and a charter

member of the Ancient & Honorable Mississippi Valley Green Ink Gang, returns to the game as W9EL with 210's in t.p.t.g. on "20, 40 and 80." Welcome, Guy! The game is different now but it's as much fun as ever. QRA W9EL: 7511 Oak St., Kansas City, Mo.

W3GM points out that not only are W3UO's initials H. A. M., but his surname also has a certain familiar ring to it. Look it up in your call book.

We take it back. Handy as it might be at times, 1875 kc. does not double to 3900 kc. The second harmonic of 3900 kc. is 1950 kc. and not 1875, as was intimated in two places in the right-hand column, page 14, March issue. Just a case of strained harmonic relationships.

THE TOURMALINE EQUATION

We don't know exactly what *QST*'s printers have against bars, but one was omitted from the equation appearing in the footnote at the bottom of page 11, April issue. It should have been this: $t = 146.25/f$.

THAT LONG CQ

Hams there are and they're not few
Who call and call and call CQ;
Though hours you wait to hear them sign
You can hear nothing but that CQ whine.

The signal's weak; you strain your ears
It seems like maybe for several years,
Then you are just about to quit
When you hear that dah-dit-dit — dit.

With bated breath, no move at all
You strain to hear that foreign call;
And then — it is as sure as fate
The — blank — will sign the number eight.

Well, all I have to say is this:
If such a ham is seeking bliss
Into Ham Heaven he'll never arrive
No matter how hard he'll otherwise strive.
— W3CKH

Silent Keys

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

William Darracott, K6CQZ, Honolulu, Hawaii.

Louis Diamond, ex-CE3CH, Santa Maria, Cal.

Fred Emery, VE3BT, Hamilton, Ont.
Albert R. Hansen, W7BGT, Dillon, Mont.
G. L. Trottier, VE2AF, Longueuil, P. Q.

EXPERIMENTERS' SECTION

EFFECT OF TEMPERATURE ON MONITOR CALIBRATION

THE following letter from Dave Ablowich, Jr., W5DW-KFPM, shows further the effect of room temperature on the calibration of a monitor, which was discussed in an article in the March issue:

"I read with interest among the several good things in our *QST* for March the article by W9DIB on Temperature and Monitor Calibration. Several months ago I needed a monitor for the station at KFPM for a brief period, so brought into service my ham monitor fashioned after one described many months ago in *QST*, and built into a metal lock box. A coil wound for the '160' band found 1310 kc., the frequency of KFPM, at one end of the scale so it was used.

"After a day or two it was noted that the dial setting varied with the temperature of the operat-

drawn through what appeared to be two well-defined series of dots on the sheet. The distance 'north and south' between the two curves, the area shaded, represents the change in dial setting for the given frequency occasioned by temperature change of the monitor itself from a 'cold' condition to the condition after being turned on an hour or more. It will be noted also that the area indicated is wider the lower the temperature, indicating the obvious fact that from cold to maximum monitor temperature a greater change takes place when the room temperature is low than when it is high."

A TUNED PICKUP

In the September issue OM Jenkins of W3VX wrote about a gadget for use in neutralizing r.f. amplifiers, said gadget consisted of pickup coil, crystal detector and low-range milliammeter in series. In the January issue W6CMQ commented on the suggestion and recommended shunting a small fixed condenser across the meter — the object being to increase sensitivity.

"I wonder if some of the boys aren't overlooking the way to add real sensitivity to that thing?"

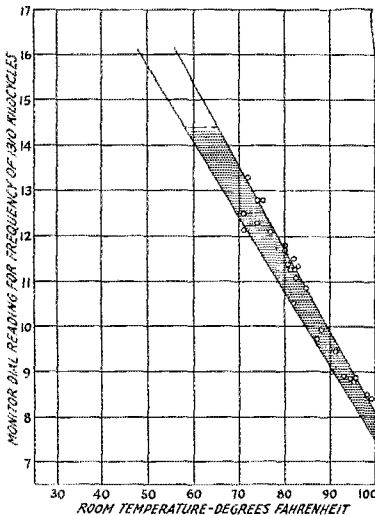


FIG. 1

ing room to tune to the 1310 kc. as indicated by a .01% accuracy G.R. temperature-controlled crystal standard. Being inquisitive I made observations over a period of weeks, comparing the monitor dial setting with the crystal standard for 1310 kc. and recording the readings. The result is shown in Fig. 1.

"All the temperatures were between 70° and 100° F. (it was last summer). Two lines were

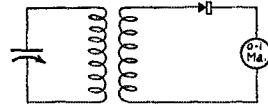


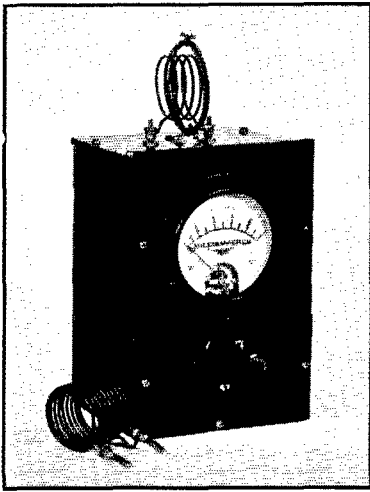
FIG. 2

Why not add a tuned circuit to it? Something like Fig. 2. The coil of the tuned circuit is placed inside the pickup coil, as shown in the photograph.

"This little piece of apparatus has been one of the most useful things around my shack for over three years, and deserves a better job than I have made of it. A very fine little article was written about it by Dr. Woodruff, and may be found in May, 1928, *QST*, page 39. It will be seen that my gadget is part of his 'Combination Fieldmeter, Wavemeter and Voltmeter.'"

After reading Dr. Woodruff's article I made great haste in constructing this much of his "Combination," and that is one thing around here that has survived. I don't see how I could keep house (or shack) without it. The coils for the tuned circuit are of the plug-in variety, the two shown in the photograph being for 20 and 40 meters. The pick-up coil is simply three turns of bell-wire held together with string — *a la* Wood-

ruff. It will be seen that I use a vernier condenser for tuning. That is not necessary. I used it simply



A TUNED R.F. PICKUP USING A CRYSTAL DETECTOR AND D.C. MILLIAMMETER

because I had it; a little relic from the year 1.
— C. W. Norder, W8ALH.

ELIMINATING BACKGROUND NOISE

Here is a receiving antenna that actually works wonders in cutting down QRM. It was devised to operate with the short-wave receiver in the operating room of KFPY, and certainly does its stuff. The operating room is built above the elevator penthouse on top of a four-story building in the heart of the business district of Spokane. In the elevator room are many large relays that clatter continuously and draw large sparks and

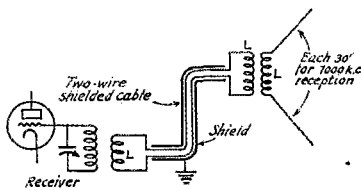


FIG. 3

arcs, making (as one might imagine) plenty of noise. Using the usual type antenna with the receiver about ten feet above these relays, reception of anything is impossible because of the high noise level. The receiver is a three-tube job using tuned r.f., detector and one audio, all of the 2-volt type.

Our first attempt was to use a conventional antenna with a shielded lead-in, but helped very little — if any. The final result is pictured in Fig. 3. The two-wire duplex lead is obtainable in

most places and is not so very expensive. Its use will warrant the cost, I am sure.

I may also add that not a sign of KFPY (1000 watts) is heard even with the receiver 5 feet from the high power inductance. It's some trick to hear DX when only 5 feet from such a transmitter, 10 feet above elevator relays, and in the heart of the business district; but it can and is being done. Each of the coils marked *L* has 5 turns. The two at the antenna end are closely coupled by jumble-winding them together.

— Wes Bell, W7ADU.

PUSH-PULL ELECTRON-COUPLED OSCILLATORS

The following letter from Ross Jones, W8SA, should be of interest to experimenters who have worked with the electron-coupled oscillator described by J. B. Dow in January *QST*:

"Experimenting along the lines suggested by the electron-coupled oscillator as briefly described in January *QST*, I developed the push-pull arrangement as shown in Fig. 4.

"This arrangement is by far the steadiest self-controlled oscillator I have ever worked. A change in plate voltage of approximately 40% made but a scarcely discernible change in the frequency

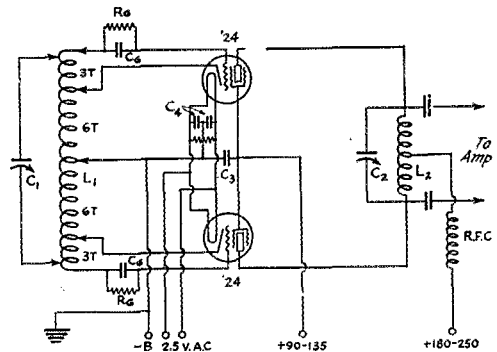


FIG. 4 — PUSH-PULL ELECTRON-COUPLED OSCILLATOR

- L*₁ — 18 turns on 2-inch form, tapped as indicated.
- L*₂ — 10 turns same tapped at center.
- C*₁, *C*₂ — 350 μfd.
- C*₃ — .5 μfd.
- C*₄ — .002 μfd.
- C*₅ — 250 μfd.
- R* — 50,000 ohms.

as checked by beat note against my receiver. The heating of the plate has no apparent effect on the frequency, and since the cathode is at a relatively high temperature while in operation a frequency change due to the heating of the tube elements is not discernible after a moment's operation. However there is some change in frequency when circuit *L*₂-*C*₂ is tuned to resonance with *L*₁-*C*₁. This is not so apparent when *L*₂-*C*₂ is tuned to a harmonic of *L*₁-*C*₁.

"Handicapped as I am by lack of time and proper apparatus I have not been able to investigate this circuit as I should like to, so I pass it

over to you. If it interests you take it up where I am forced to leave off. I am sure that there are many others, like myself, not in circumstances to afford expensive frequency control apparatus, who will be interested in the development of an oscillator of this sort."

Experiments with the single-tube electron-coupled oscillator in the *QST* laboratory fully bear out WSSA's experiences as well as the author's claims for the circuit. This type of oscillator undoubtedly is going to have wide application in amateur work, and future issues of *QST* will have a good deal of practical information about it.

GIVING THE KEYER TUBES A BOOST

Few of the items appearing in the Experimenters' Section have generated as many enthusiastic letters as those suggestions for clickless keying employing an auxiliary tube or tubes which appeared in August, 1931, *QST*. So far we haven't heard of a single case where this scheme

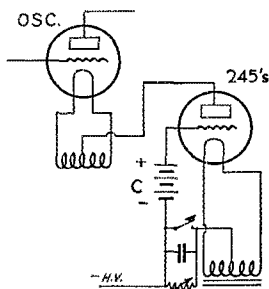


FIG. 5

failed to amputate the clicks. Here is a letter from Roy Gale, W1BD, giving a helpful suggestion for those who have had difficulty in getting one or two tubes to pass the normal plate current for the transmitter:

"Whenever we read of some new device, our first idea is, 'Well, why didn't I think of that, too?' I am referring to 'Clickless Keying' in the August issue. I used three Type '45 tubes in parallel, and while the key click disappeared, the tubes would pass only about 50 mills instead of the required 75 or 80. Of course, more tubes could be used, but an idea presented itself as to how to make the '45's do more work. Referring to Fig. 5, if a 'C' battery is inserted in the lead from the key to the grids with the positive side towards the grids we have a positive bias on the grids when the key is down. This is counteracted by the grid leak when the key is open, and the tube is blocked as usual. This is not a startling discovery, but is a good trick to try when one has only a 7.5-volt filament transformer available for use with the keyer tubes and wishes to operate with a plate current greater than will normally be passed by three '45's that were resting quietly in the junk pile after many months of service."

SIMPLIFIED BLOCKED-GRID KEYING

Another variation of the many blocked-grid keying methods is shown in Fig. 6, suggested by Ben W. Sewell, W5ALP. The principle of any blocked-grid keying system is, of course, that when the key is open the grid bias on the tube is high enough to prevent the flow of plate current.

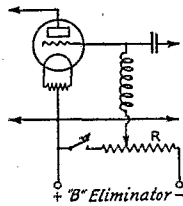


FIG. 6

When the key is closed the bias should drop to the normal operating value.

This is very simply accomplished by the arrangement shown in Fig. 6. A "B" eliminator supplies the necessary blocking voltage. The total voltage required will depend upon the type of tube used in the amplifier, its plate voltage, and the amount of excitation from the preceding stage. A voltage divider, *R*, is connected across the output of the eliminator, with the key inserted in series as shown. The position of the tap on the divider is determined with the key closed and excitation applied to the amplifier, and should be set at the point which gives the desired output under normal operating conditions. When the key is opened the bias rises to the full no-load voltage of the "B" eliminator, since no current can flow through *R* with the key open.

Since the current broken during keying is only

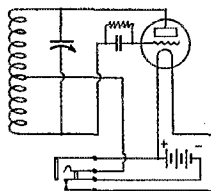


FIG. 7

that carried by the divider resistor, sparking and clicks are minimized. The higher the total resistance of *R* the less will be the current through it.

A SIMPLE MONITOR

A monitor is one of the most important and necessary bits of apparatus in the amateur station, yet it is surprising to find how many hams, especially beginners, do not possess this vital equipment. This condition is probably caused by the trouble and expense involved in making this

little gadget, which always seems to present itself in the guise of a complicated mess of wires, chokes, condensers, etc.

Usually the simpler it is possible to construct any apparatus, the better will be the results obtained and the less trouble will be encountered in its operation. With this in view the circuit shown in Fig. 7 was laid out.

The tube employed a Type '12-A, which means that a six-volt source is required to light the filament. The outstanding feature of this arrangement is the use of only one six-volt battery to supply both the filament current and plate voltage for the tube. Another distinct advantage is the use of the entire coil in the tuned circuit, thereby eliminating an extra tickler employed in other types of monitors.

The grid condenser has a capacity of 250 $\mu\text{f.d.}$ and the grid leak a resistance of 50,000 or 100,000 ohms. Other values of grid leaks may be used depending on the constants of the circuit. The coil is wound on an ordinary tube base and a tap taken off at its midpoint for connection to the 'phone jack and positive terminal of the "A" battery. If the "A" battery be reversed the monitor will not function as the plate of the tube will have a negative potential. The 'phone jack is of the filament control type, and since the point of plate feed is at zero r.f. potential, no. r.f. chokes are required.

The whole thing is shielded, but the battery may be left outside the can if it happens to take up too much space. It would be useless to give coil and condenser constants as any available parts may be used. However, a coil of about 20 turns and a variable condenser of 150 $\mu\text{f.d.}$ should tune to the 7-mc. band.

— *Americus Molinara, WSAGY*

PRIMARY KEYING

In July, 1923, *QST* we were advised in an article on clickless keying that very good noiseless keying could be obtained by keying in the primary of the plate transformer, but that if anything more than the smallest of filters was used the signals would develop bad "tails." Since that time, due mainly to the work of the *QST* development program, our oscillator circuits and equipment have been developed and improved to the point where frequency variation due to plate voltage change is negligible, especially in crystal transmitters. It follows that we should be able to use our present-day transmitters by keying in the primary, except, of course, when the same transformer supplies both plate and filament voltages.

By putting an adjustable resistor across the key (in my case a 100-watt electric light bulb) and a 1- $\mu\text{f.d.}$ condenser across the primary of the plate transformer, the keying is well-nigh perfect. The resistor across the key serves to keep the transformer core partially energized, thus

preventing surges. The 1- $\mu\text{f.d.}$ condenser helps things in the BCL receiver. Using this system I am able to operate with 400 watts input without the slightest click audible at W9ML, located about 250 yards away. The BCL receiver complains vociferously when any light in the house is turned on or off but barely clicks when keying the transmitter. Decreasing the resistance across the key improves the click, or rather serves to eliminate it further, but the process can be carried too far and a back wave will result.

At the present time I use a crystal transmitter with two power supplies, one of which supplies the crystal and runs constantly while transmitting. The large power supply then supplies all doubler stages and the P.A. stage. This large power supply is keyed in the primary. I have also used primary keying with excellent results on a high-*C* Hartley oscillator with inputs up to 300 watts without any bad effects. It is the only system I have been able to find that is satisfactory in an apartment building and is not critical in adjustment. I hope information regarding it will be of use to other members of the fraternity.

— *J. H. Platz, W3GY*

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF *QST*, published monthly at Hartford, Conn., for April 1, 1932.

State of Connecticut }
County of Hartford } ss:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared K. B. Warner, who, having been duly sworn according to law, deposes and says that he is the business manager of *QST* and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The American Radio Relay League, Inc., West Hartford, Conn.; Editor, Kenneth B. Warner, West Hartford, Conn.; Managing Editor, Clark C. Rodman, West Hartford, Conn.; Business Manager, Kenneth B. Warner, West Hartford, Conn.

2. That the owners are: (Give names and addresses of the individual owners, or if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.) The American Radio Relay League, Inc., an association without capital stock, incorporated under the laws of the State of Connecticut, President, Hiram Percy Maxim, Hartford, Conn.; Vice-President, Chas. H. Stewart, St. David's, Pa.; Treasurer, A. A. Hebert, West Hartford, Conn.; Communications Manager, F. E. Handy, West Hartford, Conn.; Secretary, K. B. Warner, West Hartford, Conn.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: (if there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear on the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also, that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct, or indirect in the said stock, bonds, or other securities, than as so stated by him.

K. B. WARNER.

Sworn to and subscribed before me this 23d day of March 1932.

Alice V. Scaulan.

(My commission expires February, 1934.)

• I. A. R. U. NEWS •

Devoted to the interests and activities of the
INTERNATIONAL AMATEUR RADIO UNION

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Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Union Schweiz Kurzwellen Amateur
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

WE are all naturally very interested in amateur radio, pleased with its progress, saddened at its setbacks. To us, then, there is something most inspiring in a contemplation of the progress amateur radio is steadily making in the field of world affairs.

It is truly a remarkable progress, worked out steadfastly in the face of all obstacles. The other day *QST*'s circulation manager, writing of the *Handbook*, called it "Depression-Proof." That is a term which aptly applies to all of amateur radio.

Though buffeted, along with the rest of the world by world-wide economic depression which caused the slackening of effort in almost every other line of achievement, amateur radio has continued to flourish with both increase in numbers and intensity of spirit.

R.S.G.B. membership during 1931 increased 24%, as reported last month, to which should be added 135 new members during the first two months of 1932. Over 150 new stations were licensed in New Zealand during the past twelve-month period, roughly a 20% increase. Similarly encouraging reports have come from many other of the national societies. In the United States, according to the last official tabulation the increase in licensed stations was about 20%, and indications are that current growth is considerably greater.

In all the world, in fact, where in 1929 when the depression first was rumored amateurs counted themselves as numbering perhaps 25,000, we can now without too great optimism lay claim to nearly 40,000 stations in more than one hundred countries of the earth.

Such is the progress of amateur radio in the face of economic obstacles. May our progress in self-government, in the retention of our privileges, in our satisfaction with our hobby, continue apace.

The latest change in the list of QSL Bureaus published in February *QST*, added to and corrected in subsequent issues, is one for New Zealand. The new address of the official N.Z.A.R.T. bureau is Box 25, Ashburton. G.H. S. Clarkson, ZL3CD, is the officer in charge.

The address of R. N. Fox is now different from that given in February. Cards for India should now go to him in care of Messrs. Lyons (India), Ltd., 11 British Indian St., Calcutta.

An alternative address for the S.K.W., U.S.S.R., is as follows: Ipatievsky per 14, Moscow.

For the last two we are indebted to Miss Barbara Dunn, G6YL. Incidentally, Miss Dunn suggests that the words "Paroul Elena" be added for further identification to the Roumanian address of Lt. C. Bratescu, as follows: Str. Ciru Ilescu 6, Paroul Elena, Bucharest 6.

Headquarters of the N.Z.A.R.T. is organizing a Radio Emergency Corps, with each district section equipped with two portable transmitters and receivers for use in times of national emergency — earthquakes, floods, storms, alpine disasters, etc. They have adopted the motto, "Be Prepared," reports D. Wilkinson, newly elected president of the New Zealand transmitters.

The traffic department of the N.V.I.R. introduced an unusual and effective means of stimulating participation in the February-March International Goodwill Tests by supplying QSL cards gratis to all participants in the Netherlands desiring to send reports to stations heard. The result of placing these cards at the disposal of members was that Dutch participation in the tests reached a very high degree. FB, PA0QQ *et al.*

Opinions from amateurs in different countries as to the relative effectiveness of our different frequency bands at different times are usually at surprising variance. When southern Europe finds 14 mc. good it often has been surprisingly bad up in the Scandinavian countries and even northern France and Germany. Where some of the European countries anticipated and secured good results from 3500 kc. during the past winter, we find the headquarters society officials of neighboring nations proclaiming that the band was relatively terrible, much less effective than a year ago.

The particular point to that, outside of some possible generalizations concerning human nature or the freakishness of high frequency radio, is that every person everywhere has some especial and original observations of his own to be made concerning radio and wave propagation effects that probably no one else could make. The solar cycle theory makes a splendid generalization, but chances are that a thousand and one qualifications must be made in your particular location. It is in identifying and isolating those qualifications that the ordinary amateur may find his golden radio opportunity.

Amateur Radio in Great Britain

By J. Clarricoats, Hon. Sec'y. R.S.G.B.

THE early history of organized British amateur radio dates back to some time in July, 1913, when a group of Londoners interested in radio problems decided to form a local club, which became known as "The Wireless Club of London." Mr. A. A. Campbell Swinton, one of the leading wireless engineers of the day, accepted the office of President, a position he held until 1920.

During the years of the War all active amateur work ceased, but many of the club members rendered valuable service to the nation in both a combatant and non-combatant capacity.

Early in 1919 the Club was revived, considerable fresh support being given by persons who had become interested in the experimental aspect of radio during the war years.

The introduction of broadcasting saw a further increase of interest in the Club's activities, and it came as a matter of normal progress that its somewhat limited scope should soon be extended along national lines.

We record then that on November 22, 1922, the Wireless Society of London became the "Radio Society of Great Britain." With this change of policy it was only right and proper that an invitation should be extended to a mem-



H. BEVAN SWIFT, PRESIDENT OF THE R.S.G.B. (left)
HAROLD B. OLD, PROVINCIAL DISTRICT REPRESENTATIVE ON THE R.S.G.B. COUNCIL (right)

ber of our Royal Family to accept the Patronage of the Society. H. R. H. The Prince of Wales, K.G., had in the past shown more than a passing interest in the development of radio communication, consequently his name was the first suggested. The Society was accorded a great honor when his formal acceptance was received.

At about this time a group of persons primarily interested in amateur transmission problems became associated under the title, "The Radio Transmitters Society." This group was not in any way connected with the new R.S.G.B., but the executive officers of the two organizations quickly realized the advantages to be gained by a fusion of interests.

In the winter of 1925 a proposal was made and carried into effect that the transmitting members who had formed the "Transmitter & Relay Section" of the R.S.G.B. should absorb the "Radio Transmitters Society" membership. The letters "T & R" have for long been symbolical of the British amateur movement, and even to-day we find them preserved in the official title of our Journal, "The T & R Bulletin," and in the Society's official coat badge and seal.

During the same year Mr. H. Bevan Swift (President, 1931 & 1932), who was then chairman of the T & R Section, had the inspiration which produced the first number of the "T & R Bulletin." This journal has now become the vital link between English speaking amateurs throughout the British Empire and the world at large, and is ranked in the forefront of amateur radio publications. Its destinies have been guided in turn by Mr. J. A. J. Cooper (now with the B.B.C.), Mr. H. Bevan Swift, and for the past three years by Mr. G. W. Thomas.

During the following year the Society was granted a Charter of Incorporation, and the

(Continued on page 76)

• CALLS HEARD •

W6BCF, Wm. T. Somerline, Box 745, Coronado, Calif.

7000-ke. band

k4rk k4ry k5ab k5ac k6aja k6dsk k6dy ka3au ve4ag ve5fo vk2ax vk2bq vk2dr vk2hg vk2hm vk2hw vk2iv vk3au vk3bj vk3mx vk3nk vk3pr vk3rg vk3xi vk4ah vk4xu vk5pk w1bwq w1ced w1ch w1doy w1mk w1ml w2aen w2ai w2akw w2ala w2anx w2api w2bex w2cjm w2couq w2doy w2jy w2vk w3apn w3bph w3cc w3cef w3ekt w3cuq w3md w4abc w4abs w4abw w4aby w4ais w4ajj w4ajk w4ajx w4ako w4alm w4asw w4bb w4bgo w4chi w4dm w4ei w4fv w4ht w4kh w4mk w4oi w4ux w4wj w5aaz w5aba w5abi w5abp w5abq w5acd w5ada w5aea w5aef w5afr w5aft w5ah w5ai w5ak w5ako w5and w5aog w5aq w5aqj w5ato w5atf w5aul w5aux w5aww w5axp w5axt w5ayl w5bbr w5bdd w5bdl w5bez w5bit w5bk w5bmi w5boc w5bpn w5bqt w5baf w5bxc w5byn w5byp w5cai w5cet w5ce w5che w5djc w5dy w5fw w5ghp w5hfd w5hx w5it w5jv w5kc w5ke w5kw w5mf w5nr w5rj w5rv w5un w5ux w5va w5vv w5wr w7acs w7aho w7air w7akq w7alb a7alz w7ath w7av w7avz w7azr w7bac w7bb w7bce w7bcl w7bcu w7bd w7bjx w7bka w7fv w7hjc w7jb w7mp w7pc w7qi w7rw w7wl w8ajs w8ao w8bgt w8boi w8ded w8dml w8dye w8dyn w8ebn w8fp w8hy w8pl w8sy w8yb w9adn w9aew w9aft w9am w9ang w9atg w9ayh w9azt w9bau w9bbe w9bef w9bce w9bj w9bjl w9bko w9bnh w9bnt w9bro w9bvi w9bvk w9byv w9cej w9cme w9cno w9csp w9dbo w9dfg w9dgt w9dha w9dim w9dlh w9dlp w9do w9dgo w9drf w9drq w9dso w9dse w9dyc w9dyn w9dws w9dyw w9edu w9ejo w9eky w9emh w9eqo w9eqv w9esk w9evk w9ew w9ewe w9ey w9fa w9far w9fbs w9fek w9fgk w9fwy w9fmx w9fnk w9fno w9fvz w9gav w9gcb w9gck w9gex w9gf w9ggd w9ggg w9ggv w9ghg w9ghk w9ghu w9gkj w9gmk w9gmq w9gpp w9gur w9gv w9gvu w9gx w9hgm w9hlg w9hri w9htu w9iu w9lf w9lu w9ny w9rq w9st w9wh x1b x1u x26a x2aj x2bo x2bs x2ce x2dn x2ds x2lf x2ldb

W1BUX, Doug. H. Borden, 77 Tenth St., Providence, R. I.

14-mc. band

em2ef em2jm em2jt em2lc em2mm em2ra em2wa em2xr em5ry em8az ct1aa ct1bx ct1gd ct2aw d4bit ear10 ear16 ear18 ear18 ear96 ear136 ear185 ei8c f3mta f8bs f8ex f8od f8ol f8pz f8rj f8tv f8ub f8wb g2bm g2by g2dh g2dz g2ig g2ih g2no g2nu g2oq g2vq g2zp g5bj g5by g5cv g5fv g5is g5ml g5oc g5pj g5sk g5sr g5vb g5vl g5yg g5yh g5yk g6ip g6li g6lm g6ot g6qb g6rb g6rg g6rv g6wn g6wt g6wy g6yk g15qx hb9k hc2jm k4rj k4rk k5aa k5ab k5ac la1g la1s lu8djc ny1ab oa4z oh7nf ok2op on4au on4fe on4gn on4jb on4jk on4rs on4sd oz9d pa nr p9aaf pa9sp p9aof py1ff py2aj py2ay py2bq q1a rx1aa ti2fg v1yb vk2xu vk2zw vo8aw vo8k vo8mc vp2pa vr2ab x1aa x1m x9a x1als

7-nc. band

em2fc em2jm em2na em2sv em2wd em6ep em8az em8yb emz14 emz1n emz1c emz2mm em7sh ct2af ear38 ear177 ear185 f3mta hi8x k4ac k4bu k4kc k4mo k4ph k4rk k5aa k5ab k6abb ti2fg vk2hq vk2hv vk2ks vk2no vk2nr vk2pz vk2xb vk2xg vk3bw vk3cx vk3ek vk3es vk3gi vk3fm vk3hl vk3jt vk3kj vk3ml vk3pp vk3rs vk3tm vk3wl vk3xi vk3zv vk3zx vk3zz vr5aw vr5wg vk5hq vk5mi vk5pk vk5yk vk6wi x1aa x1an x1n xsm7rv zl2gr zl2jz xl4ai

W9HYM, Carl H. Paulson, Galesville, Wisc.

7000-ke. band

em2op em2vm ear95 f5fo hc1fg jids k4rk k5ab k6ir py5byp

ve5ce vk2dq vk2xf vk3es vk3fm vk3ij vk3jk vk3jt vk3ra vk5pk vk5wr vk6rl vk7bc vk7ch x1ax x5aj z13as

14,000-ke. band

em2jt em2ra em8az ct1aa g5ml g6mm k4rj k5aa kfr6 py2aj py2bn py2bq velau velbt velby velcg veldm veldq veldr veldw ve5eh ve5fg x1aa x1a x9a yv2vs

W6CDA, C. B. Anderson, 3225 Nicol Ave., Oakland, Calif.

7000-ke. band

(Heard from January to March 18)

w1ben w1me w1mk w1ra w2anx w2cex w2cl w2uz w3cep w3ut w4agr w4ajj w4alg w4ako w4ec w4uc w4ua w5abq w5afn w5cas w5cdh w5ct w5ds w5kk w5ux w5vj w5zb w8bbl w8bda w8bgt w8bis w8blz w8by w8dw w8er w8qu w8zn w9aft w9bgb w9bif w9bpm w9bxi w9cac w9obu w9ome w9oxr w9eyx w9do w9elg w9eru w9ffo w9fgk w9fxg w9gkl w9grq w9hvj w9rh w9rp k5ab k5ac k6agi k6aiu k6aja k6alm k6ana k6arb k6auq k6av1 k6ayd k6baz k6bfi k6bmy k6boe k6ces k6cib k6cmc k6eog k6eqz k6fdv k6ftf k6fab k6ir k7atf k7kn k7pq z1aa z1ak z1ar z1ec z1er z1lg z1zb z1bi z1bz z1ce z1cu z1gn z1gw z1qaz z1saw z1zax z1zcc z1zao z1zba z1zbp vk2bq vk2nr vk2oc vk2zw vk3zb vk4ju vk7ch om1tb em2fg ti2fg ti3al ka1nr j1dm j1dn j1dv j1et j1eq i1er i5ce em2nc em2na em2op em8yb x1a x1ax x1u vp1aj hc1fg hh7e oxye

W1COO, Arthur E. Bent, Weston, Mass.

14,000-ke. band

em2jm em2jp ct1aa ct1bx ct1by ear224 f8tq g2pa g5by g6qb g6rg g6vp hj1ak k5aa ve4ag ve4bk v4cci ve4du ve4ft ve4ic ve4is vp1pa w5bkb w5ga w5gk w5ql w5za w6ahp w6ahu w6bc w6bif w6bja w6bux w6bvk w6cbp w6clx w6ctm w6cul w6cyv w6dio w6dgl w6ejc w6exq w6fal w6fff w6fmm w6pb w6rp w6sw w6tj w7ajq w7aol w7blv w7bor w7fv w7hb w7jf w7pl w7vt w7wl

W2CL, Harry F. Washburn, 333 Packman Ave., Mt. Vernon, N. Y.

7000-ke. band

(Heard between January and February)

ear96 k5aa k5ab k5ac py1ff ti3la vk2jr vk2ba vk3bq vk3bw vk3je vk3rj vk3xl vk3zw vk5ml vk5pk w6afy w6alt w6ann w6axy w6bkm w6bnc w6bp w6bz w6bzo w6bzt w6cdk w6cuj w6ctp w6cxw w6dep w6der w6ebg w6efm w6ehy w6elu w6eri w6eqb w6eui w6esa w6fb w6fd w6re w6tc w6tm w6ts w6wx w7ajq w7aun x1aa z1az z1ai z14am

W2AQN, L. Dubin, 1681 President St., Brooklyn, N. Y.

7000-ke. band

em2na em2lc em2wd em2vm em2sv em2mm em2ww em2jm em5ea em7sh em8by em8yb ct1aa ct1gy d4pws ear10 ear38 ear96 ear185 ear227 ear224 ear226 ear174 fm8st frear149 g5by gx9 gbrq hc1fg hh7c hi8x hk1da k4ac k4ry k4ug k4es k4oap k4rk k4ph k4rj k5aa k5ab k5ac kd5v lu2la lu8djc ny1aa pa0ai py1ff em7sv em8rv kulc ti2fg ti2hv ti3la ve4op ve4ci ve4ft ve4dd ve4hr vk2oc vk3ml vk3tm vk3zd vk4xn vk7ge vo8z vo8aw vo8ae vp2pa wsea x1aa x1g x1n x5c x9a x1als x1zcu x2a z6wz

14,000-ke. band

ee3ch ct1aa ct1gu earmc g2bm hc1fg kd5v k5aa lu2ca ny1aa py2ak rx1aa ti3la x1aa

VE3TT, E. Thompson, 55 Lawrence Ave., W., Toronto, Ontario

cm2jm cm2op cm2ww cm8yb hc1fg hc2ea hi8x k4aop k4rk k5aa k5ab nylaa py1lf rx1aa ti3la vk2oc w6acl w6ack w6ahp w6aw w6aor w6bau w6bc w6cxw w6ebg w6edw w6egh w6eqb w6evl w6exq w6yb w7gm w7vn x1aa x5c x1a1s

G5FV, W. A. Clark, Hull Rd., Keyingham, Hull, Yorkshire, England

14,000-ke. band

w1aao w1ae w1af w1afi w1aky w1alj w1asf w1ayr w1bhm w1blx w1bq w1bql w1cad w1ccd w1dm w1fh w1lz w1pb w1qb w1uob w1vp w1wv w1zw w2aao w2agx w2arb w2bao w2bg w2bhj w2bhw w2bhz w2bpm w2bro w2byp w2cgb w2cjr w2vd w3aho w3bhv w3cep w3cm w3zg w4aaw w4jn w4nh w8afp w8ben w8bip w8brp w8ocw w8ora w8ote w8ocw w9cky w9fkk w9giz w9fn py2qa st2d velax velbi velbt velbw velld veldq vk2xu vk3wk vk4gk vk6wi x1a1s xzn2a

7000-ke. band

w1uob w2aqu w2bar w2cmo w4aro w4gm w4uc ct2aw vk3xi z12bg z12jx

W7RT, John P. Gruble, 1921 Atlantic St., Seattle, Wash.

7000-ke. band

(Heard during February)

w1mk w2ais w2dm w3oxl w3nt w3xz w4abt w4ft w4kh w4oi w4agr w4si w4to w4zh w4fv w4vw w4uc w5bsf w5ajg w5de w5nu w5bnd w5ava w5acd w5acd w5akd w5bdv w5avr w5bwo w5fw w5bmi w5aev w5ke w5afn w5zzb w5aep w5agq w5it w5yg w8dv w8fhs w8ayc w8abs w8dof w8bis w8yx w8hp w8bax w8dgp w8cwk w9ffd w9do w9cme w9jt w9jl w9eqc w9gjf w9fal w9bvi w9cce w9dt w9yl w9fj w9erq w9fhy w9huh w9bah w9gdh w9gth w9atr w9bez w9bko w9mth w9ctw w9cno w9dfs w9eay w9arn w9gkj w9bto w9egd w9hdw w9mc w9hge w9oo w9gb w9asw z1lar vk2oc omit x1aa k5aa k6auq x1ax

14,000-ke. band

w3pf w5caw w5za w5aoe w5ace w8ded w9gv w9egg w9evq w9gdh w9gd w9dku w9lf w9hju w9hrh w9djf w9azm w9egk w9eku w9fyg w9hvx x1aa w6ud (fone)

W2SP, Raymond K. Strong, 9 S. Church St., Schenectady, N. Y.

7-mc. band

bx3 cm20bb cm2bu cm2fc cm2fm cm2gu cm2jm cm2lc cm2ob cm2op cm2wa cm7sh cm8uf ct1ep ct1gd ct2an ct3ls ear96 ear185 ear224 ear227 ei8b f8pz f8x hhr7 ihv k4ko k4rj k4rk k4ry k5aa k5ab k5ac k5ws k6da k6ki k6rj un1nic oa4uc on4if obe sm7rv ti2fg ti3la vk2bv vk2he vk2jz vk2nr vk2oc vk2tn vk3bh vk3bw vk3lq vk3ra vk3tm vk3wl vk3zw vk3xi vk3zw vk3zx vk5fyk vp2pa x1a x1u x9a x1ax x1a1s ybfxc yv1bc x1aas z1lck z1lqg z12ab z12bo z12dg z12du z12fa z12fr z12kx z12rb z13aq z13az z13bf z13cc z13cl z13ct z13cu z13cx z14ai z14am z14ao z14ap z14db z2a zw2dh zw3cd zw6ar

14-mc. band

cm8az ear96 f8tv hjlak oa4z x1aa

W3OP, E. J. Knoll, Jr., 708 N. 6th St., Allentown, Penna.

7000-ke. band

(Feb. 29th to March 5th)

cn8mj ct1gd ear7 ear96 ear121 ear224 f8pz f8fp fm8cr g2oq g5cv g5qc g5yu hbr32 on4dj py1lf vk3es vk2oc vk3vp vk5gr vk3tm vk3ek z14am zu6w

ZT5M, E. G. Calvert, Umkomaas, Natal, South Africa

(7000-ke. band — January)

ct1aa f8cs j7of kgeg klhr pk1jr pk3bq v8ab vk6dh vk6fl

vk6gf vk6lj vk6ra vk6rv vs7gt w6acl w6ahz w6am w6ayj w6edk w6cgf w6coe w6cuu w6cxw w6dep w6dsg w6ejo w6erm w6hm w6uc w6wx w6zoo zeljh

VE4DK, C. H. Brereton, 130 Ruby St., Winnipeg, Canada

(Heard January 15th — February 29th)

cm2fn cm2jt cm2mm cm2sv cm2kw cm2ww cm8az cx2cd f8pz g2bm g6yk h1fg k4rk k4as k5aa k5ab lu3dh lu4da nylaa nver oa4j oa4u oa4z py2aj py2aq py2bn py2bq py2qa on4ro on4jv rx1aa sm7rv ti2gf ti2mf x1aa x1ax x1n x1g x3a x9a z13ce z13cj z13cx t33al (QSL?)

W6AKY, Charles Stebbins, 4530 Kansas St., San Diego, Calif.

7000-ke. band

au1kak cm8yb fx7c h1fg j1ct j1dm j1ee j1es k5aa k5ab k6aja k6arb k6auq k6ayk k6boe k6cqc k6dv k6fir k7alt k7atd kalcm kalhr kalzo om1tb shvn tl3la v83kp v83el v8fb v8bi v8pr v8vfi v8vea vk3bw vx44x x1aa x1a x29a x29b w1aoo w1bmn w1gf w1jo w1km w1mk w1wz w2aas w2ad w2aen w2amr w2anx w2av w2bbs w2brr w2bst w2byx w2byy w2ccy w2emo w2dm w2kzp w3aih w3anh w3apn w3asj w3avo w3bbb w3bfc w3bq w3bce w3bgt w3bkq w3bm w3nrs w3buv w3bvw w3cep w3che w3cxl w3di w3ej w3hf w3ly w3mdp w3qp w3vt w3zc w4abo w4abt w4aby w4adt w4aew w4ags w4agx w4ajj w4ajp w4ajw w4akg w4akh w4alm w4alu w4ami w4anz w4aaw w4ata w4awe w4bbq w4bca w4dd w4eg w4ei w4fv w4gh w4gn w4gw w4hk w4iv w4jn w4jx w4kh w4kl w4ll w4lu w4nw w4rw w4ski w4th w4ux w4va w4we w4wss w4zh w4zl w8aac w8abt w8aju w8and w8apx w8apx w8ayc w8azl w8bck w8bda w8beb w8bi w8bka w8bkk w8cau w8obr w8ocy w8schg w8sej w8ste w8cu w8cwk w8ded w8dfh w8dmm w8dpo w8dv w8dve w8ebn w8efe w8egy w8eik w8ekh w8eky w8ers w8eve w8eve w8fee w8fey w8gbd w8hh w8jo w8ky w8lt w8pj w8pl w8qc w8qw w8rn w8rj w8zb w8zn w8zy

Frank Mullins, and Pete Gwin, 3214-8th St., Tuscaloosa, Ala.

w1abn w1aci w1aez w1ajn w1akt w1alf w1apj w1arb w1bdi w1bst w1bup w1bwj w1cxy w1clh w1cow w1cph w1cqr w1ddy w1dhe w1dmt w1ph w1qs w1mk w1vv w1zw w2ann w2ab w2acw w2agc w2ach w2adw w2agd w2ags w2ajg w2api w2apj w2apx w2aqc w2aay w2bb w2bbr w2bhw w2bna1 w2bnw w2bqk w2buo w2bzi w2cbw w2cfe w2cit w2ej w2cja w2kn w2cul w2cut w2day w2diu w2dkk w2dm w2dmi w2dmv w2dom w2dt w2fx w2m w2nz w2om w2or w2re w2se w2ul w2vh w2abj w2acl w2ada w2adl w2adr w2agf w2ahw w2aid w2air w2aix w2akd w2amu w2and w2ang w2ann w2aor w2apa w2asp w2ati w2avb w2avv w2awx w2aze w2bag w2bck w2bdq w2bek w2bfa w2bgp w2biv w2bpt w2bqc w2bqp w2bsk w2bud w2bup w2bux w2bvk w2bxf w2bxl w2bzj w2cal w2cbp w2cbz w2cdc w2cem w2ceg w2ekw w2cm1 w2cof w2cof w2cof w2eqz w2epc w2erw w2esm w2etd w2eul w2eup w2euv w2euz w2exb w2cxw w2cxy w2cyp w2day w2dde w2don w2dep w2dio w2dky w2doz w2dqa w2dga w2dus w2dus w2dzz w2ebq w2ecw w2efc w2efr w2ega w2egh w2ei w2ejo w2elo w2elv w2emt w2enn w2ens w2epw w2erp w2ert w2esm w2est w2exh w2fag w2fol w2ffw w2ffz w2fhn w2fkr w2fxp w2kn w2nb w2od w2sh w2sn w2so w2bt w2bm w2bs w2bx w2vd w2ydz w2a1 w2aey w2afs w2afw w2air w2als w2ayo w2azk w2biz w2jg w2bjs w2bqi w2brh w2ek w2hs w2kg

cm2fm cm2fn cm2lc cm2na cm2op cm7sh ear96 hc2ea k4rj k5aa k5ab k5ac k6azz k6fab nylaa ti2gf ti3la velax velcv velcd vel2z vel3bk vel3eq vel3gp vel3va vel4ag vel4eb vel4ev vel4es vel9a vk2ba vk2go vk2ha vk2hz vk2hs vk2nr vk2oc vk2vr vk3aj vk3cu vk3hg vk3hw vk3je vk3jv vk3my vk3ou vk3rg vk3tm vk3wl vk3xi vk3zx vk4bs vk5gr vk5hg vk5ie vk5ml vk5rh vk5rx vk5yh vk6wi vp1pa x1aa x1ax x1m x1n x1d x5c xba1 z1lar z12bz z12ci z12gf z12hi z13aq z13bn z13da z13de z14am z14db py1lf vk6sa ys1fm

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THE COMMUNICATIONS DEPARTMENT

F. E. Handy, Communications Manager

E. L. Battey, Asst. Coms. Manager

Radio Division Warns Call "Bootleggers"

DIRECTOR W. D. TERRELL of the Department of Commerce, Radio Division, has received a large number of complaints from indignant amateur radio operators charging that other amateurs are "bootlegging" call signals to avoid detection for violations of the Radio Act and amateur regulations while getting their transmitters adjusted. This "bootlegging" of call letters to cover up digressions is a serious thing, Director Terrell points out. An offending amateur may so use the call signal of another amateur that any infraction of the regulations will be charged against an innocent operator whose station is not responsible in any way for such a violation. L. C. Quaintance, who handles many of the Radio Division complaints of this nature, states that the "bootlegging" station discards any false or borrowed identification as soon as communication with other amateurs has been established so that an irresponsible neophyte learns to his satisfaction that his transmitter is adjusted for proper legal operations.

The Radio Division is planning to increase its vigilance materially to prevent further "bootlegging" of amateur call letters. Mr. Quaintance warns amateurs that the use of a call signal other than that assigned the station results in the classification of that station as an unlicensed one, the operation of which is a felony, and punishable by a fine of \$5,000 or a sentence of five years in prison, or both.

LAMB EXPEDITION TO TIBET

Latest word from Operator Moore of AC4UU, station of the Lamb Expedition to Northern Tibet, states that the expedition stopped off at Manila, P. I., and at Shanghai enroute to its destination. Moore was afforded an opportunity to visit several amateurs at Manila and Shanghai. At Manila he had a good visit with SCM Liner, KAISL, who was helpful with various suggestions and information relative to routing traffic to the states from Tibet via amateur radio. The International Amateur Radio Association of China gang at Shanghai cooperated with Moore in fine style, giving him many good pointers regarding reception and transmission difficulties in that part of the world. Among the amateur stations visited in Shanghai are AC8RB and AC8ZW. AC4UU will operate mostly in the higher frequency end of the 7-mc. amateur band, although both 14 and 3.5 mc. may be used occasionally. The character of the note will be "500 cycle." Regular schedule is planned for 1100 GMT (6 p.m. Local 105th East Meridian Time); at this time AC4UU will be on the air to clear traffic and to make general contacts. A QST will be sent out at 1200 GMT if no contacts are made on the 1100 schedule. AC4UU will not be on *daily* since the expedition will sometimes be "on the move" but when able to be on the air it will be on the above schedule. Radiograms originating at ACAUU will bear the request "First U.S.A. station please Airmail" (or in the case of very urgent messages: "First U.S.A. station please Western Union collect"). Messages for the expedition may be routed via W6HM, W6AMM and W6ALU.

Traffic Briefs

The next Quarterly A. R. R. L. Los Angeles Section Banquet will be sponsored by the Amateur Radio Research Club of Los Angeles and will be held in that city at 8:00 p.m.,

Saturday, May 21st. For further details drop a line to R. R. Short, W6DH, Sec'y. A.R.R.C.

Amateur Radio to the Rescue

DURING the month of March when the middle west and Atlantic seaboard states were in the throes of severe snow, sleet and wind storms amateur radio operators were afforded several opportunities to "strut their stuff" and demonstrate the value of "amateur radio" in times of emergency.

On March 2nd at 12:55 W3AAJ on the 3.5-mc. band copied a QST from W4AUA, Tallahassee, Fla., as follows: "W9DZM calling for help in storm. Please help him get a rush message through for help." At once on the alert W3AAJ tuned around and at 1:00 a.m. on March 3rd logged W9DZM, Sycamore, Ill., sending: "QST de W9DZM . . . Help. Help. We need help at once. We are in storm area." Then W9DZM sent QST an important message relative to storm relief work addressed to the Illinois Power Company at Springfield, Ill. W3AAJ copied this message and transmitted it QST adding information concerning the fact that a bad storm was in progress in Illinois and assistance was needed quickly. Following his QST W3AAJ was successful in raising W9VH, Chicago. After much difficulty due to adverse conditions W9VH got the message and immediately 'phoned it to the power company office at Springfield. W1VS, Medford, Mass., intercepted the message from W3AAJ while it was being sent QST and at 2:45 a.m. E.S.T. 'phoned it to the addressee at Springfield, Ill. Some DX 'phone call! W9DGS, Jamestown, N. Dak., also intercepted W3AAJ's QST and retransmitted the "call for assistance." W9VH advises that two short wave listeners (names not given) also copied the QST from W9DZM; one 'phoned the message, the other sent it via telegraph night letter. Thanks to amateur radio the message was definitely delivered.

Read what Mr. Mackie, General Manager, Illinois Power Company, says in a letter to W3AAJ: "The message was first radioed from DeKalb, Ill. All communications between Springfield and DeKalb, which is about 200 miles, were down, both telegraph and telephone. We dispatched one of our superintendents to DeKalb and it was he who sent the message out from the DeKalb station. It was picked up by an amateur station at Sycamore (W9DZM). Your message seemed to have been picked up by many stations, as we had reports from Portland, Maine; Washington, D. C.; New York, Chicago, and Jacksonville, Ill. The first radio message we received was from Jacksonville. They telephoned they had received a message via Chicago; and an amateur station at Chicago had received your message from Richmond, Va. Then came a telegram from Portland, Maine, relaying the message they had picked up from you. The Chicago station (W9VH) also telephoned us the message, and we received a message from West Medford, Mass. (W1VS), which was picked up from Richmond. I certainly appreciate very much your efforts in the matter."

The blizzard which hit the eastern part of the United States on March 6th raised havoc with telephone and telegraph communication lines and left many towns without any means of communication — except amateur radio. The territory in Cumberland Valley and western Maryland as a whole was exceptionally hard hit. A particularly excellent piece of emergency communication work was performed by amateurs at Hagerstown, Md. Amateur radio

was the sole means of communication with that city for many hours; W3A00, W3BCA, W3APK, W3JK and W3AHY each rendered memorable service. When it was apparent that the three means of communication, telephone, telegraph and teletype, had failed W3APK was immediately asked to contact Pittsburgh and the A.P. Due to QRM from a local, who failed to stand by and cooperate, W3APK was forced to abandon his efforts at his own station, and go to W3BCA, also in Hagerstown. W3BCA ('phone) operated by W3APE, W3AHY and the "YF" contacted W3UD, Philadelphia, and W3RR, Baltimore, news reports being handled. W3BCA was on the air for about 44 consecutive hours. Contact between Washington and Hagerstown was first established by W3ASO (on c.w.) moving into the 'phone band and working W3ZJ (Harrisburg, Pa.), who contacted W3BCA and relayed messages to W3ASO by 'phone. W3A00 of Hagerstown was marooned for 24 hours by the blizzard in an automobile enroute from Washington to Hagerstown, and therefore did not get in on the start of the emergency work. However, when he finally got through to Hagerstown he made up for lost time, maintaining an hourly schedule with W3ASO for handling official government Airways weather reports, road reports, news dispatches, and various personal messages. W3JK (Hagerstown) was on the job handling press with W3UB (Bryn Athyn, Pa.) and W3SN (Ft. Howard, Md.) all day Monday, March 7th.

At Cumberland, Md., W3ON and W3AQV were active, cooperating in every way possible. W3ON was on the air practically all day and night Sunday (March 6th) and did not sign off until about 4:30 a.m., Monday. Later Monday morning he was asked to get a message to Winchester, Va., for the local power company. He did not raise anyone in Winchester, but a "CQ Virginia" brought an answer from W3AAJ (Richmond), who took the message and relayed it along to W3AGH, after unsuccessfully trying to 'phone Winchester due to all lines being down. Radiophone W3AQV handled considerable press for various papers.

A news correspondent at Fincastle, Va., which city was also isolated by the storm, called upon W3WO for assistance in getting a dispatch to his paper in Roanoke. W3WO was successful in raising W3CA in Roanoke, who took the 200-odd words of press through QRM and bad conditions, and 'phoned same to the newspaper offices.

W3AHQ kept Harrisonburg, Va., out of the "completely isolated" class by maintaining regular schedules with Richmond stations for the exchange of news. Richmond stations W3BSM, W3FJ, W3ZU, and W3AGH at Ashland each cooperated with W3AHQ in pushing news in and out of Harrisonburg.

W3SN at Fort Howard, Md., was on the air considerably throughout the storm period, and like the others handled many emergency communications and news dispatches. W3BWT (Ops "ED" and "CJ") (Washington) took from W3SN an important news release from Hagerstown, which originated at W3JK. BWT 'phoned this at once to the newspapers and was informed that it was the first dope received from the Hagerstown area since wire communication had been crippled. Another important message was relayed to Washington via W3SN-W3AAJ-W3ZU-W3AGH-W3BWT.

At Washington W3ASO and W3BWT "held the fort" as has been mentioned in the several reports above. W3ASO was operated by Mr. E. J. Day, who remained on duty day and night, as long as there was traffic to be moved. The W3ASO-W3A00 schedules, maintained each hour from 8:00 a.m. to midnight and each four hours from midnight to 8:00 a.m. for a 28-hour period, were invaluable to all concerned. W8BPS of Grand Rapids, Mich., stood by to relay traffic from W3A00 to W3ASO in case signals should start doing tricks due to skip effects.

One feature particularly worthy of note is the fact that several of the stations which cooperated in providing emergency communication are members of the Army Amateur System. These are W3ASO, W3A00, W3SN, W3JK and W3BWT. This was the first time that Third Corps Area Army Amateurs have had such an opportunity to carry out one of the purposes for which they exist (to provide emergency communication), and the Chief Signal

Officer is sending the operator at each A.A. station a personal letter of commendation.

Other amateurs not mentioned above, who are known to have assisted in handling traffic and giving incidental cooperation throughout the storm period are W3ASH, W3ALZ, W3BMS, W8CUQ, W8BRC, W3CAH, W3CEQ, W8AOL, W8EUM, W9QU, W9AJE and W. E. Smith, Secretary of the Blue Ridge Amateur Radio Club, Hagerstown, Md.

The same storm that caused so many communication tie-ups in Maryland and Virginia stopped off in western New York long enough to bring about the isolation of several cities in that region. At Elmira, C. C. Kahn, operator of Official Relay Station W8BFF, was notified by the local police department at 3:30 a.m., March 8th, that Waverly, N. Y., was completely isolated and that any assistance amateurs might render would be appreciated. That was explanation enough for any O.R.S. appointee—Kahn at once put W8BFF to work on 3.5 mc. After a period of many calls and much listening he succeeded in hooking up with W8AVD—in Waverly! Difficulties were encountered due to high winds and ice-covered antennas, but communication was established! W8BFF was on the air for 15 consecutive hours handling "QRR" for the Pennsylvania and D. L. & W. railroads, as well as numerous personal messages. The following are mentioned by W8BFF as being of material help to him in moving traffic and re-transmitting his "QRR" calls: W2AGO, W8BYD, W2CWP, W3CBF, W3AJH, W2BTY, W8DUA, W8CYQ, W8BEN, W8CSW, W8AVD and W2AQZ. W8AON was heard by W1VV calling "QRR Utica and Syracuse" although the full extent of his work is not known.

At the time of the tornado in Alabama early in March, W4PAI, the station manned by National Guardsmen at Birmingham, was on the air ready to cooperate in every way possible. W1MK contacted W4PAI on March 21st and assisted them in their efforts to raise W4ALG at Tuscaloosa.

The above examples of amateur radio cooperation in times of emergency speak for themselves. It is good to know that "amateurs were on the job" proving their value to their communities in times of disaster. To all the operators mentioned above—"Good work, and more power to you!"

— E. L. B.

Second ORS QSO Party Results

IT'S always fair weather when good fellows get together. . . . and the contacts made possible by the second official QSO Party held exclusively for Official Relay Station appointees were no exceptions to this axiom. There were thirty hours (January 23rd, 6 p.m. to January 24, midnight) crammed full of the most friendly, enjoyable QSOs with good operators any amateur ever had. The air was just full of signals let loose via the fists of those unreliables—the ORS.

Non-ORS, write your Section Communications Manager (see page 5 this issue for his address) for an application form for Official Relay Station appointment. Get in on the fun at future ORS QSO Parties.

A method of scoring has been adopted for our ORS QSO Parties in order to instill a spirit of good natured rivalry, which is so effective in making such get-togethers the success they are. The scoring system is, briefly, a count of two points for each ORS contacted, with an additional point allowed if traffic is handled during a QSO. A count of one point is granted for each ORS heard (other than those worked). The summation of points is multiplied by the number of A.R.R.L. Sections contacted for final score. Since competition is primarily "between operators" scores of stations having more than one operator are divided by the number of operators on duty for final score; in such cases the number of operators is indicated in parenthesis with the calls wherever they appear in this account.

The highest scoring operator in the January Party was W9IU, who made a total of 6420! FB. VE3GT is second high with 2812, and leads the Canadian group. The ten

highest scorers are shown below together with pertinent data relative to their accomplishments.

TEN HIGHEST SCORES

Call	Score	ORS Worked	Traffic With	Other ORS Heard	Sections Worked
W9IU	6420	57	50	50	30
VE3GT	2812	41	26	40	19
W8EXA	2646	43	22	18	21
W8DDS	2550	25	7	93	17
W5AVF	2331	26	19	40	21
W6EGH	2024	28	14	18	23
W9EGI	1955	21	19	54	17
W9FFD (2)	1781	33	30	41	26
W2AVS	1751	22	7	52	17
W3AOC	1458	24	16	17	18

Nineteen stations contacted 15 or more Sections during the party. W9IU made the record, working stations in 30 sections. The five working the next greatest number of sections are W9FFD (2) 26, W6CXW (2) 24, W6EGH 23, W5AVF 21, and W8EXA 21. The best QSO records were made by W9IU, VE3GT and W8EXA, who respectively worked 57, 41 and 43 different stations. To W8DDS goes the distinction of "hearing" the most ORS. He heard a total (including those contacted) of 118 different stations. The two operators at W9FZO heard a total of 113. Other stations where high numbers of ORS were heard are W9IU 107, W8BR 99, VE3AD 91, W9DGS 89, W8AGS 84, W9GYO 84, VE3GT 81, W9IO (2) 81. At 24 stations more than 60 ORS were logged. 27 stations ran up scores of over 1000 points. Two operators were on the job at the following stations: W1BDI, W1BFR, W6CXW, W9FFD, W9FZO, W9GXM and W9IO. The following were active at the Party although they did not submit scores: K4RK, W7ASB and W7AYM. The scores of all participants who submitted reports follow, listed according to government inspection districts and A.R.R.L. Sections. In each district the Section having the greatest number of participants appears first, stations being listed in order of scores.

SCORES — SECOND ORS QSO PARTY

Connecticut: W1AOK 715, W1AFB 689, WIAPJ 450, W1BDI (2) 396, W1ASP 301, W1HD 280, W1CTI 222, W1TD 20. *Maine:* W1CFG 1008, W1CEQ 246, W1APX 111, W1BOF 72, W1ATO 40, W1R 24. *Western Massachusetts:* W1BVP 900, W1CPG 384, W1AUQ 325, W1BZ 300, W1BXF 76. *Eastern Massachusetts:* W1CHR 1155, W1ABG 504, W1BFR (2) 159. *New Hampshire:* W1IP 801. *Vermont:* W1AXN 684. *New York City-L. I.:* W2BGO 413, W2DBQ 304, W2WP 231, W2AZV 52. *No. New Jersey:* W2DV 994, W2AIF 351, W2BPY 301. *E. New York:* W2AVS 1751, W2BZZ 376. *Md.-Del.-D. C.:* W3A00 1458, W3BGI 546, W3BOE 490, W3BND 150, W3BWT 48, W3AHG 24. *Virginia:* W3FJ 1404, W3CFL 248, W3AAJ 140, W3ZU 33. *E. Pennsylvania:* W3AKB 1300, W3NF 825, W3MC 168. *North Carolina:* W4RE 869, W4AVT 360. *Ga.-S. C.-Cuba-etc.:* W4WB 66, W4BW 30. *E. Florida:* W4FZ 5, W4HY 3. *Oklahoma:* W5ALD 460, W5BPM 16, W5BOE (Heard 18). *Northern Texas:* W5AVF 2331, W5NW 330. *Southern Texas:* W5BKE 60, W5ES 30. *Louisiana:* W5KC 156. *Arkansas:* W5BDB 4. *Los Angeles:* W6EGH 2024, W6CXW (2) 1164, W6CVZ 756, W6DEF 144, W6AM 12. *Sacramento Valley:* W6AXM 560, W6AFU 432, W6AAC 222, W6CAW 18. *San Diego:* W6CTP 1280, W6BAM 1065. *San Francisco:* W6CAL 720, W6DZZ 80. *San Joaquin:* W6BIP 512, W6FFU 231. *Santa Clara Y.:* W6YU 924. *Arizona:* W6BJF 374. *Oregon:* W7ALM 792, W7AMF 14. *Washington:* W7QI 64, W7RT 28. *Idaho:* W7KQ 936. *Montana:* W7AAT 429. *Ohio:* W8EXA 2646, W8DDS 2550, W8ALQ 1343, W8BSR 416, W8DVE 222, W8CXF 189, W8ENN 60. *Western New York:* W8DES 1456, W8AGS 1400, W8BR 648, W8BEN 612, W8AYM 224, W8DHU 130. *Michigan:* W8DFE 1312, W8PP 552, W9HK 360, W9CE 329. *W. Pennsylvania:* W8AJE 696, W8KD 528, W8CQA 30. *Iowa:* W9FFD (2) 1781, W9IO (2) 1415, W9AWY 1360, W9FZO (2) 943, W9CWX 432, W9EJQ 351, W9FYC 156. *Illinois:* W9IU 6420, W9GYO 1265, W9FGD 1260, W9CSB 280, W9ATS 306. *North*

Dakota: W9EGI 1955, W9DGS 1140, W9DF 48. *Missouri:* W9ASV 840, W9DHN 330, W9GXM (2) 215. *Kentucky:* W9BWJ 884, W9BAN 100. *Colorado:* W9DQD 322, W9EPZ 10. *Southern Minnesota:* W9EFK 195, W9BKK 84. *Nebraska:* W9DMY 138, W9DI 120. *South Dakota:* W9FLI 702. *Northern Minnesota:* W9HIE 455. *Wisconsin:* W9HMS 46. *Maritime:* VE1BV 440, VE1AE 160. *Ontario:* VE3GT 2812, VE3AD 636, VE3DW 224, VE3AU 45. *Saskatchewan:* VE4BB 136.

— E. L. B.

ARTICLE CONTEST

We invite contributions on every phase of amateur communication activity. New ideas and viewpoints, criticisms of and remedies for conditions, hints on DX, suggestions concerning radio club organization, information on interference elimination, exceptional two-way communication work covering emergencies, athletic games and trips, timely attention to operating practice, commentary on the place of radio-telephony, experimenting or development work in present-day amateur radio, data on low-power possibilities, 1750-kc. operation, etc., all are needed. There is plenty of romance and real accomplishment in amateur work. Read these contributions. Then give us some real operating stories or the benefit of your views on different subjects.

In addition to publication of the best articles in QST, the author whose article appears to have greatest value of those received for consideration, has his choice of (1) a copy of *The Radio Amateur's Handbook* bound in leather cloth, (2) six pads of message blanks, or (3) six of the new type A.R.R.L. log books. This offer will continue until further notice. The article presented herewith is the prize-winning article for this month.

— Communications Manager.

The Old-Timer Handles Traffic

By Eugene A. Hubbell *

"H'LO, Ed. What's new?" Lee dropped into a chair and looked at Ed inquiringly.

"Nothing new here, as usual. Heck, Lee, I'm disgusted with this traffic business. You said take up traffic for a while and improve my speed. That's a lotta bull. I think my speed has gone down about five words a minute since I started this traffic stuff. Look at that hook. Got ten messages off a six yesterday, and do you know how long it took me to get 'em? Just an hour and ten minutes. Thought I never would get through with the grind, and if they hadn't been Philippine Island traffic I would have quit long before I did."

"Oh, don't worry about that. It's all in the game. You will find plenty of trouble whatever branch you go into. What gives you the kick is when you do manage some snappy work. Who is the sked you were working?"

"W6 —. He is a good fellow, but rather slow and his sig is a bit sloppy and hard to copy in QRm. And his procedure is off sometimes too. Say, why don't you write up a bunch of instructions for would-be traffic handlers? Tell you what, I'm practicing up on my short-hand, I'll write the stuff down if you'll tell me what you want. How about it?" Ed reached for paper and pencil. "Don't go too fast, I get mixed up easily, that's why I don't use it for traffic-handling yet."

Lee meditated for a minute. "Well, there isn't a lot I can say. It's all in the Handbook and the R. & R. book, if a fellow only digs it out, I could say a few things on how to handle skeds and in general, a few hints on traffic-handling

* W9ERU, 227 N. Fourth St., Rockford, Ill.

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W5VE	1264	16	22	1302
KAIHR	326	323	636	1285
W5VQ	17	68	1142	1227
W8PP	25	34	1104	1163
W3ASO	254	189	638	1141
W2BZZ	38	13	938	989
W8CNM	442	10	532	984
W5WF	117	70	734	921
VE3CPT	84	109	702	895
W6ALU	194	226	452	872
W6AFJ	757	3	25	785
W5CRA	4	3	737	744
W9BN	39	69	606	714
W8BTK	78	35	560	673
W8PQ	29	26	614	669
W5AOD	46	34	560	640
W5BMI	16	31	569	616
W8SN	36	55	516	607
W9HK	49	63	494	606
W8DBX	20	41	528	589
W5AUW	38	40	506	584
W8ETJ	41	90	432	563
W8DD5	307	56	190	553
W9BNT	107	256	189	552
W6YAU	97	362	78	537
W3BWT	99	109	329	557
W8BMG	27	72	428	527
Q42DM	392	35	—	517
W2UL	56	31	428	515
W8RN	119	47	342	508
W8EWT	41	50	416	507
W7BB	51	159	282	492
W8CDV	—	102	350	432
W9FO	76	104	260	440
W2ADQ	160	191	4	355
W2WP	31	113	190	334
W5AVF	23	241	54	318
W1ASF	66	192	56	314
W6AMM	141	131	—	272
W5ELO	3	205	4	212
W8FX	24	122	58	204
W9FAK	37	112	50	199
W7TX	72	102	20	194
W5AVY	1	150	2	153

Month of February 16th-March 15th. Note the stations responsible for above one hundred deliveries. Deliveries count!

A total of 500 or more *bona fide* messages handled and counted in accordance with A.R.R.L. practice, or just 100 or more deliveries will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also?

that I have picked up. Write 'em down if they'll help you any."

"Shoot right ahead, I'll catch it if you don't ring in some big words, Old Boy." Ed scratched busily. "There she am, 'Traffic Hints by Lee Jackson.'"

"Well, in the first place, it doesn't mean much to sked a station if the fellow isn't a good operator. I mean, if he can't send decently at a good rate and copy the same way, and be quick-witted to catch just what fills you want. Of course, one must use standard procedure. Wonder just how many fellows realize how important procedure is, anyhow? You know, I always considered procedure one of the big things for a budding amateur to study along with learning the code, but few fellows do it. Oh, gosh. I forgot you're trying to copy me."

"That's all right. I'm just putting down a little outline of it. Go right ahead, Lee."

"Well, procedure in handling telegraph communication is just like syntax in grammar. Its correct use identifies the educated person and distinguishes him from the illiterate."

"Hey, I thought I told you to lay off those big words. I don't know how to write 'em in short-hand. Guess I'll just listen, anyhow, and put down important things. Sounds good, so far."

"Well, if one wants to draw parallels between communicating in code and communicating by a spoken language, there are plenty of them apparent. For instance, one's 'fist' is similar to one's enunciation, and so on. But I'm getting away from my subject. To go back to traffic-handling, to get traffic across between two stations with a minimum of effort and strain, one should be able to use all the labor-saving devices thought up in all these years of telegraphic communication. 'Q' signals instead of plain-

language questions, and so on. For instance, if you send a message and don't get the other fellow's acknowledgment of receipt, instead of 'DID U GET NR99 OK OM,' just 'QSM?' is the berries for a snappy job. Only trouble is most fellows don't use it when needed." Lee leaned over and took Ed's Handbook from the shelf.

"Say, that's a good idea. Only trouble, as you say, is that fellows don't use it. I'm going to try it hereafter."

"Well, let's just run through this list of 'Q' sigs and see what we can find that will speed up our traffic handling. Here is one that might be used in case you want to work a fellow you hear on the air, but who is already working another station. You park on his frequency with your own transmitter while he is listening to the other fellow, and as the two of them get ready to quit work, give a short call to the other station just after your man signs off and follow it with 'QRW W9 —,' the call signal indicating the station you want to QSO. Get me?"

"Yes, but what about getting set on the 'other fellow's' frequency and working the man I want that way?"

"Just two reasons against it. In the first place you may not be able to locate his frequency, and in the second place you will QRM him for work after he signs, while if you are on the same frequency as the station you are working, QRM will be just that much less."

"You sure sound good. I never would have thought of that trick if I'd looked at that 'Q' sig for a week. Any more in your bag like that one?"

Lee traced down the list of signals. "Well, here is one that might fit in if you were in a three or four-way QSO. 'QRY?' It could be used by indicating in what order the stations were to transmit. 'W9AAA QRY1, W8BBB QRY2' and so on will give the order of operation. 'QRZ?' that's a helpful one if called by some station and one misses the call letters. It means, 'Who is calling me?' Good signal to use when signing off from a broadcast or even from working a station."

"Hold on a minute. I want to put that down." Ed scratched away furiously. "There, guess I've got it. Dah-de-dah, Old Man."

"Well, 'QSD,' 'QSE,' 'QSG,' and 'QSH' are all good time saving sigs and if one has a busy evening with a lot of skeds and has run over his period a snappy 'QSK 10MN' tells the ether operator 'Suspend traffic. I will call you again in ten minutes.' That saves time over plain-language. And for work through another station 'QSN,' 'I cannot receive you now. Continue to listen.' is another good one. 'QSQ' comes in handy when QRM has stopped. 'QSU,' 'QSV,' and 'QSQ' are all good ones for traffic stations. Most of the rest of the 'Q' sigs are not much good for amateur work, altho 'QTR' comes in handy and occasionally 'QTU' will help."

"Whew, that's some list of stuff. Guess I'll just take that chart and sit down and study 'Q' sigs for an evening every now and then. I didn't realize there were so many of them. Just a minute while I finish this page."

Lee looked over the International Abbreviations. "Personally I think a lot of fellows might study these standard abbreviations with profit. Especially, of course, those used for obtaining fills. 'AA,' 'AB,' and so on, are very useful. Most fellows seem to prefer the old system of repeating last words correctly received, a question mark for the unknown portion, and the next word or words correctly received. 'C' and 'N' are useful if more fellows understood them. Also 'UA,' 'CFM,' 'PBL,' and 'RPT.' Look them all up, Old-Timer."

Traffic Briefs

Ed Glaser, W2BRB, challenges chess enthusiasts to a game via 3500 kc. Who will take him on?

An echo of the Transcon Relay — The message started by W4PM read in part: "Do the stations on the west coast work the Philippine and Hawaiian Islands on the 3500-ke. band?" By the time this same message reached the midwest it read: "Do the stations on the west coast work the Philippines and how many islands on the 3500-ke. band?"!!

Relative Traffic Standings

(FEBRUARY-MARCH)

Messages Per Station (25%)	Stations Reporting Tfc. (25%)	Gain or Loss (Tfc. Reports) (25%)	Traffic Total (25%)	Standing Based on Average of All Four Ratings %	Leading Section in Division
W. G. 110.1	Central 278	Pacific + 28	Central 18711	Pacific 89.3	Los Angeles
Delt. 105.2	Pac. 195	Roa. + 19	Central 13679	Central 83.9	Michigan
Atl. 89.8	Atl. 148	W. G. + 18	Atl. 13297	Atlantic 80.3	Western New York
Hud. 75.6	N. E. 142	N. W. + 18	N. E. 9137	West Gulf 75.1	Northern Texas
Pac. 70.1	N. W. 107	Cen. + 6	W. G. 8044	Roanoke 66.1	Virginia
Cen. 67.3	Roa. 101	Atl. + 3	Hud. 5295	New England 62.5	Maine
N. E. 64.3	Mid. 82	R. Mt. - 1	Roa. 5132	Northwestern 51.9	Washington
Roa. 56.3	Dak. 78	Dak. - 3	Mid. 4568	Hudson 50.1	Eastern New York
Mid. 55.7	W. G. 73	Delt. - 3	N. W. 3972	Delta 44.7	Arkansas
R. Mt. 51.3	Hud. 70	N. E. - 4	Dak. 3960	Midwest 42.9	Kansas
Dak. 50.7	Can. 68	S. E. - 5	Delta 3474	Dakota 41.1	Southern Minnesota
Can. 43.9	S. E. 58	Can. - 10	Can. 2986	Rocky Mt. 26.8	Utah-Wyoming
N. W. 37.1	Delta 53	Hud. - 11	S. E. 1258	Canada 23.2	Ontario
S. E. 21.6	R. Mt. 23	Mid. † - 115	R. Mt. 1182	Southeastern 17.8	Geo.-S. C.-Cuba-etc.

THE TEN HIGHEST SECTIONS

S. C. M.

P. I. 257.7	Mich. 90	N. Y. C.-L.I. + 18	Mich. 8143	Michigan* 67.5	Stephenson, W8DMS
M.-D.-D.C. 144.3	Los. Ang. 69	Los Ang. + 17	Los. Ang. 4678	Los Angeles 67.5	Nahmens, W6HT
N. M. 143.4	Virginia 58	Virginia + 16	Ohio 4538	Virginia 52.5	Eubank, W3AAJ
Okl. 137.	Ohio 58	Mich. + 11	W. N. Y. 3980	No. Texas 40.	Taylor, W5RJ
La. 128.8	Illinois 56	E. B. + 11	N. Tex. 3772	Ohio 37.5	Tummonds, W8BAH
N. Tex. 121.6	Wash. 56	N. Tex. + 9	Virginia 3627	Western Penn. 30.	Lloyd, W8GFR
Miss. 110.6	W. N. Y. 45	E. Penn. + 8	Ill. 3373	M.-D.-D. C. 27.5	Ginsberg, W3NY
E. N. Y. 107.2	E. Penn. 38	Ariz. + 8	E. N. Y. 3216	W. N. Y. 27.5	Farrell, W8DSP
N. H. 105.5	S. Minn. 35	Maine + 7	M.-D.-D.C. 3031	Illinois 25.	Hinds, W9APY
W. Penn. 99.3	Maine 34	Wash. + 6	E. Penn. 2998	N. Y. C.-L. I. 25.	Baunach, W2AZV



*Flash!! **MICHIGAN** gets the Banner by a hair! Tied with Los Angeles in percentage standing in averaging the "No. Tfc. Repts.," "Gain or Loss," and "Total" Columns, we were obliged to decide the tie on examination of M.P.S. for the two Sections (Michigan 90.4, Los Angeles 67.7 m.p.s.).

During the traffic reporting month February 15-March 15, 1446 stations originated 20669; delivered 15461; relayed 58565; total 94695 (77.7% del.) (65.5 m.p.s.). This represents a decrease of 60 in the number of traffic reporting stations as compared with the preceding month. This drop is due to the missing Missouri report (usually over 100 stations). The standing of the entire field organization otherwise shows a 3.75% increase in reports from the previous month. †The Midwest Division's "loss" is shown only for statistical purposes, and reaches these proportions due to the failure of S.C.M. Laizure (W9RR) of Missouri to report for his Section. In this instance, in order not to unfairly favor this Division and Section in the "gain or loss" and also the "average of four ratings" for the next traffic month the standing will be determined by comparison with the January-February figures for this Section and Division. Also of course the comparison with February-March will be given parenthetically but for information only.

The quantity of traffic handled, in spite of 12 days devoted to DX testing, actually made a gain over the previous month, crossing the 90,000 mark! Deliveries held up quite well, although the percentage is only "fair."

Michigan made first place in two of our four ratings, "Stations Reporting Traffic" and "Traffic Total." In "Messages Per Station" and "Gain or Loss in Traffic Reports" the Philippine and N. Y. C.-L. I. sections lead respectively.

The listings above show the relative standings of each Division and the ten highest Sections in (1) M.P.S., (2) stations reporting traffic, (3) gain or loss in traffic reports, (4) traffic total, and (5) average of all four ratings. The sixth column shows which Section led each Division, and gives the S.C.M. of each of the ten highest Sections in our whole field organization.

How does your section stand? If your section is not listed it indicates the need of more organized effort on the part of all stations within your territory. Work toward "making" all of the columns! Get busy and put your section at the top!

Invitation to All Live Amateurs: Send your report (DX, traffic, 'phone, r.c.c., experimenting, etc.) to your S.C.M., address on page 5, on the sixteenth of each month for the work of the preceding thirty days. Get behind your S.C.M. Make your Section a leader and keep it a leader by regular reporting.

Traffic Briefs

It's regrettable that more of the 3500-kc. gang didn't observe the Quiet Hours effective during the DX Tests (not that the fellows on the other bands obeyed the rules to the letter!). A good amount of DX was worked and heard on 3500 kc. during 1931 and reports are still coming in. For instance, on March 18th K6AJA worked W3BGS and W8BDG on 3.5 mc. W8EUY, Ripley, New York, reports a 100% QSO with K6AJA on March 21st from 3:24 to 4:05 a.m. E.S.T. W8EUY logged K6AJA QSA5 R6 throughout the QSO, and he received a report of QSA5 R7. K6AJA was using 1500 volts on a pair of '52s; W8AUY had a pair of '03As in P.P. TNT with about 200 watts input. Think it over, you who scoff at 3500-kc. DX possibilities.

When we send "SK" only at the end of a communication it is rather generally understood to mean "I have finished a QSO and will now listen for whomever wishes to call." As an enlargement on this procedure W3NY and W8DSP

suggest that we send "SK QRZ?" The abbreviation "QRZ?" means "By whom am I being called?" W3NY and W8DSP feel that since so many operators neglect to cover the band after an "SK" the addition of "QRZ" would be a definite means of showing the gang that we really intend to look for other calls. If we are not going to listen for other calls, we should send "CL" which means, "I am now closing my station." "CL" should always be used when we are definitely through operating and turn off the receiver.

W1ASP claims a record number of QSOs for the year February 4, 1931, to February 4, 1932, having made a total of 1586 contacts; 75% of the work was on 7 mc., the rest on 3.5 mc. Practically all of his 1586 contacts were different; only in a very few cases was any one station worked more than once.

Question: Explain how to reactivate an '01A tube.
O. I. Hancock, CBS: Why bother? You can buy new ones for 27 cents.

Official Broadcasting Stations

(Local Standard Time)

CALL	FREQUENCY	SCHEDULES
WIABG	3800 kc.	Mon., Tues., Wed., 7:00 p.m.; Thurs., Sun., 2:00 p.m.
WIAJC	3750 kc.	7200 kc. & 14100 kc. additional whenever on those bands.
WIABY	3915 kc. (phone)	Tues., Thurs., Sat., 6:00 p.m.
WIAPK	1900 kc. (phone)	Mon., Wed., Fri., 6:00 p.m.
WIAQI	3850 kc.	Effective April 29.
WIBWY	3760 kc. (cc)	Daily 7:00 p.m.
WIBXF	Between 3830 & 3870 kc.	Daily 7:15 p.m.
WICDX	3800 kc.	Sun., Mon., Tues., 7:00 p.m.
WICEK	7024 kc. (cc)	Mon., Fri., 7:30 p.m.
WIKH	5816 kc.	Tue., Thurs., Fri., 6:15 p.m.;
WIMK	3825 and 14,048 kc.	Tue., Thurs., Fri., 6:15 p.m.;
(A.R.R.L. Hdq.)	3825 and 7024 kc.	Sun., 2:15 p.m. also whenever possible at other times.
	1850 and 7024 kc.	Mon., Wed., Fri., 6:00 p.m.
	3575 and 7150 kc.	Also Sun. afternoons at various times.
	3825 and 7024 kc.	Sun., Tues., Thurs., 7:00 a.m. & 10:30 p.m. 7 a.m. schedule for Oceania and Far East.
	1850 and 7150 kc.	Mon., Wed., Fri., 6:20 a.m.
W1YU	3575 kc.	Mon., Wed., Fri., 6:20 a.m.
W2AOJ	1785 kc.	Sun., 8:30 p.m.
	3512 kc.	Sun., midnight.
	7025 kc.	Mon., 8:30 p.m.
W2AZV	14,050 kc.	Mon., 10:30 p.m.
	3550 kc.	Tues., 8:30 p.m. and midnight.
W2BGO	3850 kc.	Thurs., 8:30 p.m. and midnight.
W2BIV	4800 kc.	Fri., 7:30 p.m.
W2BO	7130 kc. (cc)	Fri., 10:30 p.m.
W2BSD	3900-4000 (phone)	Wed., Sat., 8:00 p.m.; Fri., 8:30 p.m.
	7000-7300 (CW)	Tues., 8:30 p.m.
W2CBB	7175 kc.	Thurs., 8:15 p.m.
W2FF	7160 kc. (CW)	Fri., 7:30 p.m.
W2FP	14,320 kc. (CW)	Sun., 10:00 a.m.
W2GF	3550 kc.	Sun., 6:00 p.m.; Wed., 11:00 p.m. Various times throughout week.
W2SC	3776 kc.	Daily except Tues., 3:00 a.m.
W2UL	3613 kc.	Mon., Thurs., 8:00 p.m.
	7226 kc.	Mon., 6:30 p.m.; Wed., 6:30 p.m. or 10 p.m.; Sun., 8:00 p.m. or 10:00 p.m.
W2VH	7004 kc.	Mon., Wed., 5:50 p.m.; Sat., 1:30 a.m. (or later)
	14,008 kc.	Sat., 7:30 p.m.
W3ALE	3700 kc.	Sat., 3:00 p.m.; Sun., 10:00 a.m.
W3ANZ	7225 kc.	Tues., Thurs., Sat., 7:30 p.m.
	3596 kc.	Sun., Noon.
W3AOJ	7200 kc.	Fri., Sat., 8:00 p.m.
W3BAK	7006 kc.	Mon., Wed., 6:00 p.m.
	3665 kc.	Thurs., 6:00 p.m.
W3BEY	3793 kc. (cc)	Mon., Thurs., Fri., 7:30 p.m.;
		Mon., Fri., 9:30 p.m.
W3BWT	3650 kc.	Sun., during daylit at irregular times.
W3CDDQ	7140 kc.	Mon., Thurs., 10:30 p.m.
W3OO	3950 kc. (phone)	Mon., Thurs., 7:00 p.m.
W3PBN	14,200 kc. (phone)	Mon., 9:00 p.m.
W3QF	14,240 kc. (cc)	Tues., Thurs., Fri., 11:00 p.m.
	1718 kc. (cc)	Mon., Wed., Fri., 7:00 p.m.;
	7257 kc. (cc)	Mon., Wed., Fri., 7:00 p.m.;
	1718 kc. (cc)	Mon., Wed., Fri., 7:00 p.m.;
	7257 kc. (cc)	Mon., Wed., Fri., 7:00 p.m.;
W3WI	3915 kc. (phone)	Sun., 12:00 noon.
W3WN	3550 kc.	Sat., 7:30 p.m.
W3ZA	3532 kc. (phone)	Tues., Fri., 4:45 p.m., 10:30 p.m.
W4AAD	3995 kc. (phone)	p.m.
W4ACB	3600 kc. (approx.)	Tues., Thurs., Sat., 9:00 p.m.
W4AGY	7250 kc. (approx.)	Tues., Thurs., Sat., 6:30 p.m.
W4AEM-W4PBM	7025 kc.	Daily except Sun., 7:00 p.m.
W4AIS	7240.25 kc. (cc)	Sun., 11:00 a.m.
		Several additional times each week as convenient.
		Tues., 6:15 p.m.; Sat., 5:30 p.m.
		Sat., midnight; Sun., 10:30 a.m.
		Mon., Fri., 8:00 p.m.
		Thurs., 10:00 p.m.
		Mon., 8:00 p.m.
		Mon., Wed., Sat., 7:30 p.m.;
		Sun., 10:30 a.m.
		Daily except Sun., 2:00 p.m.
		As many times as possible during week.
		Sat., 2:00-2:30 p.m.; Sun., 1:00-1:30 a.m.; Wed., 6:30-7:00 p.m.
W4AOW	7200 kc.	Mon., Wed., Fri., 8:00 p.m.
W4IF	14,300 kc.	Daily Noon.
W4KB	7038 kc.	Sun., 1:30 p.m.; Mon., Thurs., 7:15 p.m.
W4KF	4530 kc.	Tues., Thurs., Sat., 7:00 a.m.
W4KP	3640 kc.	Mon., 8:00 p.m.; Tues., 8:30 p.m.; Fri., 8:30 p.m.
W4MS	3560 kc. (cc)	Tues., Thurs., 7:30 p.m.
W4ZZP	7158 kc.	Mon., Wed., Fri., 5:30 p.m.
		At intervals on both freq. on Sundays.
		Daily 8:00 p.m.
		Sun., 6:00 p.m.
W4N	7050 kc.	Wed., Fri., 7:30 p.m.
W4OI	3633 kc.	Sun., 1:00 p.m.
W4ZZV	7266 kc.	Tues., Fri., 12:30 p.m.
W4PM	7054 kc.	Sun., 9:30 a.m. & 11:30 p.m.;
K4RK	7000 kc.	Tues., 10:00 a.m. & 3:00 p.m.;
W4UW	3591 kc. (CW)	Thurs., 10:00 a.m. & 11:00 p.m.;
W5NO	3850 kc. (phone)	Fri., 10:00 a.m. & 3:00 p.m.;
		3850 kc.
W4WS	3921 kc.	Daily from 6:00 to 7:30 a.m.;
		12 noon to 12:30 p.m.; 6:15 a.m. & 8:00 p.m. Sun., 8:00 to 10:00 a.m.
W5ACY	7150 kc.	Sun., 1:00 p.m.; Tues., 3:00 p.m.;
		Wed., Fri., 9:00 p.m.
W5AOD	7080 kc.-7248	Wed., Fri., 12:15 p.m.
W5AWP	3910 kc. (phone)	Mon., Wed., Fri., 8:00 p.m.
W5AZV	7076 kc.	Mon., Wed., 2:30 p.m.
W5BHO	3591 kc. (CW)	Mon., Wed., Fri., 7:00 p.m.
W5BJX	3979 kc. (phone)	Mon., Wed., Fri., 7:00 p.m.
		Tues., Thurs., Sat., Sun., 7:30 p.m.
		Tues., Thurs., Sat., Sun., 12:30 p.m.
W5MS	7294 kc.	Sun., 7:00 p.m.; Mon., Thurs., 11:30 p.m.;
		Tues., 10:30 a.m. Several times in early morning hours.
W5PP	3502 kc. (CW)	Fri., 9:00 p.m.
	3998 kc. (phone)	Mon., 7:00 p.m.
W5VJ	3567 kc.	Every night except Sat., 9:00 p.m.
		Every night except Sat., 7:00 p.m.
W6ACL	7134 kc.	Mon., 6:00 p.m. Any other time available.
W6AEO	7100 kc. (cc)	Tues., Thurs., 6:30 p.m.
W6AIM	7185 kc.	Daily except Sun., 9:00 a.m., 1:00 p.m.
W6AKW	3850 kc.	Wed., 7:00 p.m.
	7250 kc.	Sun., 5:00 a.m.
W6ALU	7200 kc.	Daily except Sun., 5:15 a.m.
W6BRI	7020 kc. (cc)	Daily except Sun., 1:30 p.m.
W6ATJ	7275 kc.	Mon., Wed., Thurs., 8:30 p.m.
W6AWT	3998 kc. (phone)	Daily except Sun., 7:30 p.m.
W6BBJ	3950 kc. (phone)	Mon., Wed., Sat., 11:00 p.m.
		At any other time convenient.
W6BIP	7280 kc.	Mon., Thurs., 8:00 p.m.; Sun., noon.
W6BKM	7201.4 kc. (cc)	Tues., Wed., Fri., 7:30 p.m.
W6BLS	3640 kc.	Mon., Thurs., Sat., 7:00 p.m.
W6DVS	3640 kc.	Mon., Thurs., Sat., 7:15 p.m.
W6EBK	3640 kc.	Mon., Thurs., Sat., 7:30 p.m.
		Daily except Sun., 6:45 p.m. & 10:00 p.m.
W6CLS	3575-7150 kc.	Tues., 7:30 p.m.; Sat., 7:30 & 10:30 p.m.
W6CRF	3907 kc. (phone)	Mon., Thurs., 8:00 p.m.
W6CVV	7105 kc.	Mon., Wed., Fri., 3:00 p.m.
W6CVW	7100 kc. (cc)	Daily 5:00 p.m.
W6CXW	7165 kc. (cc)	Tues., Wed., Thurs., 8:00 p.m.
W6DJH	3920 kc. (phone)	Daily 7:25 a.m.; Mon., Wed., Fri., 6:15 p.m.
W6DSP	3918 kc. (phone)	Tues., Thurs., 7:00 p.m.
W6DWH	3950 kc. (phone)	Mon., Wed., 7:00 p.m.
W6EDR	3500 kc.	Tues., Thurs., 7:15 p.m.; Sun., 1:00 p.m. Various other times.
W6EGH	7162 kc. (cc)	Daily 5:00 p.m.
W6EJC	7025 kc. (approx.)	Wed., Sun., 7:00 p.m.
W6ESA	7174 kc. (cc)	Mon., Wed., Fri., 5:00 p.m.
W6ETJ	3950 kc. (until April 1)	Daily except Sun., 6:15 p.m.
W6TE	7160 kc. (approx.)	Mon., Wed., 6:30 p.m.
	14,300 kc. (approx.)	Fri., 4:00 p.m.
W6ZX	7188 kc. (cc)	Sun., 8:30 a.m.
W7AAT	7033 kc. (cc)	Mon., Wed., Fri., 4:30 p.m.
W7AVM	7140 kc. (cc)	Sun., 12 noon, Wed., 5:00 p.m.
W7BZ	3975 kc. (phone)	Daily except Sun., 12:30 p.m.
W7MQ	3580 kc.	Mon., Wed., Fri., 9:30 p.m.
	7080 kc.	Mon., Wed., Fri., 11:45 a.m.
	7180 kc. (cc)	Mon., Thurs., 8:00 p.m., 10:00 p.m.
W7PL	3550 kc. (CW)	Mon., Wed., 8:00 p.m.
W8AFM	14,200 kc. (CW or phone)	Mon., Thurs., 6:30 p.m. Various times Sun.
W8AGS	3800 kc.	Daily except Mon. & Fri., 7:30 p.m.
W8AJU	3618 kc. (cc)	Mon., Wed., Fri., 7:30 p.m.
W8AVY	3607 kc.	Mon., Wed., Fri., 11:00 p.m.
	7100 kc.	Odd times during the daytime.
W8AXV	3717-3630 kc. (cc)	Mon., Thurs., Sat., 9:30 a.m.
W8BCZ	3700 kc. (cc)	Daily except Sun., 11:00 p.m.;
W8DSY		Sun., 10:01 p.m.

W8BLP	14,200 kc.	Sat., 3:15 p.m.	VE1DQ	14,163.4 kc.	Tues., Thurs., Sun., 10:00 a.m.
W8BWP	7200 kc.	Mon., Tues., Fri., 8:00 p.m.;	(phone & CW)	Repeated at 3:00 p.m. Sun.	
W8CEO	1798 kc.	Sat., 10:30 p.m.	(cc)	3750 kc.	Wed., Sat., 7:00 p.m.
W8CIO	3753 kc. (cc)	Mon., 7:15 p.m. Also when			
W8CLN	3900-4000 kc.	possible at other times on			
W8CPC	14,226 kc.	3705 kc. and 14,300 kc.			
W8CPE	3610 kc.	Daily 7:00 p.m.			
W8CRA	14,008 kc. (cc)	Irregular. Probably at least			
W8CSW	1930 kc.	twice			
W8CITY	3600 kc.	Daily 8:30 p.m.			
W8DBY	7140 kc. (cc)	Thurs., 7:30 p.m.			
W8DED	3825 kc.	Sat., 8:30 p.m.			
W8DLG	3800 kc.	Wed., 8:00 p.m.			
W8DME	3550 kc.	Mon., Thurs., 7:30 p.m.			
W8DPF	7060 kc.	Mon., Thurs., Sat., 7:30 p.m.			
W8DPO	3650 kc.	Sun., 12 noon; Sun., 7:00 p.m.;			
	7150 kc.	Wed., 9:00 p.m.			
	14,200 kc.	Tues., Fri., Sun., 7:30 p.m.			
W8DRJ	7100 kc. (cc)	Also as time permits at other			
W8DYG	14,200 kc. (phone)	hours and days.			
W8EFN	3950 kc.	Mon., Tues., 7:00 p.m.			
W8HD	3620 kc. (cc)	Tues., Thurs., Sat., 10:30 p.m.			
W8NW	3870 kc.	Daily 7:00 p.m. & 9:00 p.m.			
	7180 kc.	Several times each Sun. (day-			
W8UP	1965 kc.	lite)			
W8WV	3910 kc. (phone)	Mon., Wed., Sat., 6:00 p.m.			
W9ACS	3750 kc.	Sun., 2:00 p.m. & 4:30 p.m.			
W9ACU	3514 kc. (cc)	Daily 7:30 p.m. At other hours			
W9AFN	7028 kc. (cc)	when time permits.			
	7140 kc. (cc)	Daily 6:00 p.m. Sun. at con-			
	14,280 kc. (cc)	venient times.			
	7300 kc. (cc)	Mon., 8:00 p.m. & 10:00 p.m.			
	3650 kc. (cc)	Daily 6:00 p.m.			
W9AHQ	7090 kc.	Daily 10:30 p.m.			
W9APR	14,150 kc.	Sun. on 3870 or 7180 kc. when			
W9BAN	3525 kc. (cc)	convenient.			
W9BEF	7075 kc.	Daily 11:00 p.m.			
	14,200 kc. (phone)	Daily 6:00 p.m.; Wed., Sat.,			
W9BKJ	284,00 kc.	10:30 p.m.			
W9BRA	3735.3 kc. (cc)	Mon., Wed., Fri., 10:00 p.m.;			
W9CJQ	3635 kc.	Sun., 12 midnite.			
W9CSB-	7040 kc.	Mon., Fri., 8:00 p.m.			
CF		Wed., 12:00 p.m.			
W9CWG	1835 kc.	Sun., Mon., Wed., 11:00 p.m.			
W9DUD	3588 kc. (cc)	At appropriate times when			
W9EDW	3540 kc. (cc)	believed necessary.			
W9EFD	7080 kc. (cc)	Tues., Thurs., 1:00 p.m.			
W9EPX	3998 kc. (phone)	Mon., Wed., 6:00 p.m.			
W9EPY	3836 kc. (cc)	Mon., Wed., Fri., 9:30 p.m.			
W9EQX	3855 kc. (cc)	Sun., 5:00 p.m. Also various			
	3680 kc. (CW)	times at dusk through the			
W9ERU	7040 kc. (cc)	week.			
W9ESL	1854 kc. (phone)	Sun., 12 noon.			
W9ETD	3908 kc. (phone)	Tues., Thurs., 7:00 p.m.			
W9FAD	3950 kc. (phone)	Mon., Wed., 7:30 p.m. Various			
W9FCW	1800 kc. (phone)	other times during week.			
W9FFD	3750 kc.	Mon., Wed., Fri., 9:30 p.m.			
W9FFE	3592 kc. (cc)	Mon., Fri., 5:30 p.m.; Sun.,			
	3999 kc.	11:00 a.m.			
W9FNK	7040 kc.	Mon., 10:00 p.m.			
W9FZO	7110 kc.	Wed., Fri., 7:00 p.m.			
W9FYM	14,225 kc.	Mon., Wed., Sun., 5:00 p.m.			
W9GAI	3637 kc.	Sun., Wed., Fri., 12:30 p.m.			
W9GFA	7274 kc.	Mon., Wed., Fri., 9:30 p.m.			
W9GY	3750 kc.	Tues., Wed., Fri., Sat., 11:00			
	7095 kc.	p.m.			
W9HJC	3590 kc. (cc)	Sun., 7:00 a.m.; Wed., 8:00			
W9IK	1880 kc. (phone)	p.m.			
W9SO	7120 kc.	Daily except Sun., 6:00 p.m.			
W9YB	3750 kc. (cc)	Daily 11:00 p.m.			
	7005 kc. (cc)	Daily 12:30 p.m.			
	14,010 kc. (cc)	Mon., Thurs., Sat., 10:30 p.m.			
CM2WW	7225 kc.	Mon., Thurs., Sat., 7:00 p.m.;			
CM8YB	7220 kc.	Sun., 3:00 p.m.			
		Mon., 8:00 p.m.			
		Wed., Sat., 8:00 p.m.			
		Wed., 12:10 p.m., Sat., 5:00			
		p.m.			
		Daily except Sun., 10:00 a.m.			
		& 1:00 a.m.			
		Tues., Thurs., 6:15 p.m.; Wed.,			
		12:45 p.m.			
		Tues., Thurs., 8:15 p.m., Sat.,			
		10:30 p.m.			
		Mon., Wed., Fri., 1:00 p.m.			
		Mon., 7:00 p.m.; Wed., Fri.,			
		7:45 p.m.			
		Tues., Thurs., 7:45 p.m.; Sat.,			
		7:30 p.m.			
		Sat., 5:00 p.m.			
		Mon., Wed., Sat., 5:00 p.m.			
		Tues., Fri., Sun., midnight.			

ADDITIONS

W4QR	3500-4000 kc.	Tues., 8:00 p.m.; Wed., 9:00
		p.m.
		Sun., 9:30 a.m.
W6DLV	7000-7300 kc.	Tues., Thurs., Sat., 5:00 p.m.
W6DOE	7022 kc.	Mon., Wed., Fri., 1:00 a.m.
W6DQN	7124.05 kc. (cc)	Mon., Wed., Fri., 10:30 p.m.
W6DJJ	7100 kc.	Wed., 10:15 p.m.; Sat., 6:30
W6BMM	7200 kc.	p.m.
W6CFN-	3510 kc. (CW)	Tues., Thurs., 7:00 p.m.
W6NF		Tues., Thurs., 10:00 p.m.
		Various other times when-
		ever possible.
W8ON	3750 kc.	Mon., Wed., Fri., 8:45 p.m.
W9JL	7100 kc.	Daily except Sat., Sun., 12:15
		p.m.; Sat., 8:00 p.m.; Sun.,
		8:00 a.m.
VE3IR	3850 kc.	Mon., Fri., 5:00 p.m.

Traffic Briefs

The Fargo Amateur Radio Club, well known to North Dakota hams as publishers of *Dakota Amateur Radio News*, will hold a hamfest May 1st at Fargo. All hams welcome, and a good time is assured!

The third annual banquet-hamfest of the Arrowhead Radio Amateurs will be held at Duluth, Minn., May 7th and 8th. Eighty-six visitors were present at the 1931 affair and an even greater attendance is expected this year. If you're in the vicinity of Duluth on those dates, don't miss the fun!

Announcement has been made of the annual stag dinner and QSO party of the Milwaukee Radio Amateurs' Club, Inc., to be held at the Hotel Pfister at 6:30 p.m. on May 14th. Those who were at last year's "fest" will not want to miss this affair. Advance reservations may be obtained at the rate of \$2 from the club treasurer, W9FSV, 2841 N. Murray Ave., Milwaukee, Wis.

The article on the "Frequency Measuring Test" in January *QST* neglected to mention that Foster Strong, W6MK, made an "average accuracy" of 99.935% and received one of the "Certificates of Accuracy." Also, the meter used by W3UX was constructed by W3JR; a certificate was issued to W3JR for efficient construction and calibration, and one to W3UX for accurate observing and use of the meter.

Vermont amateurs interested in receiving information regarding the new Volunteer Naval Communication Reserve units at Burlington and Brattleboro should get in touch with Ensign C. S. Doe, U.S.N.R., Commander Section 8, Box 88, Bellows Falls, Vt. Informal U.S.N.R. drills for Vermont amateurs take place at 10:00 a.m. Sundays on approximately 3510 kc.

LU2EB explains why we hear so few Argentine amateurs in the States even though the call books list some 2000-odd LUs: Firstly, LU amateurs are not allowed more than 100 watts power input, and secondly, about 90% of the Argentine hams use low powered 'phones.

W1HQ reports that his OW in looking through the Transcon table in April *QST* said, "Wasn't it a shame so many amateurs died during these tests." Ach!

J1EZ reports practically all J.A.R.L. amateur stations active in the International Goodwill Tests. Japanese amateurs are normally permitted to transmit during only twelve out of the twenty-four hours of each day, but the J.A.R.L. made special application for transmitting at any time in the March test. This probably accounts for a large number of "Js" being heard during the tests.

W7QI is keeping schedules with the U.S.S. *Discoverer*, N1JT, K6FCX, W5AOT, K7ATF and K7OX. He says 7 mc. is going to pieces for traffic, so expects to move to the 3.5-mc. band. W6DQH keeps a schedule with K7LH on 3.5 mc.

W4ACB has a large A.R.R.L. emblem painted on the top of his car so that aviators can tell he is a ham. Hi.

V.F.W.

Amateurs at Sacramento, Calif., lost much sleep during the months of February and March in handling messages to Washington, D. C., for the Veterans of Foreign Wars. Several stations were kept on the air night and day. W6APJ had four operators and handled much of the traffic. W6EJC was another outstanding station, handling more V.F.W. messages than any other Sacramento station. W6AXM, SCM Farrelle, who was in charge of arrangements says that W6EJC also deserves special mention due to the fact that he blew so much equipment; power transformers, filter, rectifier tubes, and what all! Other operators who assisted in handling the great volume of V.F.W. traffic are: W6EFM, W6EQU, W6ELC, W6ADS, W6CMA, W6EAG, W6ERW, W6DON, ex6ADL, exKA1CM, W6AYA, W6EOC and W6BYB. A special station erected at the V.F.W. hut where the traffic was collected used the call W6AVA. SCM Farrelle, W6AXM, says that along about the latter part of August the Veterans of Foreign Wars will be holding a convention in Sacramento and there will be a large amount of worthwhile traffic. W6AXM would like to arrange schedules now for the handling of V.F.W. traffic in August.

Members of Long Beach Post No. 1392, Veterans of Foreign Wars are developing the idea of a nationwide chain of V.F.W. members' amateur stations so that a national network might be organized to promote a closer feeling between the various posts. Commander Williams (W6IW), Post No. 1924 at Sausalito, Calif., suggests that all V.F.W. members interested in this proposed network communicate with Comrade Walker, W6CGF, 3838 Weston Place, Long Beach, Calif.

W5VE was the station at the Fort Worth Fat Stock Show and Rodeo, held in Fort Worth, Texas, March 4th-March 13th. The Fort Worth Radio Club obtained permission to use part of the booth occupied by the Texas Electric Service Company. SCM Taylor, W6RJ, donated a transmitter for use at W5VE, and it's hardly necessary to mention that "the installation worked." In addition to accepting about 1200 radiograms for relaying via amateur channels, the staff at W5VE did much toward educating visitors at the show as to the "whys and wherefores" of amateur radio.

DIVISIONAL REPORTS

ATLANTIC DIVISION

SOUTHERN NEW JERSEY—SCM, Robert Adams, 3rd, W3SM—Many reports indicated that failure to handle traffic was due to rebuilding and experimenting, and among those were W3BFH, W3KW, W3UT, W3AUI, W3UN, W3BEI, W3SM, W3BAQ and W3ADL. W3ARN and W3BSC had nice totals. W3BDO sent his first report from his new QRA. W3ARV was working on 1750 kc. W3AEJ kept four schedules. W3CDK worked thirty countries since the tests. W3KJ has been licensed for unlimited phone operation, as have W3AQC, W3VX, W3ZX and W3SM. W3PC is working DX. W3ZL and W3ASG are still active with Army-Amateur work. W3ACJ reports W3CGY is a new "Ham" in Ocean City. W3BPD reports twenty-seven members in the Cumberland County Radio Club. W3APN was active during the tests. W3SY is getting out nicely on 3500 kc. W3SM is arranging foreign schedules on 14 mc. W3BEI logged quite a few off-frequency stations. Unless reports are received next month from W3ATJ and W3UN, their certificates will be cancelled, as will the Official Observer appointments of W3BBD and W3UN. Your

SCM is arranging to be present at each of the Radio Clubs in New Jersey within the next few months. Will the club secretaries please advise the dates of their meetings?

Traffic: W3AEJ 38, W3QL 70, W3CDK 39, W3ARV 94, W3ACJ 1, W3BDO 18, W3ARN 228, W3APN 37, W3BPD 7, W3JL 14, W3ZI 18, W3BSC 20, W3PC 31, W3SY 8, W3SM 32, W3BBD 14, W3ASG 18, W3BEI 19.

WESTERN NEW YORK—SCM, Don Farrell, W8DSP—W8DBX is the section's greatest traffic handler. W8GBL is a new ham in Cobleskill. W8AGS handled some rush traffic for VP2PA and got an answer in ten minutes. W8DSS continues his good work. W8QL has a bunch of new crystals. W8DHU says the Good Will tests put a crimp in his traffic total. W8BDK handled a bunch of traffic for the local Boy Scout exposition. W8BEN says he is going to make the BPL next month. W8DES got his new A.C. receiver perking. W8AYM is rebuilding his shack. W8AED tried the examination for Commercial Second. W8HQJ is using a type '10 to drive an '04A in his MOPA. W8DQP reports a new station in Glens Falls, W8GHO. W8CRF is rebuilding. W8BFF handled a bunch of emergency traffic for the P.R.R. W8DSP has a new SW3 receiver. W8BWW reports skip distance and fading. W8DXF's receiver is on the sick list. W8CJJ has a new crystal-controlled job. W8DEQ keeps four schedules. W8BR spends most of his time ragchewing. W8DHQ has a new Crosley Ban Box-Super. W8CZF is back on the air. W8CSW and his partner Tom Jarvis did some fine work for the Western Union when the land lines were down during our recent bad storm. W8BFF cooperated with W8CSW in the emergency work. W8EUY is QRO work. W8GBK is a new ham at Sherman. W8EWF is on 'phone now. W8AFM reports the Buffalo Club going strong. W8DII reports by radio via W8HAL. W8BFG has a new Jr. op. Congrats. W8DSA cut his punctured crystal into three parts, and now has three good oscillating crystals, "believe it or not." W8ECM is QRL work. W8ABX is putting up a new rain pipe mast. W8ALY and W8ATH were snowbound at WHAM for five days. W8ATH walked six miles to get food. W8DEJ has a daily schedule with W6BWK. W8BHK reports the Southern Tier Transmitting Association is very active. W8BGN is going to put in 'phone. W8AOR reports from Champlain. W8AJZ handled traffic for his local telephone company when the lines were down. W8FOL is QRL school. W8CII has two new 50-foot masts. W8FQS is a new ham in Chautauqua. W8ERZ worked ten countries during the month. W8JV says ragchewing takes 75% of his time. W8AWM says the Jamestown club will have a new call soon. W8FQS reports from Chautauqua.

Traffic: W8BEX 589, W8AGS 350, W8DSS 289, W8QL 216, W8DHU 179, W8BDK 168, W8BEN 141, W8DES 99, W8AYM 97, W8AED 89, W8BQJ 89, W8DQP 72, W8CRF 68, W8BFF 44, W8DSP 41, W8BWW 37, W8DXF 36, W8CJJ 29, W8DEQ 27, W8BR 21, W8DHQ 21, W8CSW 20, W8EUY 18, W8AFM 11, W8DII 11, W8BFG 6, W8DSA 6, W8ECM 6, W8ABX 5, W8DEJ 4, W8BHK 1, W8CYG 56, W8AQF 17, W8FFL 45, W8EWE 37, W8EMW 248, W8EWT 507, W8FME 31, W8DMJ 48, W8AOR 52, W8AJZ 20, W8FOL 20, W8ERZ 90, W8JV 14, W8FQS 5.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Harry Ginsberg, W3NY—Too many ORS forgot their pledges to report this month—"beware of the ax." The Eastern Shore Traffic Loop has been holding initial tests on Monday, Wednesday, and Friday, 6:30, with W3BAK in control. Write W3VJ for particulars, you Eastern Shore men. The Hamfest and Banquet given by the Blue Ridge Amateur Radio Club at Hagerstown, March 19th, was a rousing success. All 51 who came had a FB time. Speakers were R. C. Corderman, M. H. Thurmond, Charles Myers, and S. W. Piper. Maryland: W3BND, who leads this gang, resigns as ORS. W3NY broke his traffic record. Hi. W3A00 had hamfest and key-clicks QRM. W3BGI will soon use 50-watt. W3LA has regular schedule with Spain. W3BOX is helping to make the Eastern Shore Traffic Loop a success. W3HT "turned out" another op. W3BCS is QRL with work. W3AHT is using '01A with 300 volts. W3ZD finds great improvement in using pentode as crystal oscillator. W3WN offered use of his station to Mayor of Frederick, Md., during recent emergency. W3AFF is "all set" in his new

shack. W3BOE slackened up a bit. W3BKC is cracking books instead of brass-pounding. W3DGI is building 56-mc. equipment. W3AEG says his antenna "just won't perk." W3CDG is trying 14-mc. DX. W3VJ is on 3700 kc. with MOPA. District of Columbia: Ed Day puts W3ASO across with a FB total to lead the whole Section. W3BWT shows his versatility with a 'phone rig perking FB. W3NR was off lots due to YF's illness. W3IL shows real ORS spirit in reporting even if —. W3CAB sends report on FB photo of our National Capitol at night. Delaware: W3BAK is doing excellent work with the Eastern Shore Traffic Loop. W3ALQ finds the attic too cold for transmitting. W3CXL's report arrives at the last minute.

Traffic: W3ASO 1141, W3BWT 537, W3CND 279, W3SN 177, W3BAK 137, W3NY 133, W3AOC 105, W3BGI 41, W3LA 28, W3BOX 25, W3HT 17, W3BCS 15, W3AHT 14, W3NR 12, W3ZD 10, W3WN 7, W3AFF 6, W3BOE 5, W3IL 3, W3BKC 2, W3CXL 337.

EASTERN PENNSYLVANIA — SCM, Jack Wagenseller, W3GS-W3BF — Many non-ORS reported this month. Thanks, OMs, and congratulations on the fine spirit thus shown. W3MC takes first place this month. W3NF runs a close second. W3BEY is now an OBS. W3OK says traffic slow. W3AHD's new crystal rig is perking FB. W3CVS has a new 1750-kc. rig. W3UX has a nice bunch of schedules. The recent storm blew down W3BCD's antenna. W3CFF and W3DHL handled a lot of Williamsport Auto Show traffic. The storm broke W3AQN's mast. W3AKB is active in the Army Net. W3ATN QSOed HO3DR. W3BKQ reported via radiogram. W3ANK is very consistent in reporting. W3BBK QSPed from a ship in the Pacific to N. Y. in 30 minutes. W3BTP also says storm blew mast down. The same thing happened at W3FCB. W3EO worked W3BNY at the key of CM8AZ. W3AAD schedules Newfoundland. W3AFE now owns a gas station. W3ANZ is beginning to like 3.5 mc. W3VB's total was reported by W3UX. Believe it or not, W3AMR is located in a barn. W3GS is working portable W3BF from Phila. W3ZZD is portable of W3BOL. W3AGV reports in person. W8AXH is out for an ORS. W3CBK and W3NA are QRL school. W3BPX originates traffic from his High School faculty. W3DZ reports four new hams in West Phila. W8VD's new crystal outfit is FB. W3BUH handled a new. W3AAU is building his fourth transmitter. W3BVX won the "Best Station" contest held by the Western Radio Society. W8EU couldn't get a TNT to work so he has grid coils for sale by the hundreds. Hi! The Western Radio Society held a very FB Hamfest and Banquet on March 19th. Over a hundred hams attended including our Director, Dr. Woodruff. W3CFA reported for first time with nice total. W8AFV says conditions unreliable.

Traffic: W3NF 434, W3MC 460, W3BEY 256, W3OK 224, W3AHD 224, W3CVS 165, W3UX 100, W3BCD 101, W3CFF 85, W3AQN 83, W3AKB 79, W3ATN 95, W3BKQ 41, W3ANK 63, W3BBK 54, W3BTP 53, W3FCB 44, W3EO 44, W3AAD 42, W3AFE 41, W3ANZ 35, W3VB 33, W3AMR 34, W3BF 27, W3ZZD 25, W3AGV 32, W8AXH 20, W3CBK 18, W3NA 12, W3BPX 12, W3DZ 11, W8VD 11, W3BUH 7, W3AAU 5, W3BVX 4, W8EU 3, W8AFV 9, W3CFA 12.

WESTERN PENNSYLVANIA — SCM, Robert Lloyd, W8CFR — W8CRA leads the Section this month, but W8AVY cops the logbook prize with 150 deliveries. W8CUG blew his 50-watter. W8YA is all set to give away crystals in the rag-chew contest they announce this month. See complete details following this report. W8CCW was sick a good part of the month. W8FKU is building a new 7-mc. rig. W8DYL reports by radio from the snowbound mountains! W8DZP is on regularly. W8AJE is a trunk line station. Our Director, W8CMP, turns in a total every month. W8DVA is back on the air. W8CQA is now crystal; he reports a new ham, W8ESR, on the air. W8BUC has changed to 7 mc. W8DML is busy at school. W8EDG is on both 7 and 3.5 mc. W8DLG expects to get going strong soon. W8KD handled traffic for two Senators and a Congressman! W8CEO handled storm emergency traffic for the West Penn Company. W8ECH has a lot of news from Waynesburg; he and W8BF% both have new receivers; W8DDU is on 1750 kc.; W8FFR has push pull '45s. W8AQY is going

after schedules; he reports W8BNU is back from school and that W8BHN and W8BPW are active. W8AGO is kept most awful busy. W8DRO is rebuilding. W8EEC has taken to 56 mc. W8CFR managed to get in a bit of traffic.

Traffic: W8CRA 744, W8CUG 338, W8CFR 331, W8YA 280, W8CCW 169, W8AVY 153, W8FKU 65, W8DYL 55, W8DZP 53, W8AJE 50, W8CMP 50, W8DVA 50, W8CQA 41, W8BUC 38, W8DML 24, W8EDG 21, W8DLG 18, W8CPE 17, W8FPD 17, W8APQ 13, W8FHN 14, W8KD 13, W8CEO 9, W8ECH 4, W8AQY 1, W8DXI 14.

WESTERN PENNSYLVANIA RAG-CHEW CONTEST

1. Open to A.R.R.L. members in the Western Pennsylvania Section.
2. Contest last two weeks 0000 May 8th to 2400 May 21, 1932.
3. To each of the three highest scoring operators, the staff of W8YA, the amateur station of the Pennsylvania State College, will present a one-inch quartz crystal cut and ground to the approximate frequency specified by the recipient.
4. Each station in the W. Pa. Section with whom a QSO is made, according to the rules following, shall count *one point* toward the score of each.
5. Each QSO must include at least *ten minutes of conversation* after reliable communication has been established.
6. Contacts by pre-arranged schedule shall not count in the contest.
7. Any further contacts with a station already worked in the contest shall not count.
8. Messages may be handled but the time taken shall not count in the "ten minutes of conversation" required.
9. Any power not over 1000 watts; also any frequency band may be used; 'Phone or C.W. may be employed.
10. Where there is more than one operator at a station individual scores must be kept and submitted for each operator.
11. A complete list of the stations with whom satisfactory QSOs have been made according to the above rules, together with times, dates, and other log notations, shall be submitted to the SCM of Western Pennsylvania (R. M. Lloyd, 175 Allegheny Avenue, Emsworth, Pittsburgh, Pa.) to reach him not later than May 30th. He shall appoint a neutral group who shall inspect the scores and submit to him the names and scores of the winners.

CENTRAL DIVISION

INDIANA — SCM, George H. Graue, W9BKJ — W9BYB has QSY to 1750 kc. W9EZR is rebuilding. W9HZH is helping will be HAMS. W9FXO has a new AC receiver. W9HHI expects to blossom out with a 50-watter soon. W9FYB is having antenna troubles. W9ABW is off temporarily due to night work. W9CHA on with crystal again. W9GZB, W9HKK and W9GFS are rebuilding for crystal. W9DVE is monkeying with Tourmaline crystals. W9YB has 10 ops. W9EGE is busy working DX. W9AIR's crystal rig is nearly done. W9FKI has QRO. W9DHL lost his antenna in a sleet storm. W9AXH reports traffic on 7 mc. as NG. W9BOS is trying new transmitter. W9GDD is a new ham at Elkhart. W9EXL is out for more schedules. W9HLA is a new station at Frankfort. W9HUO expects to be an ORS soon. W9GJS is rebuilding for 14 mc. W9CKB is a new ORS. W9HJ is showing signs of activity. W9FAK is handling Indianapolis end of W9YB circuit. W9BKJ finally gets going after three months of rebuilding. W9BWI and W9CLF have merged, CLF taking care of the voice and BWI the television end. The Bloomington gang are planning on having a big hamfest in July.

Traffic: W9YB 297, W9FAK 199, W9HGB 109, W9GJS 43, W9HUO 40, W9BXT 32, W9TE 25, W9DEJ 22, W9FKE 13, W9GGJ 12, W9CKB 9, W9AKJ 9, W9AXH 7, W9BOS 6, W9EXL 6, W9FKI 5, W9EGE 2, W9AIP 2, W9YV 1, W9CKY 20, W9CWE 18, W9EJB 7.

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — BAZ still insists he will install a phone. Wonder what W9FZL used to get such a total on phone? W9BWJ put in '47 osc. noting much improvement. Beginning April 1st, W9OX will be C.W. on 3542, phone 3985. Between work and the YL, W9CNE sho' am busy. W9AZY has a 14-mc.

transmitter. Western Ky. should give R.M. W9BAN more cooperation. W9HAX has a nice list of schedules. W9ARU is rebuilding for crystal. W9AUH QSO Austria with new '04A. W9QT believes he hooked a Jap. If he could find more stations with traffic, W9BZS says his total would be higher. W9EDQ must be awfully busy, or sunpin'. W9CRJ ditched schedules to go ice-skating with the YL. W9BOZ says we can count on him to handle his share of the traffic. W9CDA has a fine-looking outfit. W9ERH QSO EAR96 during tests. W9ABV has a new receiver. W9HCO built himself four receivers during the month. W9DDQ is now eligible for WAC. W9BBO blew another filter. If he gets an unrestricted phone license, W9EDV will put in 100 watts. W9AYH put in '47 osc. W9ACN reports several new calls in Winchester. Lexington reports sadly missed. Let's everyone report regardless of traffic totals. This means YOU!

Traffic: W9BAZ 88, W9FZL 87, W9BWJ 77, W9OX 68, W9CNE 52, W9AZY 37, W9BAN 31, W9HAX 27, W9ARU 22, W9AUH 19, W9QT 19, W9BZS 14, W9EDQ 13, W9CRJ 12, W9BOZ 6, W9CDA 6, W9ERH 6, W9ABV 4, W9HCO 3, W9DDQ 1.

MICHIGAN — SCM, Ralph J. Stephenson, W8DMS — Here's the biggest month yet, with 98 reporting stations. The Detroit Amateur Radio Association installed a booth nicely decorated at the North American Flower Show and told the world what "ham radio" was. The "Bull" put out by the D.A.R.A. seems to be getting results. If you want a copy, send in your report of traffic on the 16th and a copy will go out to you. It has ALL the Michigan news and gossip. Five Michigan stations in BPL again, with W8PP leading us. W8AVQ reports for the Flint crowd. W8BMG has certainly organized the west side of the state. Kalamazoo now has fine bunch of hams, and an active club. W8DOS and W8DWB stir up the ether with Morse. W8EG1 thinks some one in Cleveland "confiscated" some private property of his. W8AIU and W8CAT went down to 1715 kc., and W8RF is playing with 56 mc. Had two report cards with no call letters. W8SH says 'phone results discouraging. W8JX moved again. W9GDJ has been under the weather. W9BBP uses pentode receiver. W9HIS is encouraging new hams in Gladstone. W9CEX is disgusted with 14 and 7 mc. W8DCT keeps the A.A. nets perking. W8AKN says "QRT mostly." W9VL shows a nice group of schedules. Miss W8DZ now has her operator's ticket. W8DYH is getting a crystal rig going. W8CPH has been QRL helping new hams. W8BJG reports for first time. W8CUE, an old-timer (1910), reports for first time also. W9HSQ says his '10 won't reach out. W8DU is getting some results on 14 mc. W9FBC is taking to the woods as the leap year situation has him nervous. W8GHP reports from the "Thumb" district. W9EGF reports for the Larium gang. He's at B.C. WHDF and replies to QXL cards to the B.C. station via amateur radio. W8BOR moved to Kalamazoo. W8JO had his Model "A" stolen and thanks Police radio for its recovery. W9DUE overlooked expiration date on ticket and is now awaiting a new call. W9HK says the Northern Mich. gang have a 100% delivery record and all within the 48-hour limit. W8FTT is keeping FB schedules. W8AUT felt the "depression" when his batteries died. New ORS this month are W9DAB, W8EVC and W8AZQ. For further Michigan news see the D.A.R.A. "Bull."

Traffic: W8PP 1163, W8PQ 669, W9HK 606, W8BMG 527, W8DYH 433, W9VL 361, W8GHV 325, W8EVC 308, W9EGF 278, W8QT 272, W8AZQ 229, W8DED 220, W8FX 204, W8EG1 175, W9GQS 165, W8EKL 156, W8DFS 128, W8CPH 112, W8FTT 109, W8DZ 106, W9CE 102, W8CFM 87, W8FYJ 79, W8DMS 63, W8JD 59, W8CFZ 56, W8AVQ 55, W8DCT 55, W8CST 55, W9EXT 51, W9DAB 49, W8DOS 48, W8DAQ 37, W8AW 36, W8EHD 33, W9BBP 32, W8FSK 31, W8DLX 30, W8ARR 28, W9ADY 28, W9CSI 28, W8BJG 27, W9GQF 26, W8BGY 22, W8JO 22, W9GJX 21, W8BTK 22, W8SCU 20, W8CEU 20, W8RF 18, W8BXJ 18, W8DWB 17, W8DSX 17, W8WR 17, W8HL 17, W8JX 16, W8AKN 15, W8CUE 15, W8FRW 15, W8DYR 14, W8COW 14, W8BXJ 13, W8BIK 13, W9CEX 12, W8AYO 12, W9HSQ 11, W8COQ 11, W8FIO 11, W8CSR 9, W8AJL 8, W9CWR 7, W8GHR 6, W8DEH 6, W8EWO 6, W9EEM 5, W8AE 5, W9FBC 5, W8EGX 5, W8CAT 4, W9CSX 4, W8SH 4,

W9HIS 4, W8DU 4, W8BOR 3, W8AIU 2, W8GDR 2, W8DM 2, W8BG 1, W8CEV 1, W8GA 6.

ILLINOIS — SCM, F. J. Hinds, W9APY — RM, E. A. Hubbell, W9ERU — Our RM, W9ERU, requests all schedule information be sent him direct so he can help you. W9GAI has a new dynatron. W9CUH is installing a key click filter. W9ACU has changed to crystal. W9DOU has ten schedules. W9ENY now has crystal. W9JO is getting along fine with schedules. Fireworks again at W9GIV. An old-timer is back again with us — W9AGQ. W9CZT has been ill. W9FDQ is getting sleep now that the DX Tests are over. W9BRX has finished rebuilding. New Brass Pounder at W9HNK — Congratulations, OM. New receiver at W9AFB. W9GVX received a QSL from a ZL listener. W9HPK has a new TNT in PP. QRM bothered W9GDI in the DX Tests. W9BVV is working fine DX with a '10. The Egyptian Radio Club of East St. Louis, Ill., has W9AIU on the air now. W9AIA has a 1750-kc. 'phone and gives code practice between traffic schedules. W9FXE says most interest is in DX this month. A new crystal-controlled transmitter at W9FXE. Overhauling the outfit at W9CEO. W9CZL has Hertz troubles. W9CUX has a new crystal rig. W9ATS says the DX Tests shot traffic all to pieces. W9CSB has fine traffic schedules. W9BIR is trying DX. W9BSR has his crystal rig working fine. W9AFN will be on 'phone soon. W9CN is rebuilding. W9FO says, "Let's start using a proper check so the other fellow can OK a message and see how long it is going to be, etc." A new YL operator has been received by Mr. and Mrs. W9DGG. Congratulations, folks. Ice brought down the antenna at W9NN. Likewise a storm tore down the antenna system at W9OQ. A fine new MOPA is going at W9CFV. W9VS is "raring to go" for traffic. The boys at Pontiac, Ill., had a fine Hamfest on March 13th. W9AND has been on the sick list. W9GFY built an auto receiver. W9FCW built a new PP outfit. W9BPU is using a crystal MOPA. W9RO passed the unlimited 'phone exam. The '01A in TNT is doing good work at W9DBO. W9FDN had a dandy three-way QSO with W8FXF and W9FWL on 7000-kc. band. A pair of '10s in TNT Push Pull on 3.5 mc. and a '10 TNT on 7 mc. is the equipment at W9FAU. W9GFU is finishing up his special vacuum tube course at school. Some DX at W9FUR with his new crystal rig. W9BYL is president of the Tritown Ham Club. W9FRA has a new crystal. W9FGD says schedules and traffic going along fine. W9HCB is on again.

Traffic: W9IU 443, W9FO 440, W9ESG 434, W9CGV 346, W9ERU 202, W9APY 133, W9BPU 110, W9FGD 108, W9VS 70, W9HCB 75, W9NN 66, W9EWN 59, W9ACU 56, W9CZL 55, W9ATS 50, W9ALA 49, W9DOU 49, W9ANR 46, W9FXE 46, W9GAI 43, W9FAU 42, W9FCW 42, W9GVX 41, W9AMO 36, W9DYG 36, W9AFB 30, W9AFN 28, W9FJB 23, W9CSB 22, W9DBO 16, W9HPK 14, W9CUH 13, W9GDI 13, W9HNK 13, W9AVB 12, W9BTU 12, W9CZT 12, W9GEP 10, W9JO 10, W9KA 9, W9DJG 8, W9BYL 7, W9CUX 7, W9BIR 6, W9EM 6, W9FDQ 5, W9BSR 3, W9CEO 3, W9GCU 3, W9WR 3, W9FDN 2, W9GIV 2, W9BVP 1, W9BYZ 1, W9CKM 1, W9OQ 1.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9FSS piled up a nice total on 3770 kc. in daylight. W9DKA's daily schedules work out best. W9GYI pounded brass some during his vacation. W9ZY-AZN has receiver trouble. W9FAA is rebuilding. W9EYX and W9HSV send their first reports. W9HFA is now located at WLBW, Poynette. W9ESZ will change from 3900 kc. to about 3800 kc., April 1st. W9AN schedules W9GZP, W9BN, W9GPQ and W9HZ. W9HMS will put in crystal soon. W9SO says most activity is U.S.N.R. Drills. W9EOX is experimenting with Hertz single-wire antenna. W9EGZ is disgusted with DX Tests. W9HTZ is building new MOPA. W9FAF applies for ORS. W9F1X has '45 in PP. W9CJU is looking for schedules. W9DLQ will have his crystal on as soon as he gets a pair of '66s. W9EGP says the Checkered Vests will attend the QSO Party en masse. W9BIB and his gang visited several Milwaukee stations. W9ASQ reports that the Superior amateurs are coming to life. W9FAV has a pentode receiver. W9IH took traffic from Arctic. W9AVG, RM, wants to hear from stations in southeastern Wisconsin regarding schedules and operating hours. W9EAR has '45 crystal,

'10 buffer and '03A P.A. W9DRO has new MOPA. W9AMR had his appendix removed. W9DUX is on at new location. W9EHD says Cheerio to the gang. W9LAQ has finished his crystal job. W9CFP reports Racine Club has 62 members and 35 licensed hams. W9GYQ sends news of the Appleton boys. W9FPB is new station at Westby. W9EOJ is covering the country with low power. W9GFL is handling a lot of traffic. W9ABM is on 3750 kc. W9VD after Apr. 1st will be on 3535, 7070 & 14140.

Traffic: W9GFL 229, W9DKA 138, W9GVL 98, W9ZY-AZN 78, W9FAA 66, W9EYX 43, W9HFA 41, W9ESZ 38, W9AN 35, W9HMS 26, W9SO 25, W9EOX 21, W9EGZ 18, W9HTZ 18, W9FAF 15, W9F1X 15, W9FSS 144, W9CJU 12, W9HSV 9, W9DLQ 7, W9EFG 6, W9BIB 5, W9ASQ 5, W9FAV 4, W9IH 4, W9AVG 4, W9EAR 4, W9AMK 4, W9DRO 2, W9DUX 2, W9EHD 1, W9VD 14.

OHIO — SCM, Harry A. Tummonds, W8BAH — W8AXV and W8CUW report. W8CCK is taking a vacation. W8EFW reports new hams W8GCU, W8GGN, W8GGH and W8GGV. W8ACZ is a new reporter. W8UC will soon be ORS. "Back in 400 point class next month," reports W8BMX. W8DIH now works on four bands. W8CZT was QSO Honolulu on 3600 kc. Operators at W8FJE are W8EFW, W8GGN, W8CPS, W8GCU, W8EBY, W8FFK and W8FPL. W8BFT schedules W8EQU. W8CIY is QRL broadcast checking. W8ENJ asks, "Anyone in eastern Ohio want a 6 a.m. schedule?" W8BON delivered a death message. Always an FB report from W8EY. W8BT signs "HX." W8CIO schedules W8ANS. "Pendote rig a success," reports W8EKA. W8BAH schedules NDS. W8BYD has two ops now. W8RN comes through with a BPL ticket. W8DDS has center position in Trunk Line "G." District No. 2: W8CSB is rebuilding. W8EJY reports Amateur Radio Club of Ashtabula organized with new hams W8GDP, W8GHD and W8GCF. W8DMK says 14-mc. DX is good. W8EJ says W8AQX would make good ORS. W8AQX reports a nice total. W8BKM has new receiver finished. District No. 3: W8ZZU is a new reporter from Toledo. W8FSN is a fireman. W8BTT has been experimenting. W8AND lost his job and got a new one same day. Nice report from W8APC. District No. 4: RM W8EFQ. W8OQ says nine hams in small town. W8ANZ and W8HT report. "Helping the gang for Amateur Extra Firsts," reports W8OQ. W8UW says traffic slow on 7 mc. W8DTW signs "Smitty." Meet W8PO, a new Ohio ORS, at Shelby. Totals from W8EEQ are getting better every month. District No. 5: RM W8DFR. W8AXQ is now the proud Papa of a new Jr. Op. New crystal job on the air at W8DVE. W8DFR reports new club, Canton Society of Radio Amateurs. He is president. District No. 6: RM W8CNM. W8CXF wants report cards. W8BBH is on Trunk Line "B." W8BPN schedules W8ANS. W8CNM leads the state this month. District No. 7: RM W8V. W8CKX is on 14 mc. now. W8V reports W8CGR interested in ORS. W8ANZ is doing real traffic work. District No. 8: RM W8CGS. W8ENH schedules W8EXI. W8ALQ is now on 3630 kc. W8FA and W8CWF report. W8EDY works on 1825 kc. 'Phone RM W8CUL reports the gang getting together at Washington CH every Saturday night. W8CGS is going full steam again. District No. 9: W8EQF is looking for schedules on 7 mc. W8EQB has new '03A in MOPA. The QRK Amateur Transmitting Club of East Liverpool reports with W8FKI, W8DCU and W8AXR on the air regularly. Sixty-nine stations reported this month. Gang. Team work will put Ohio back at the top! Mail that report card to the SCM on the 16th. New men can use a QSL card for report. The SCM will be glad to send report cards on request.

Traffic: W8CNM 984, W8DDS 553, W8RN 508, W8BYD 218, W8EEQ 196, W8DFR 168, W8DVE 162, W8BAH 156, W8ANS 132, W8EXA 101, W8V 91, W8BKM 85, W8EDY 78, W8CIO 77, W8PO 74, W8BT 72, W8EBY 69, W8BZL 68, W8BMK 56, W8CUL 52, W8BNC 51, W8DTW 49, W8APC 49, W8BON 48, W8EQB 43, W8AQX 42, W8CGS 32, W8ENJ 31, W8AXV 29, W8BPH 26, W8EXI 24, W8EJ 22, W8CIY 20, W8SU 27, W8BFT 20, W8OQ 17, W8DMK 17, W8CKX 15, W8FJE 12, W8HT 11, W8ANZ 10, W8BBH 10, W8AND 9, W8CZT 8, W8EJY 8, W8BTT 7, W8DIH 7, W8FA 6, W8CXF 6, W8BMX 6,

W8EQF 5, W8ALQ 5, W8OQ 4, W8UC 4, W8ENH 3, W8ACZ 3, W8BSR 1, W8EFW 1.

DAKOTA DIVISION

SOUTH DAKOTA — Acting SCM, Stanway Gough, W9DNS — W9HZT and W9FLI have the highest traffic totals. W9HJT handled some Red Cross traffic. W9CFU has a new National receiver: W9GYG has changed from TNT to MOPA. W9FLO is a new station at Huron. W9FLM has been experimenting and claims one mile as his best DX on 56-mc. 'phone. W9AQB has a good MOPA outfit with '45 in final stage. W9EER let his license expire. W9EES has been snowbound a good share of the winter. W9DRB paid a week's visit to the Sioux Falls gang.

Traffic: W9HZT 400, W9FLI 127, W9DB 44, W9BLZ 42, W9HJU 38, W9DNS 26, W9BJV 25, W9DIY 18, W9HBA 17, W9FKL 12, W9ALO 11, W9DES 7, W9CFU 6, W9CRY 6, W9HSH 2, W9ID 1.

SOUTHERN MINNESOTA — SCM, H. Radloff, W9AIR — W9BN had three transmitters on the air during all transmitting periods of Goodwill Tests. W9EPJ reports a well organized transcontinental traffic route perking smoothly. W9EFK took 108 messages on one QSO!! W9BKK gets out well on 1.7 mc. W9BKK issues a snappy Minnesota A.A.R.S. Bulletin. W9HFF says a whistled CQ will raise all kinds of DX — at Kresge's radio counter. Hi W9BNN has constructed a new station. W9ELZ joined the Army Amateur Radio System, as did W9HGN, W9HRH and W9HXR. W9GNU is a Medic at Waseca and very obliging in sewing up busted hams according to W9CFF. W9DH's crystal is perking FB. W9EYS has 650 volts on '50. W9FCS reports W9CSU a new ham at Vasa. New hams in Minneapolis include W9GIA, W9GFH and W9IAE. W9GFA applies for OBS appointment. W9FLE has wind-driven power supply. W9GLE applies for ORS. W9EEB has a 'phone station so large that he charges batteries a week for one night's operation MIM. W9DRG reports new hams at Owatonna. W9FAD is building a Dynatron. W9HKI wants to get hold of 1000 volts — !!! W9GCA experiments with receivers. W9AIR has a new portable. W9GBZ is going strong on 1.7-mc. 'phone. Minneapolis Radio Club reports good attendance at meetings. W9SF participated in Goodwill Tests. W9DGE operates at KNWA. W9HEX reports 73 to the gang from Dick Cotton, ex5DPX, now W7HM.

Traffic: W9BN 714, W9EPJ 286, W9AIR 188, W9EFK 167, W9BKK 142, W9BKK 133, W9HFF 82, W9BNN 76, W9ELZ 45, W9CFF 23, W9DH 22, W9EYS 21, W9HMV 21, W9YC 17, W9FFY 17, W9FNK 15, W9CKU 13, W9ERT 13, W9QE 13, W9EGE 12, W9HGN 10, W9EPD 7, W9HXR 6, W9HCW 6, W9HRH 5, W9LN 5, W9GFA 4, W9GLE 4, W9FCS 5, W9COS 10, W9BQJ 3, W9EYL 2, W9ZT 1, W9CUX 1, W9FCC 3.

NORTHERN MINNESOTA — SCM, Ray H. Weihe, W9CTW — A new SCM was elected this month and all honors go to W9DOQ Palmer Anderson, Duluth, Minn. Send your reports to him from now on. Mr. Anderson is very capable of running our section, and if the gang cooperates with him, Northern Minnesota will be right among the leaders. W9BRA leads the gang as usual. W9BBL finds time to swell his totals. W9FNQ has a FB Naval Reserve Unit. W9BAR wants an ORS appointment. W9EOZ "graduated" to the 'phone class. W9AVZ is getting the Brainerd gang going. W9GBW is a new ham at Brainerd. W9AEL wants more traffic. W9CTW visited 9HED and W9BRA this month. W9HIE is playing with 'phone. W9HZV is a new reporter. W9EGU is building a Class B 'phone. W9HEN reports for the Anoka gang. He and W9GZO are the only active hams at present. W9IAK is a new reporter. W9DB reports a new ham at Graceville, W9HEO. W9FNJ will be going soon. This ends my term as SCM for Northern Minnesota gang, and I want to say that I thank each and every one of you who has helped me to keep things moving. 73.

Traffic: W9BRA 108, W9BBL 94, W9FNQ 49, W9BAR 40, W9EOZ 26, W9AVZ 22, W9DOQ 15, W9GBW 10, W9CTW 3, W9AEL 9, W9HEN 9, W9HIE 5, W9HZV 2, W9EGU 1, W9GZO 1, W9IAK 3.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — The N. Dak. gang is becoming "crystal conscious."

W9LHC, W9AOX, W9EVQ, W9BVF, and W9DGS participated in International Tests. W9CRL and W9EGI are having QSO difficulties. W9DFF's YL, W9LFP, is on the air now. W9DOY is Local A.A.R.S. Controller at Fargo. W9FMC reports new station, W9ENF, at CRETE. W9HJC, W9DGS, and W9DQH keep several schedules. W9DGS and W9CBM, are still in the crystal business. W9BVF manages to spare time from the Differential Equations to keep schedules with several A.A.R.S. W9DYA is taking care of the 1750 kc. A.A.R.S. work.

Traffic: W9DGS 256, W9HJC 175, W9BVF 124, W9CRL 55, W9EGI 26, W9DQH 15, W9DYA 9, W9DOY 8, W9DFF 6, W9EVQ 5, W9DM 5.

DELTA DIVISION

MISSISSIPPI — SCM, William G. Bodker, W5AZV — W5VJ has just completed his 3.5-mc. crystal rig. W5ANX is standing by for Army Net schedules. W5APR's mother made an incubator of his radio cabinet and now baby chicks are R-9 all over the shack. W5BUI reports commercial operating on the Mississippi River not all it's "washed up to be." W5BUI and W5AZV are Mississippi trunk line stations. Where are all your reports, fellows?

Traffic: W5BUI 88, W5ANX 12, W5AZV 75, W5APR 370, W5VJ 8.

ARKANSAS — SCM, Henry E. Vette, W5ABI — W5BMI has been appointed Route Manager, and as usual leads the state in traffic handling. W5IQ edits YE ARKANSAS NERTZER, an A.A. sheet. W5FM reports traffic. W5LK lost his antenna in a recent storm. W5BPE says he has sold his entire outfit. W5BRI, W5JK and W5BDR have been appointed ORS. W5AKB worked a VK and an LU. W5ARP handled traffic for the Governor. W5AGB is QRL school. W5JK at DeQueen is new ORS. W5AYH is a new station in Hot Springs. W5BED uses a '52 in TNT. W5UI uses 2 type '10 tubes in push-pull. W5HN is on with both 'phone and CW. W5BDW reports QRM from a BCL set. W5BUX has a regular schedule with W5BDR. W5BKB keeps regular schedules on AA nights. W5SI is the State Net Control station for the Army-Amateur Net. W5ABI gets out well with a type '10 tube. Let's have a report from every active station in the state next month.

Traffic: W5BMI 616, W5ABI 164, W5BED 150, W5IQ 113, W5BDR 26, W5JK 19, W5BUX 15, W5BRI 14, W5BDW 16, W5FM 10, W5ARP 8, W5UI 2.

TENNESSEE — SCM, James B. Witt, W4SP — W4HA says it was too cold to get up during DX tests. W4AHD is rebuilding. W4OI is replacing his 212D with a '04A. W4GX has gone to New Orleans to take 2nd class Commercial Test. W4RO has moved. W4SP is building new AC receiver. Trunk line "E" extending from east to west coast crosses Tennessee, and we would like to have stations located in Memphis, Nashville and Knoxville. W4AFM at Kingsport is already our eastern link in Tennessee. Anyone interested get in touch with the SCM.

Traffic: W4GX 194, W4AFM 178, W4OI 160, W4HA 146, W4RO 22, W4EX 20, W4APA 16, W4SP 1.

LOUISIANA — SCM, Frank Watts, W5WF — W5ACA sends in a very fine report each month, although he is in Brooklyn, N. Y. W5ACV is getting a 50-watt sock from his '10 MOPA. W5BS will have his 50 going full blast soon. W5KE works nearly everything he hears. W5CW is a new station in Shreveport. W5ASJ and W5BYQ have signed up for CMTC. W5BYY has a new 211. W5BJA is talking about a 'phone rig. W5KC participated in the International Goodwill Tests. W5BPL reports weather rotten there in NOLA. W5HR has nothing to say this month. W5BPN is still pounding away contentedly. W5AIB has an SW3. W5AYZ is getting along fine with her crystal rig. W5RR-W5W1 reports lots of DX. W5AQC is a new station in Minden. W5BZR reports contacting a ship off coast of India. W5APA is on with a pair of '52s in PP. W5AYA has moved to W5WF's side of town. W5WF is ready to hit the trail for more traffic. The KC Kid (WJ) is going to apply for 'phone license soon. Let's have another good crop of reporters next month. We can have one of the best sections in the country if you will only report each month. Send your reports to 1716 Park Avenue, Shreveport, La.

Traffic: W5WF 921, W5BYQ 28, W5AYZ 28, W5AIB 17, W5BPN 14, W5BJA 13, W5BPL 6, W5KC 4.

HUDSON DIVISION

EASTERN NEW YORK — SCM, R. E. Haight, W2LU — W2BZZ and W2UL both make the BPL. W2BKM almost reaches BPL. W2BLU contacted W2ZZAT at Tortugas Lighthouse and delivered three rush messages. W2BJA QRL lining up Trunk Line schedules. W2CFU replaced '10 in 2nd stage with 50-watt. W2DEL reports nice total. W2ANV and W2BZW report traffic. W2ATM is due for ORS appointment. W2COQ, Ex W1BFT, ORS, joins our Section. W2CJP contacted three Europeans in two hours. W2BUN is new ORS. W2CJS is going to give Pentode oscillator a trial. W2CAZ reports fine DX on 7 mc. W2BTW got through to West Coast six times in five days. W2DJS can be heard most any afternoon. W2CL reports via radio. W2AEQ prefers a two-tube battery receiver to a a.c. set. W2AGZ, W2COY, W2BCO and W2CEO are proud owners of 50-watters. W2DAV is having trouble getting Push-Pull transmitter to perk. W2BJX has portable W2ZZBG. W2BCQ says W2BJJ is doing some experimenting, also W2DQD, W2DSH and W2BYF expect to have 150-watt C.C. perking soon. W2BLL is new station in Albany. W2CTC keeps his signals hot down with the VKs every day. W2AVS is QRL studying electrical and radio engineering. W2YO was heard in England during DX tests. The Hudson Division Traffic Net is in full swing, and the Eastern N. Y. Section is out to give its fullest support with the following stations: W2BJA, W2BZZ, W2DEL, W2BKM, W2LU, W2CFU and W2UL. Any stations wishing to join with them get in touch with the SCM. Congratulations on our record breaking month. Let's keep on the climb, and the Banner may be ours yet.

Traffic: W2BZZ 989, W2UL 515, W2LU 410, W2BKM 338, W2BLU 230, W2BJA 158, W2CFU 155, W2DEL 71, W2ANV 36, W2ATM 28, W2COQ 24, W2CJP 22, W2BUN 21, W2CJS 19, W2BCQ 20, W2CAZ 19, W2BTW 16, W2CL 16, W2ACB 15, W2BKW 15, W2BZW 15, W2CTC 15, W2CGO 15, W2BWF 13, W2KW 11, W2OP 9, W2ZZBF 4, W2CGT 4, W2BJX 2, W2AVS 11.

NEW YORK CITY AND LONG ISLAND — SCM, V. T. Kenney, W2BGO — The first N. Y. C. and L. I. Section ORS Contest didn't seem to go over so big. W2LB and W2BGO scoring only two points each and W2BDN reporting no contact. We will try it again, the date being Sunday, May 1st, and if we cannot get more reports we'll just drop the idea. New appointments are W2AOJ as OO and OBS, and W2YH as OBS. W2OT has organized two Long Island trunk lines, one on 7 and the other on 3.5 mc.: W2AKL of Long Beach, W2DHI of Staten Island, and W2BHL, who was known as W6AXI. W2OT is anxious to hear from any L. I. ham interested in traffic work with a view to recruiting them for a L. I. trunk line station. Manhattan — W2BHL can be heard on 7160 kc. W2AOY is looking for QSOs on 56 mc. W2AWT tells us he's with the A. E. S. (Army Emblem System). Bronx — W2CWP was QRL with a QRR from Elmira, N. Y. W2CYX just built an MOPA. W2CBB is forced to QRT schedules. W2AJJ is the station at De Witt Clinton H. S. W2LW is working with the new Hudson Division Traffic Net. Brooklyn and Queens — W2ADQ makes the BPL with 191 deliveries. W2AIQ is close behind with a good total, and with W2VA he's having some 56-mc. fun. W2DBQ is an A.A.R.S. now. W2BJ is knocking out DX records. W2DKB has a '45 PP job with '52 amplifier. W2AVP-NO gives us the dope that W2AKL and W2AVP will take traffic on 7 mc., while W2CLC, W2WT, W2BWQ and W2NO take N. Y. C. and Brooklyn stuff. Two brothers keep W2DLO going. W2IS was at WHOM; as well as W2BOY and W2AEC. W2AST likes his one-quarter kilo 'phone. W2AOW is having trouble with his crystal rig. W2DMI is after a commercial ticket. W2CRB got his MOPA going. W2AEX is using a new AC receiver. W2TO designed the new outfit at W2AC. W2RK has a new '52 MOPA. W2OT has lined up W2AIQ, W2AGL, W2AOJ, W2CE and W2BGF on the 3.5-mc. T.L., and W2AOI, W2DHN, W2WX, W2CSS and W2BET on the 7-mc. T.L. W2AUS puts 800 volts on a crystal. W2LR has a '52 in the final stage. W2BDN, W2COI, and W2BDR all sound like

CC. W2BST goes after and QSOs DX. W2OB slows up 'cause of business QRM. W2KG got the '61s working O.K. W2DLY is a newcomer in Lynbrook. W2EC will soon be an A.A.R.S. W2NL, L. I.'s only active YL, has left her brother W2BST in the east to acquire a W6 call. W2DQK tells us that W2BCM, W2DPU, W2DRB, W2CLD, W2DRG and himself are members of the Rockaway Amateur Radio Club. W2AOJ our new L. I. OBS, can be heard on 1.75, 3.5, 7, and 14 mc. with the OBS. Staten Island — W2WP, the YL RM of S. I., comes through with enough deliveries to make the BPL. W2DHK will soon adorn his shack with a nice blue ORS certificate.

Traffic: Manhattan — W2BHL 9. Bronx — W2BGO 74, W2CWP 70, W2CYX 53, W2CBB 52, W2AJJ 11. Brooklyn & Queens — W2ADQ 355, W2AIQ 240, W2DBQ 66, W2BJ 32, W2PF 23, W2AZV 21, W2BDN 17, W2LB 16, W2BEV 8, W2DNQ 2. Long Island — W2AVP 76, W2AUS 12, W2DQK 8, W2AKL 6, W2OT 16. Staten Island — W2WP 334, W2DHK 5.

NORTHERN NEW JERSEY — SCM, A. G. Wester, Jr., W2WR — Traffic honors and the prize of 50 QSL cards donated by W2AEY go to W2AGO. W2CWK reports a new station, W2BRV in Highland Park. W2CJX stayed off during the contests. W2BBU uses remote control. W2DY keeps a schedule with W1AJW. W2CNL is treasurer of the new Palisades Wireless Club. W2BKE has been quarantined for the past month. W2CFY dropped in a list of prospective ORS. W2CEX uses 500 watts in final stage. W2DHU is bothered with local QRM. W2CLX expects to concentrate on schedules. W2DJE sends in his initial report. W2DPB would like to become an ORS. W2ABT is looking for a new location. W2CPR is out for DX. W2DQE hangs out on 7 mc. W2TX is a commercial op. W2AZL reports a new radio club in Union, the Central Jersey Radio Club. W2BBR has W2AUQ as an assistant teacher. W2AUT says job is too unreliable. W2ACL is off due to sickness. W2AKC was injured in a motorcycle accident. W2DIU's traffic dropped due to rebuilding. W2BFY, our RM, keeps traffic stepping. W2CIZ is operating his portable, W2ZZW in Newark.

Traffic: W2CWK 27, W2CJX 12, W2BBU 93, W2DVL 12, W2CNL 25, W2BPY 71, W2AGO 157, W2CFY 1, W2CEX 1, W2DHU 17, W2DJE 11, W2ABT 1, W2DQE 48, W2DMU 12, W2DIU 68, W2TX 10, W2ZZW 7.

MIDWEST DIVISION

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9BNT heads the list this month. W9DHA turns in a good report. W9DMY is now AA SNCS for Nebraska. W9FUW is champion traffic 'phone station of the U. S. A. W9FAM had a lot of trouble; tower blew down; blew recto-bulb; had a shot of Flu, including the whole family; off the air three weeks. W9EHW reports good total. W9EYE is pounding brass. W9DXY is helping put Omaha back on the map. W9DGL is still working for more improvements. W9EWO says committee work on State Convention worked him short on traffic. W9BBS says depression has out him short on the R.R. W9EEV, why not tell us about your trip, OM? W9BQR is still keeping Falls City on the map. W9DFR says job and school QRMIing his amateur activities. W9DI has gone back to school in Lincoln. W9HTU says International Good Will Tests not so hot account too many not observing quiet hours. To W9FGS, W9APJ and W9AZT: Thanks for reports, OMs. Come again.

Traffic: W9BNT 552, W9DHA 212, W9DMY 192, W9FAM 106, W9FUW 111, W9EHW 85, W9EYE 76, W9DXY 71, W9DGL 33, W9EWO 23, W9BBS 10, W9EEV 6, W9BQR 4, W9DFR 2, W9FGS 41, W9APJ 5, W9HTU 18, W9AZT 7.

IOWA — SCM, George D. Hansen, W9FFD — One of the new Trunk Line stations is first this time, W9GWT. W9DNZ reports W9DPO QRX station renewal. W9BPG is installing crystal. W9FEB's traffic circuit is working wonders. W9ACL says hams in his burg continue to grow. W9FFD keeps busy with 56 mc., A.A.R.S., U.S.N.R., and gas alley. W9GFQ is the Alternate A.A.R.S. 'Phone station. W9ABE requests ORS application. W9EIV QRL moving. W9EJQ is confined to his bed and has schedules with the doctor. Here is hoping for a speedy recovery, OM. W9IO

has only one op. on the job now. W9BJP QRL the tests. W9ECB is still on low-power 'phone. W9DMX, another 'phone, is busy with A.A.R.S. W9CWG was QRX storm traffic in PA. W9EFU finally got the license back. W9ERY's antenna down due to March winds. W9CFB is active on 14 mc. W9DFZ, another Trunk station, was QRL Tests. W9DJX reports new ham, W9DJY, his town. W9EOE says transmitter perking FB. W9FIB reports break-in OK. W9ANO lands a few licks in between tests. W9FYC built long-wave receiver. W9FZO is trying to get MOPA on 14 mc. W9GOQ reports a few due to A.A.R.S. W9AHX gets report in just in time. W9EHX reports '52 on 14 and 7 mc. and crystal on 3.5 mc. W9DEA reports a few. W9BWF finally got it neutralized. W9AIIQ has been QRL between DX and 56 mc. W9DFK is also in on 56 mc. W9AWY reports too much work. Stay by the ship, fellows, and let's bring her in heavily loaded next time.

Traffic: W9GWT 230, W9DNZ 110, W9BPG 109, W9FEB 93, W9ACL 90, W9FFD 83, W9GFQ 81, W9ABE 76, W9EIV 63, W9EJO 60, W9IO 49, W9BJP 45, W9ECB 45, W9DMX 42, W9CWG 40, W9EFU 35, W9ERY 42, W9CFB 21, W9DFZ 21, W9DJX 20, W9EOE 18, W9FIB 18, W9ANO 17, W9FYC 16, W9FZO 12, W9GOQ 10, W9AHX 10, W9EHX 6, W9DEA 3, W9BWF 2, W9AHQ 1.

KANSAS — SCM, J. H. Amis, W9CET — W9NI leads the state in traffic. W9CFN has completed rebuilding. W9DSI is building 56-mc 'phone. W9FEG expects to have 14- and 3.5-mc. 'phone soon. Ex9DUG is back with the call W9BO. W9FMX is rebuilding. W9HWW handles a lot of heavy traffic. W9AWP was a visitor at W9FRC. W9CKV is all hopped up about 56 mc. W9GCL reports a new station, W9IEW in Leavenworth. W9FEL is on 1750 kc. W9CET has replaced his '10s with '47s in the low power stages of his crystal. W9JA is on with MOPA. W9DFY is going to Radio school at Fairfax in K. C. The following, W9ATR, W9DQJ, W9CXS, W9GFM, W9IBL and W9EVM of Emporia are all grinding crystals. W9GK is active at Modoc. W9BEB is quite thrilled over a card from ZL. W9FLG is keeping the RM job humming. W9HL works 7, 3.5 and 1.75 mc. W9BGL is on week-ends. W9DEB keeps an even dozen schedules. W9ESL had a '66 go west. W9AEF is on 14 mc. W9DOV has a schedule with W9FRC. W9DVQ is having trouble with BCL QRM. ExW9DSD is back on the air with call W9CSE after ten years' absence. W9GDH worked hard on the DX tests. The following new officers have been elected in the Sunflower Radio Club: Pres., W9BSK; Vice-Pres., W9AWB; Sec'y-Treas., W9FMX. The Kansas State Radio Club sponsored a hamfest in connection with the Engineers open house at the college in Manhattan, March 18th and 19th. About 70 hams were in attendance. Every one had a wonderful time and left with the hope that we may again get together in Manhattan next year. Plans are under way for the Midwest Division Convention to be held at Topeka in September. The KVRC meets the second and fourth Wednesdays, Topeka Chamber of Commerce, 8:00 p.m. Visitors always welcome.

Traffic: W9FLG 158, W9FEL 28, W9CFN 24, W9FMX 15, W9HWW 117, W9AWP 8, W9CET 45, W9CKV 56, W9FXY 64, W9GCL 8, W9NI 210, W9NL 81, W9JA 31, W9ATR 25, W9DQJ 8, W9CXS 8, W9GFM 7, W9IBL 4, W9GK 12, W9BEB 8, W9HL 10, W9FRC 122, W9EHT 22, W9DEB 177, W9ESL 10, W9AEF 6, W9DOV 73, W9DVQ 127, W9ERR 17, W9GDH 18, W9BGL 45.

NEW ENGLAND DIVISION

VERMONT — SCM, Roy L. Gale, W1BD — W1ATF continues to hold the traffic standard high. W1BNS says the BCLs don't appreciate his key-clicks. W1DAJ is experimenting with key filters. W1AXN and W1CBW are building new A.C. receivers. W1CBE says his "double M special" gets out FB. Was it, OM? W1AZV also gets beyond the back yard now. W1CGX is giving 14 mc. a try. W1BZD has a crystal on 3600 kc. W1AXN and W1BDX have been on the sick list. W1BHR has discovered that the ultra-high frequencies are tough on tubes! W1CGV brothers will be with us soon. W1BCK reports everything quiet. W1AHH works army schedules at W1BZD's station. W1BD has a crystal on 1922 kc. W1BMS is QRL college. The regu-

lar monthly QSO parties are officially cancelled because of poor attendance.

Traffic: WIATF 149, WIBNS 94, WIAXN 46, WICGV 35, WIBD 26, WICBE 24, WICGX 20, WICBW 17, WIBZD 3, WIDAJ 2.

MAINE—SCM, John W. Singleton, W1CDX—WICFG leads the list this month. The SCM drags in next. W1BEU is looking for a new job. W1EUF is mourning the loss of a 211D. W1BUIO is experimenting with new style R.F. choke. W1BWS worked some DX. W1CEQ is rearranging his schedules. W1CPT is working everything he can hear. W1APX is having trouble with the BCLs. W1CRP is a new ORS. W1AQW blew a '10. W1BWB has a new tube. W1ABQ is busy as commander Unit 1, U.S.N.R. W1BFA took part in the Goodwill Tests. W1DPR, a new ham in Portland, recently did some very fine emergency work when he picked up a "QRR" from W3AAJ, who was QSP for W9DZM; W1DPR copied the message and relayed promptly to its destination, Springfield, Ill. W1DIN also took part in some emergency relay work during the month. W1IR is busy. W1BAE reports this month. W1AXJ reports a new ham at Belfast. W1DVL. W1AFA has some big tubes. W1BWI reports activity at W1DJE. W1BTC, W1DEQ, W1BYP, W1RU, W1AWR, W1BVF and W1DEB all report for the first time. Make it a regular habit, OMs.

Traffic: W1CFG 388, W1CDX 311, W1B0F 287, W1ATO 223, W1BEZ 157, W1CIP 124, W1BLI 78, W1BOZ 78, W1BEU 60, W1EF 53, W1BUIO 51, W1BWS 47, W1CEQ 43, W1CPT 36, W1BTC 34, W1APX 29, W1CRP 26, W1AQW 25, W1BWB 23, W1AWR 18, W1ABQ 17, W1BFA 17, W1DPR 7, W1IR 4, W1BAE 4, W1AGL 4, W1RU 6, W1BYP 6, W1DEQ 6, W1BVF 3, W1DEB 2, W1AXJ 2, W1AFA 2, W1BWI 2.

NEW HAMPSHIRE—SCM, V. W. Hodge, WIATJ—W1UN has been busy organizing a Naval Reserve Unit. W1CCM is coaching a new ham. W1AUU is using a new 'phone rig. W1BAB reports lots of QRM. W1APK is rebuilding for 3600. W1BXU is putting a 211 in final stage. W1DLQ is going to Belfast, Maine. W1AVL and W1AVJ have the rebuilding bug. W1AWU says traffic is fine. W1HG is drilling every week with the Reserve. W1BVJ drills with W1HG. W1IP is to be congratulated again on his fine traffic total! W1AXL is in the market for some tubes. W1DMI is ready for traffic. W1AEF threatens to come on with a '52. W1CVK sends a newsy letter. W1NZ is back on all bands. W1YB has placed a message box in a local drug store to collect traffic. The SCM regrets to report the death of W1MS of Manchester, one of our old-time amateurs. W1CMT is building an MOPA. W1CGP is pounding out a few. W1DQU is trying a new crystal rig. W1BAC is using 2 new '10s. W1BST has been heard trying 'phone.

Traffic: W1IP 444, W1UN 293, W1BVJ 84, W1HG 65, W1YB 403, W1CVK 14, W1BAB 17, W1CCM 16, W1APK 9, W1BXU 8, W1AXL 14, W1DMI 4, W1AUU 1.

CONNECTICUT—SCM, Fred A. Ellis, Jr., W1CTI—"RP," W1MK, says he had a good time in the DX tests even if traffic did fall off. Commodore Hebert, W1ES, says yachting takes a lot of his time, but schedules take care of a big bunch of traffic. W1AMG was off some due to blown filter and '66. W1BVW is still keeping up the reputation of the Army. W1NE has a new crystal transmitter. W1ADW keeps Danbury on the map. W1VB is thinking of increasing power. W1AOK says DX tests busted up his traffic. W1HD is rebuilding transmitter. W1AFB says portable W9HP is in Hartford and is the loudest W9 ever heard or worked. Hi! W1CIG, Taft School Radio Club, is off for the spring vacation. W1BNB had to QTA his evening schedules due to too much QRM. W1BEO spent most of his timesending "TEST." W1CTI fixed up some BCL QRM with wave traps. W1QV was visited by W1LT. W1AVB was sick for three weeks. W1AQF has moved to West Hartford. W1ASP spent most of his time on 7005 kc. for the DX tests. W1APJ reported direct to HQs. W1APZ has a brand-new frequency meter. W1DCM is building a new MOPA. W1CNU is working all kinds of DX on 14 mc. W1AZG visited W1YU. W1AXB reports direct by radio to the SCM. The Norwich Amateur Radio Club with 23 members elected the following officers: Pres., W1DET; Vice-Pres., W1DRW; Secy., S. K. Ander-

son; Treas., W1CJN. The Amateur Radio Club of Middlesex County meets at the home of W1BGO in Middletown. A club member station is on the air every Sunday at 11 a.m. sending code practice in the 3500-kc. band. W1AZK says he has too many switches to throw on his crystal outfit. The Connecticut Brasspounders Association, W1CBA, has decided in favor of crystals and a new transmitter is being built. Now that the DX tests are over let's get the traffic moving again. Sunday morning is a good time to QSO the local gang. Listen for QST from W1CJD at 9 a.m.

Traffic: W1BD1 405, W1CJD 329, W1YU 268, W1MK 237, W1ES 161, W1AMG 157, W1BVW 73, W1ADW 66, W1AOK 56, W1HD 43, W1AFB 40, W1BFW 22, W1AJB 21, W1CIG 20, W1BNB 18, W1BEO 16, W1CTI 15, W1QV 13, W1AVB 9, W1BJJ 7, W1BGJ 7, W1APW 6, W1CUH 6, W1TD 4, W1AXB 4, W1BAI 4, W1AQF 3, W1ASP 3, W1APZ 2, W1DCM 1, W1APJ 51.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullen, W1ASI—The young squeaker that has been spitting its traffic from W1ASI is doomed to die before the onslaught of high power. Despite the BCL QRM W1ABG is pouring the smoke to the atmosphere. W1WU has gone to 14,000 kc. for a change. W1KH is headed the other way and expects to stop off at 1750 kc. W1WV landed his 53rd country during the International Tests. W1AGA is comfortably situated in the 1750-kc. band. W1BZQ says he doesn't get on much. W1LM leads the Section in traffic! FB. W1ACH has moved to a new location. W1CHR reports an inactive month due to school QRM. W1ATX is working on 14 mc. W1CQN is assisting W1CHR in staying off the air. Hi.

Traffic: W1LM 334, W1ASF 314, W1ABG 274, W1WV 256, W1BGW 81, W1ASI 72, W1ABF 67, W1KH 65, W1BEO 62, W1BEF 62, W1ACH 60, W1NC 37, W1BFR 36, W1BJM 32, W1AAL 31, W1VS 30, W1CRO 26, W1CAF 22, W1BZQ 22, W1ATX 19, W1AGA 18, W1WU 17, W1BZY 13, W1CUY 13, W1CFU 1, W1CQN 5, W1AK 6, W1CHR 6.

WESTERN MASSACHUSETTS—SCM, Leo R. Pelouin, W1JV—Western Massachusetts is holding its own in traffic totals nowadays, and much credit is due both the old-timers and newly appointed Official Relay Stations. Let's all get together and do our best to originate only good traffic and in that way help to keep our section at the high point of rating it now enjoys. W1AZW takes the honors in traffic this month; at last W1ASY has been beaten into second place. W1NS turns in his usual good total. W1BNI is moving to new QRA. W1BXF claims to be the lowest power O.B.S. in New England. W1AIF reports unusually good DX on 14 mc. W1ZB was QRL business in Washington. W1DHB, Worcester Tech. ham, reports for first time. W1BSJ has been busy on Club transmitter.

Traffic: W1AZW 171, W1ASY 151, W1NS 103, W1BNI 99, W1BXF 64, W1AIF 61, W1BPN 49, W1AUQ 43, W1BVP 38, W1AQM 32, W1DHB 31, W1AFI 29, W1NQ 21, W1CNS 19, W1ARH 17, W1BVR 14, W1APL 10, W1BQ 5, W1BZY 4, W1OF 2.

RHODE ISLAND—SCM, N. H. Miller, W1AWE—W1AWE is building a new transmitter. W1MO resigns his ORS. W1CAB is having real fun with the Navy drills. W1ATM has been pounding out good signals on 3.5 mc. W1BLJ and W1GV are on with new outfits. W1BMU QRMs the neighborhood with his 1750-kc. 'phone. W1FU is experimenting with a motor generator. W1EX is having fairly good luck with 56 mc. W1GR is going strong. W1BES is perking out OK. W1BML is heard drilling with the Navy. W1AQ has been making plans for the New England Convention. The old Providence Radio Association has started up again after about three years of inactivity. Any prospective members should get in touch with W1CAB, 1711 Elmwood Ave., Providence, R. I. W1BOY is working lots of DX. W1BTP is hoping to meet a crowd of N. E. Federated High Schools radio clubs at the Convention. W1ASZ is building a new portable transmitter. W1BLV is going strong on 3.5 mc. W1AWE, your SCM, would like to hear from some of the newer hams. Please send a report on the 16th of each month.

Traffic: W1BTP 80, W1ASZ 36, W1CAB 25, W1ATM 11, W1AWE 7, W1BOY 6.

NORTHWESTERN DIVISION

OREGON—SCM, Dr. Dolph I. Craig, W7ALO—W7AWH leads in traffic. W7WR turns in his usual good total. W7AJX reports for W7AHJ. W7AZJ injured his hand badly. W7ED is going to be working too steadily next few months for much radio. W7SY now has PP '10s. Another man with a brand new '10 is W7ZD. W7PE, our 00, sent in a long list of stations transmitting during silent hours in DX tests. W7AYN now has MOPA. W7AIG joined the Army Net. W7AMF reports as usual. W7AUL sends in his first report. W7AGX writes a nice card. W7QY has been a sailor, going to Seattle on an Eagle boat. W7AEK has worked Hawaii with his low-powered phone. W7BOO has '45s TNT. W7AYV sent a big total, due to a few good schedules. W7MQ likes the A.A.R.S. W7AEM is about due for ORS. W7HD is on 14 mc. most of the time. W7UK sends in a nice report. W7AZK is busy on convention work. W7EN has his crystal job going great. W7BOG has '10s PP. W7AVT has had case of Y.Litia. W7BLN sent in news of Coos Bay Club. New officers of club are: Earl Pickett, W7BCZ, Pres.; Dick Hall, W7AVT, Vice-Pres.; George Worthley, W7BLN, Sec'y-Treas. W7AHJ won club QSL contest. W7APE is going well as OBS. W7BNE is getting out fine. W7ALO visited Portland and Eugene Radio Clubs. To W7AUL, 7UK, W7AGX, W7HD, W7BOO, W7AZK, W7BOG and W7AIG all reporting for the first time: Thanks, fellows, and come again. A checker tournament for the state championship has been suggested. Do any of you clubs have a man you'd back with your shirt? If so, send in the challenge and we will see if we can find an opponent.

Traffic: W7ACH 242, W7ED 168, W7AEM 154, W7AUL 125, W7BFO 124, W7AYV 121, W7WR 102, W7QY 54, W7AMF 53, W7AZK 48, W7PE 20, W7UK 18, W7ALO 19, W7BOG 17, W7SY 14, W7AVT 10, W7AIG 10, W7AHJ 9, W7AYN 8, W7BOO 10, W7EN 7, W7ZD 3, W7MQ 6, W7HD 1.

MONTANA—SCM, O. W. Viers, W7AAT—W7BHB is our newest ORS appointee. W7BW has applied for ORS. W7AHF wants appointment as OBS. W7AHN is another prospective ORS. How about the rest of the gang? W7HP burned up a bearing in his MG. W7CU is a live wire traffic man. W7AHF devotes 90% of his operating time to traffic. W7ASB sends in his usual report. W7BBS moved for the second time. W7BGC is DNCS for the A.A.R.S. W7AFS worked J, P, Y, LU, VK, ZL, X, K6, all W and VE. W7AMK is now in both the U.S.N.R. and A.A.R.S. W7BI reports the death of W7BGT of Dillon. W7BFX has a nifty wallop on 7 mc. W7AAT has a new screen grid receiver. W7ASQ has been on the sick list.

Traffic: W7CU 26, W7AAT 26, W7ASB 20, W7BGC 14, W7BHB 8, W7HP 2, W7HF 2, W7BBS 1, W7BW 24, W7AMK 19, W7AFS 3, W7ASQ 6.

WASHINGTON—SCM, John P. Gruble, W7RT—Howdy, gang! The SCM is sick. W7BB leads off with high place, making BPL on deliveries together with W7TX. Next we have W7KZ. W7ACS is awaiting license renewal. W7HS worked about twenty VKs and ZLs. W7AGE to try 14 mc. soon. W7BCV sends nice report on activity in his section. W7VG may be seen regularly at Seattle Radio Club. This Club, by the way, meets each Tuesday evening at the Moose Lodge, Seattle. Everyone welcome. W7KQ sends in report by radio. W7AHO reports for the Spokane boys. W7ANF is to be appointed OBS for this region. W7BHH has a zepp that actually works well. W7BUU is busy with printing business. W7BAO is member Navy Net. W7JA has new remote control arrangement. W7BXL is to be on air with good power soon. The following fellows keep W7GN, Roosevelt High School, on the air: W7AEA, W7AUI, W7BRT, W7BTW, W7AQI, W7EB, W7UX, W7AHC, and the W7LD brothers. W7WY has been notified of winning the 1931 Navy Net trophy. Congrats, OM. W7ADS handles traffic from K6 to Seattle. W7QI and his total of nine missed the BPL. W7BJV is still working with antennas. Our director, W7BG, reports having several Seattle visitors. W7OI could get plenty traffic if he could find an outlet for it to the Orient. Nice report from W7ACB. First report from W7AQB as new ORS. W7SL clicks the

K6's on 'phone. W7JF heard G5MG on 14 mc. one evening. W7ARQ is busy studying at Y school. W7BBP's low power 'phone can be heard FB. W7AHQ added another '10 to his rig, making it push-pull. Old W7AKJ of Seattle returns after many months of commercial work at sea. W7WU and W7JJ are back in Kent. Visitors to W7DF must use canoes, because of recent floods near Auburn. HI. W7HC is now at Seattle. W7BIW submits excellent dope on the Pasco region. W7BFG is heard over W7YH occasionally. W7YH, which is the amateur station at WSC is also manned by W7AFX, W7AGB, and W7AOB. W7BQH is interested in MOPA. We hope W7VO, W7BWC, and W7BVR of Pasco will soon be on the air. W7EX boasts 300-watt 'phone. DX is good for W7BGE. W7EW's first report is welcomed. W7BBL reports schedule with Portland on 'phone. W7BBL plans to begin 56-mc. 'phone experimenting after March 20th. Portable W7BXX is to be used. For further dope, address communications to W7BBL, J. M. Black, 7028 Palatine, Seattle. W7KO is Official Observer, so watch that off-frequency operation! W7UX, formerly of Portland, is now in Seattle. The Renton Amateur Club has a lively membership, and use the club call, W7BUV. A good DC sig and an SW5 do the work at W7BKF, Olympia's YL op, W7AOM, should be on the air by this time. A dandy time was had by all who attended the ham banquet at Leak's Roadhouse, on the Seattle-Tacoma Highway. The event took place on Saturday, February 27th, with about seventy persons in attendance. Numerous prizes were given away, the entertainment was excellent, and the friendly get-together did much toward stirring and reviving old spirit. COMING! Yakima Convention!

Traffic: W7BB 492, W7KZ 197, W7TX 194, W7WY 113, W7QE 108, W7BCV 120, W7ACB 56, W7GN 54, W7HS 51, W7SL 42, W7AYO 40, W7KQ 33, W7APR 27, W7BCI 20, W7AGV 18, W7ANE 18, W7BHH 17, W7AMY 15, W7AHQ 15, W7BTX 15, W7AQB 15, W7BCS 12, W7BHH 12, W7ADS 11, W7AUI 11, W7BQH 11, W7KO 11, W7NV 11, W7BBL 10, W7IC 10, W7JF 9, W7BSX 9, W7QI 9, W7BUV 7, W7APS 7, W7BHP 7, W7AFC 6, W7BNI 6, W7BBD 6, W7GW 5, W7RT 4, W7AVM 4, W7ABX 4, W7EW 3, W7AEX 3, W7AGE 3, W7AGP 2, W7BUX 2, W7BRS 2, W7BID 2, W7AUC 2, W7AHO 1, W7BRI 1, W7A 1, W7BUQ 1, W7BLG 1.

IDAHO—SCM, Oscar E. Johnson, W7AKZ—W7AYH reports WIZZA snowed in at Moose, Wyoming. W7ATN blew a filter condenser. W7HK applies for ORS. W7BWX is new ham in Sandpoint. W7AT says the depression has arrested the development of his new transmitter. Dame rumor has told us that W7AFN has become united in Holy Matrimony—is that correct, Kenny? W7ACO is busy helping "hams not yet" get started. W7BKA reports the High School in Burley has organized a radio club. W7AJQ is working nice DX on 14 mc. Things are rather quiet in Elk River according to W7AFT. One ham who behaved during the International Tests was W7AVP. W7KG is now on with crystal. W7BUN is new man in Boise. W7BEO is rather quiet due to lack of power. W7QD is still plugging along. Government monitor station in Portland keeps W7ALW from doing much hamming. W7AKZ blew all his receiver tubes.

Traffic: W7KG 16, W7AVP 9, W7AFT 7, W7BKA 14, W7ALY 23, W7AYH 15, W7AKZ 10, W7AJQ 22, W7ACO 6.

ALASKA—SCM, Richard J. Fox, K7PQ—Thanks for reports, fellows. Alaska will soon be on the map. The W7TX-K7FF-K7BLI circuit is functioning again. K7BLI got his station back on the air after it was buried for ten days in a snow slide. He used K7EZ transmitter while digging. Juneau has an up and coming Amateur Short Wave Club. K7ABQ is handling all volcano eruption news by dispatch, routing all news of the Father Hubbard Expedition via K7BND. K7AFF handles Pacific Airways weather report from K7ALT and K7BND daily. K7PQ has a second op now—his YF. K7BQE is a new ham at Cape Spencer. K7BMY is rebuilding. K7ARL and K7PQ are the only Army Amateur Net stations in Alaska.

Traffic: K7BLI 34, K7EZ 147, K7PQ 110, K7BND 158, K7ABQ 6, K7ATF 35.

PACIFIC DIVISION

SAN JOAQUIN VALLEY — SCM, E. J. Beall, W6BXY — The SCM had fifteen days' active duty at radio San Francisco NPG. Who said interest was on the decrease? Just count the number of reporting stations this month. W6DQV just completed his crystal job. W6CXT turned in a good report. W6BIP reported on activity around Fresno. W6EFP just completed his MOPA. W6EJE and W6EOM are busy with school work. W6AHO maintains schedules with W6BXY on 1800 kcs. W6KU turned in a long list of ZL, VS, and Js worked with a pair of '10s. W6FFU is on schedules with W6BXY, AME and 7BJG, and leads in traffic. Lynch, the M.A.R.C. Secretary, reports eight new members and three new QRAs. W6FNA, W6FNI and W6FNO. W6CLP succeeded in working Great Britain along with 16 other countries. W6AME ran up a total of 163. W6CJK, the Tulare HI School, is on the air. The club consists of 20 members, with W6AEQ as President. W6BIJ has replaced W6EMI as operator at WPDA. W6CCW has a '52 rig on 1750 kc. W6ASV is on 56 mc. W6BJC joined the U.S.N.R. W6SF turned in a FB report on the Stockton gang. W6DZN, W6BBC, W6DXL, W6BFH and W6BXX are ALL BUILDING. W6CUL worked Belgium on 14 mc. W6EXH has traffic schedule with W6BLE in Utah.

Traffic: W6DQV 6, W6CXT 80, W6BIP 105, W6AHO 51, W6KU 10, W6FFU 187, W6CLP 5, W6AME 163, W6EPQ 4, W6FFP 74, W6EXH 33, W6DZN 10, W6BTF 3, W6BFH 10, W6EZT 4, W6SF 8, W6BBC 12, W6BRP 12, W6BXY 100.

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — W6AMM and W6YG had a neck and neck race this month, with W6YG nosing out the veteran PI Contact station by 10 messages. W6EL is new comer to transpacific communication, having shovled 150 across during the month. W6YL is keeping the hook clear with several good operators. W6NJ is on 3895 kc. twice weekly. W6HM has two schedules with PI and also one with KEGE. W6YU entered the DX tests. W6FBW is new Secretary of S.C.C.-A.R.A. W6ALW is new radio-man in charge of San Jose U.S.N.R. unit. W6CEO has schedules with Guam and P. I. W6DDS will soon be on 1750 kc. W6DBB pounds traffic from his own station when not at W6YL. W6BRD handled his consistent traffic. W6DNY passed his government examinations. W6NX's 1750-kc. schedule with W6AJL is functioning 100%. The weekly attendance at the S.C.C.-A.R.A. is fifty. A few ORS have not as yet forwarded certificates for endorsement — kindly do so at once.

Traffic: W6YG 282, W6AMM 272, W6EI 151, W6YL 75, W6HM 98, W6NJ 87, W6YU 48, W6BW 41, W6ALW 31, W6CEO 20, W6DDS 14, W6DBB 12, W6BDR 11, W6DNY 6, W6NX 28.

EAST BAY — SCM, S. C. Houston, W6ZM — I wish to express my appreciation to the section membership for election as SCM for the next two years. With your help and co-operation we will put the East Bay Section on top and keep it there. All stations are asked to report each month not later than the 16th. W6ATJ has been appointed as Chief Route Manager. W6CTX leads the section with W6EDO a close second. W6RJ says he got a new SW3 receiver, Monitor, Electric Clock and Willys-Knight all in one month! W6EJA and W6BIG worked several J's. W6CGG is building crystal rig. W6EW got married. W6BGR and W6DUB want to be ORS. FB, send in the blanks. W6CDA reports that Pentode crystal oscillator is FB. W6BKM has the rebuilding bug again. W6CZN is still busy with bridge work. W6BYS is threatening to get on with a 1-KW bottle. W6FII won a certificate in the Frequency Measuring Contest. W6EDR says too busy for radio. W6EXO, W6DUA and W6EVQ report for the first time. W6DCZ is now W6BXY. At a recent meeting of the Oakland Radio Club, C. W. Laufenberg of the Radio Supervisor's office gave the new 'phone examination to W6ACD, W6CFQ, W6AKB, W6AQO, W6AVE, W6DIR, W6AZG, W6ATJ, W6BFO, W6CAZ, W6BAP, W6DUA, W6SQ, W6ENX, W6BEM, W6ZAW and W6DWR. W6CMQ was a visitor at W6ZX. W6ZM, the SCM has moved and his new QTH is 2523-23rd Ave., Oakland. W6BIS is a first time reporter.

Traffic: W6CTX 254, W6EDO 240, W6ATJ 161, W6RJ 40, W6EJA 35, W6EVQ 32, W6BGR 28, W6CDA 24, W6DUB 21, W6BKM 12, W6AF 12, W6AQO 8, W6EGM 8, W6AUT 7, W6BTW 6, W6JT 6, W6EXO 4, W6FII 4, W6DUA 2, W6ZAW 1, W6ZM 44, W6BIS 22, W6AOH 6.

ARIZONA — SCM, Ernest Mendoza, W6BJF — W6ALU, the new "OO," makes the BPL both ways. W6BJF is assistant editor of the A.S.W.R.C. semi-monthly newspaper, edited by XYL W6BVN. Write in for a sample copy. W6CKW handled all of his traffic on 'phone. W6EFC is in the Los Angeles Y. M. C. A. Radio School studying for a commercial ticket. W6CAP is putting in a 50-watt crystal. W6EFN has a new YL arrival. He reports W6EJ working on experimental 3.5-mc. 'phone. W6BYD handled an important death message on 'phone. W6CQF worked VK and ZL with a pair of '45s. W6CQR is getting ready to go on the air. W6DKF has been trying to get a condenser mike to perk! W6DNP just completed a super converter. W6EAW is getting ready to come on again. W6UG is in Tucson finishing his electrical engineering course. W6BM is coming on the new 3.5-mc. 'phone and CW band with a new crystal. W6EL and W6DNP put on a 'phone demonstration for the Boy Scouts. W6CJF spent a whole day chewing the rag with W6CQF! W6EJN is using a combination short and long wave Silver Marshall super-het. W6ATR is now W6BKM in El Paso. Old 6HV of nine years ago is W9DHK in Michigan City, Ind. W6EJU is on the 'phone band with '45s in PP TPTG circuit. W6FNM is another new ham at the college. W6BTV is doing post graduate work at the U. of A. W9DLS and W6EJU were in Phoenix visiting hams for several days. W6EEB is back in Los Angeles. X6CCN is regaining his code speed by diligent practice on midget short wave receiver. W6DSA is building a 56 to 7-mc. meter super-regenerative receiver. Fred Elser, KA3AA, said hello to the SCM over the telephone, as he passed thru Phoenix on his way back to the Philippines, via Vancouver and Hawaii. W6FGO gets better results with a current-fed zep than with a voltage-fed zep. W6DCQ is rebuilding in accordance with the new 'phone bands. W6DSQ built an all-electric receiver. Seven men from the Tempe Teachers College radio club, including Prof. Ross, W6DUQ, attended the Phoenix Radio Club meeting in March. W6BRI is sending out her 7018-kc. crystal "OBS" schedule daily at 1:30 p.m. M.S.T. Mark a circle around the 16th of each calendar month, hang the calendar up in front of your operating table, and use this as a monthly reminder to mail in your report cards.

Traffic: W6ALU 872, W6BJF 438, W6CKW 68, W6EFC 42, W6CAP 32, W6CVR 31, W6DJH 25, W6BVN 17, W6BEP 15, W6BLP 14, W6CWW 14, W6FBN 12, W6DRE 12, W6EFN 11, W6BYD 7, W6COF 4, W6DKF 1, W6DNP 1.

LOS ANGELES — SCM, H. E. Nahmens, W6HT — Atta ol' co-operation, gang! New reporters — larger totals! Send in your traffic totals on the 16th regardless how small. **LOS ANGELES COUNTY:** W6SN leads this county and is second high in the Section. W6ETJ is second high man. W6CUU just barely misses making the BPL. W6HT has a perfect radio location at last. W6DEP handled a flock of traffic. W6CHA just got his heap on the air when he was called back to sea. W6EGH increased power to 1 kw. and worked his 65th country. Watch W6CVZ's smoke when he gets his new 52 crystal rig working. W6EKZ's new portable call is W6ZZAB. W6CXW got three new countries, bringing his total to 38. W6ACL has a good Hawaiian schedule. W6BLS says the depression hit even his traffic this month. W6AM lost no sleep during the tests through the use of a three-phase automatic tape relay operated by a time clock. W6BPU says results "nil" on "tests" account QRM from stations operating in "listening periods." W6CUH worked his 56th country! W6DSP informs us that W6ALU is located in Glendale. W6ERL now has portable, W6EDB. W6CGP is going back to DC receiver. W6ESA is going to try and dodge his pet power leak by sneaking up to 14 mc. W6BHP says a BCL wanted to know why all the hams had ladders going up to their aerials. HII W6DQG is heading for 1.7 mc. The only records around W6VO's shack lately are phonograph. "International tests — and am I sleepy?", yawns W6AKD. After a silence of three years,

ol' W6BJX returns to the air. And that ain't all. His wife, W6AML, presented him with a junior op, David, January 25th! Congratulations, folks! W6BME now has 212-D in final. W6DOZ says his total is only a drop in the bucket. W6AZL is getting going again. W6EXQ worked PK for his 36th country. W6EHZ makes first report. W6OF has moved again. Street car QRM practically squelches W6DZI. W6RZ is having tough time getting his crystal rig to perk. W6FAL worked four new countries. W6WO received card from Siberia. W6BGF is inactive due to school. W6EK, the new YL in Pomona, says, "Amateur radio is sure lots of fun and I'm proud to be called a ham." SAN BERNARDINO COUNTY: National Orange Show traffic put W6BIK at the head of the entire Section and in the BPL. Very FBI! W6BY waited five years for a card from Africa. One finally came through, and the coveted WAC certificate has been received at last. W6CVV has been keeping schedules with W6AHP on 56mc. SANTA BARBARA COUNTY: W6YAU is way out in front and makes the BPL with deliveries. W6BZF is studying for Unlimited Broadcast license. Playing nurse maid to a sick wife kept W6DJS off the air. W6EDZ is getting out fine. W6EGS is a new ham in Santa Barbara. W6LC is back on the air. W6FFC is waiting for his license to arrive with change of QRA. The new receiver at W6DBJ has a terrific wallop. W6AWY reports five new enlistments in the U.S.N.R. The new QRA of W6EZX is half block from 60,000-volt line which gives him constant R5 QRN. W6FFC and W6ZBJ are doing their best to get their new crystal rigs completed. RIVERSIDE COUNTY: W6DLV holds down this enormous territory all by himself. SAN LUIS OBISPO COUNTY: W6ALQ's arm is still sore from winding his 2250-volt transformer by hand. W6DWW is away from home these days on business. W6FNP and W6DPH are brand-new hams. VENTURA, MONO AND INYO COUNTIES: Next month should see some results from these counties! It is rumored that W6BOM in Mono and W6EAF in Inyo are both going strong.

Traffic: W6BIK 673, W6SN 607, W6ETJ 563, W6CUU 489, W6YAU 537, W6HT 211, W6DEP 187, W6CHA 139, W6EGH 101, W6CVZ 90, W6EKZ 77, W6BY 70, W6BZF 67, W6CXW 62, W6ACL 60, W6EBK 53, W6BLS 50, W6AM 46, W6BPU 40, W6EQW 40, W6BYF 34, W6ETM 32, W6AKW 30, W6CZZ 29, W6TE 27, W6EUV 26, W6DLV 26, W6FT 25, W6BC 21, W6DQC 20, W6DJS 20, W6EDZ 19, W6FGT 16, W6DWP 15, W6CVV 13, W6CZT 13, W6TN 11, W6CID 11, W6EGJ 10, W6AWY 10, W6ON 9, W6AIF 8, W6DLI 7, W6DNA 7, W6DZP 6, W6BVL 5, W6BVS 5, W6DUX 5, W6CUH 4, W6DSP 4, W6ERL 4, W6CGP 4, W6ZZA 4, W6ESA 4, W6AYF 4, W6FGQ 3, W6BHP 3, W6VO 3, W6EDF 3, W6EZX 2, W6BCK 2, W6AKD 2, W6BJX 2, W6BME 2, W6FJT 2, W6DOZ 1, W6AZL 1, W6EXQ 1, W6EHz 1.

SAN FRANCISCO — SCM, C. F. Bane, W6WB — W6BNA leads the gang. W6CIS took over W6BNA's schedule while he was down south. W6NK sends in some good traffic. W6DPF says his schedules with K6 are going strong. W6YO found time to gather in a lot of traffic. W6EYN surprises us with a nice report. W6DBD is thinking of another Alaska voyage. W6AYC says new half KW crystal rig about ready to go on the air. W6AVO is busy with his radio store. W6DER is getting a rest from his regular A-A work, as W6PQ has taken over some of his schedules. W6CZK reports full of pep. W6CAL also ran. W6BVL is struggling with a new zepp. W6ADK says the DX tests were great. W6DHE says his crystal won't work. W6KJ is with us as usual. W6IU says nothing doing on traffic. We are sorry to hear that old W6MV has been laid up again.

Traffic: W6BNA 128, W6NK 91, W6DPF 59, W6CIS 56, W6YO 53, W6EYN 30, W6DBD 21, W6AYC 13, W6AVO 17, W6DER 16, W6CZK 4, W6CAL 3, W6BVL 1, W6ADK 3, W6DHE 6, W6KJ 3.

NEVADA — SCM, Keston L. Ramsey, W6EAD — W6AJP is high in traffic again. W6CRF is going back to phone April 1st. W6BYR is putting in push-pull modulation. W6FMS is an old timer with a new call. W6UO reports traffic. W6EAD has a '52 in last stage now.

Traffic: W6AJP 95, W6UO 15.

SAN DIEGO — SCM, H. A. Ambler, W6EOP —

W5ZZI, Leavenworth Wheeler, ex-SCM of New Mexico, with portable leads the Section. He is still waiting for his W6 call. W6AXV was second. W6QA says the radio club is coming right to the front. W6DDJ is an old ham with a new call. W6AXN turned in a nice total. W6BGL QRL Spring Fever. W6CTP and W6BAM were on during the DX tests. W6EOH has a new receiver with Pentode. W6AKY is looking for traffic. W6EFD and W6BEY report fine luck on 56 mc. W6BCF is now an ORS.

Traffic: W5ZZI 174, W6AXV 60, W6QA 34, W6DDJ 14, W6AXN 13, W6BGL 4, W6CTP 4, W6BAM 3, W6EOP 3, W6EOH 2, W6AKY 2.

PHILIPPINES — SCM, I. S. Liner, KA1SL — This report received by W6AMM via radio from KA1HR and mailed to HQs. Charles Lamb Expedition into western Tibitt has call AC4UU; will use 7 mc. chiefly but 28- and 14-mc. tests arranged with KA1SL. OM2TG, OM2DM, OM2TB are blasting away with nice tone signals. KA1CO is convalescing from a serious attack of antennaitis. KA1DP is QRD naval. KA1JR is rebuilding. KA1SP is mourning a pair of '10s and '81s. KA1CM has some good traffic schedules. KA1HR is still holding the lead, but the OM stations are a competitive threat for honors. KA1NA has fine signals. KA1NE returns from China soon. KA1AC is QRL the YLs. KA1RT is QRX a good receiver. KA1XA QRI, bowling. KA1RL is experimenting with indoor antenna. KA1CH operates now and then. KA3AA will soon doctor that rotten note. KA4HW hammers consistently on local traffic.

Traffic: KA1HR 1285, OM2DM 518, OM2TG 209, KA1CM 104, KA3AA 63, KA1SL 58, KA1JR 49, KA1SP 25, KA1DP 9.

SACRAMENTO VALLEY — SCM, Paul S. Farrelle, W6AXM. RM, Bernard F. Herzog, W6AIM — W6EJC, the station which handled most of the V.F.W. traffic, has the highest total in the Section. W6APJ makes the BPL. W6CTH reports for the first time. W6BYB has new C.C. transmitter. W6DOH and W6CKZ are located at Williams. W6TM has schedules with OM1TB, KA1CO and K6BOE. W6AIM sends in a FB report. W6FEJ is a new ham at Marysville. W6BSQ is QRL National Guard. W6BEV is off the air. Reason: Violation of F.R.C. regulations. W6EPB is heard on 7000 kc. W6APE has FB crystal rig. W6FMX will have '52 going soon. W6CMA has an '02 on the air. W6BYB and W6AID fought a bloody three-round draw at club meeting. Hi. W6DVE sends in a nice traffic report. W6DDV is a new traffic man. W6ERW has a FB total. W6AAC is putting in a pair of '10s. W6EOU had a "test machine" running during DX Tests. W6EOC bought brand-new 211, put in a drawer, two days later opened drawer and found 211 glass divorced from brass base. W6CKA has 14-mcg. C.C. rig. W6CAW has National SW3. W6AUO is YLing. W6EWB is prexy of local ham club. W6LO staged a FB come-back. W6BLX is a lawyer. W6DKW put up a new antenna. W6BKB will be back soon. W6AXM has been visiting the radio clubs around the Section.

Traffic: W6APJ 785, W6CTH 94, W6CMA 64, W6ERW 60, W6TM 57, W6DVE 18, W6AIM 14, W6FMX 12, W6AAC 11, W6AK 8, W6DDV 4, W6AID 1, W6EJC 0.

ROANOKE DIVISION

WEST VIRGINIA — SCM, C. S. Hoffmann, Jr., W8HD-WLH3 — W8CDV and W8ELO lead the list this month, both getting in the BPL. W8CSF put up new antenna. W8DPO continues working VKs in good shape. W8BWK is practicing code listening to NAA. W8HD works west coast on 3.5 mc. W8CAY and W8ADI report the following enrolled in USNR at Wheeling: W8AZD, W8BWK, W8CSF, W8CWY, W8XCR, W8ELO, W8FQA, S. E. Pence, Franklin Oberle and Charles Moss. W8BTV was home for Easter vacation. W8FUM works Texas. No power in W8FQC's town, and he's nearly broke buying B bats for his transmitter! Hi! During the recent flood in Elkins, W8AKZ had to wade to school, and W8CJ's porch steps floated away! W8TI is having tube trouble. W8EJZ is having trouble with Parasitics on 14 mc. set. W8FFO is getting out well with his '01As. W8OK has new 1-KW crystal job. W8EDV worked RX1AA and HH7C. W8BDD is constructing new power supply. New hams turned in — Fairmont:

W8GAL (ex-W8BCN), W8GAD, W8GDW, W8GBF (ex-W8ACZ); Moundsville: W8GB, W8FZH, W8EKK; Catawba: W8DRU, W8GGT. Send in a report for QST, you new fellows. The Ohio Valley Amateur Radio Club of Wheeling, at a meeting held March 25th, had an annual election of officers. W8CDV, President; W8ELO, Vice-President; W8DPO, Secretary-Treasurer.

Traffic: W8CDV 482, W8ELO 212, W8CSF 34, W8ADI 18, W8EJZ 17, W8TI 16, W8DPO 17, W8BWK 13, W8HD 11, W8FUM 7, W8FFO 5, W8CAY 5, W8AZD 4, W8FAA 3, W8BDD 3, W8FQC 6.

VIRGINIA — SCM, R. N. Eubank, W3AAJ — Route Manager, S. T. Terry, W3AGH — Following stations handled relief messages in storm emergency work and deserve lots of credit, as all means of communication were out: W3CA, W3AHQ, W3WO, W3BSM, W3FJ, W3AAJ, W3AGH, W3BAG, W3ZU, W3ADJ and W3ZA. W3BRY is keeping schedules with crystal signal. W3AHQ wants 'phone schedules with CW men. W3APU sends first traffic report. W3CHR is new station in Covington. W3BAG has 3619-ke. crystal now. W3HJ has been playing checkers with W8BGY. W3BTR works West Coast on 3500. W3WO is back on with crystal 3818 ke. W3CEP is new station at Hampton. W3BUY worked Spain. W3AOT applied for ORS. W3BMN is OT Ray Carr. W3QF is now in Washington. W3ZU is measuring frequencies of Virginia stations for Bulletin. W3BSW reports traffic. W3QN is a YL traffic handling station. W3BNH is active on 3.5 mc. W3AEW QRL work. W3BIX has new MOPA. W3AMB's pole punched hole through roof during recent storm. W3BFQ is active. W3CFL is building "swell" crystal rig. W3BKJ worked Germany with '71. W3BKI is making changes in transmitter. W3FE — 100% attendance at Richmond Club. Richmond Club gives subscription to QST every month at drawing. W3AEW and W3AMB won first two. W3ATY, new traffic station at Ft. Monroe, is Ex-KALAF. W3AUG, W3BEK, W3BFT, W3CEY, W3BFQ and W3GE are interested in 56 mc. W3BGS has new PP '45 TNT. W3AUG asks, "What is a quiet period?" LI. W3NE is active on 7 mc. W3GY's 'phone was heard in Chile. W3BJX is coming back on 3850 for schedules. W3EJ made 357 with burned hand. W3ARD is still active. W3BEV was in Richmond. W3MT is building '47 crystal outfit for 3500. W3BBX QRL school. W3BSE overhauled receiver. W3CIT is new call in Lynchburg. W3BAD, W3BEP, W3BJE and W3BLE all took first class license exam when RI was there. W3AAJ got nice letter from General Manager Illinois Power Co. thanking him for handling rush message. W3BLE is on CW 100% now. W3NT schedules CMSYB, W3BAI and W3ATY. W3CXM has A.A.R.S. call WLMA on 3497.5 ke. W3FZ handled storm messages. W3BAN is doing FB O.O. work. W3BTM is having local trouble. W3BRA is rebuilding to '47s. W3AGY is on 28 mc. some. W3APT is working 7000 mostly. W3BEP wants Richmond schedule. W3ZA handled death message when wires down. W3BMN sends in the 58th report this month. If you wish to report and do not receive card monthly, tell me so. Thanks to everyone reporting this month. New high for state. Great. — W3AAJ.

Traffic: W3FJ 424, W3BAI 357, W3EJ 357, W3BSM 344, W3AGH 182, W3AAJ 181, W3QN 173, W3CAH 150, W3ZU 111, W3AVU 108, W3ADJ 69, W3BPR 65, W3WO 59, W3OM 58, W3AHQ 52, W3ATY 40, W3CEP 35, W3ANM 24, W3GE 24, W3BUY 20, W3BAG 18, W3AVR 15, W3BJX 15, W3BLE 14, W3RUR 13, W3AUG 9, W3BRY 11, W3RS 10, W3CA 10, W3BGS 10, W3CHR 9, W3BSB 8, W3BGX 8, W3GY 7, W3BSW 6, W3ARD 5, W3FE 5, W3CFL 4, W3NE 4, W3AMB 3, W3APU 3, W3BTR 3, W3AJA 2, W3ACT 1, W3BKI 1, W3HJ 1, W3NT 327, W3CXM 159, W3FZ 16, W3BJE 22, W3BLE 14, W3BAN 13, W3BEP 12, W3BTM 8, W3BRA 7, W3AGY 2, W3ZA 6, W3BMN 13.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — W4DW's high-voltage power supply went up the same month that his salary went down, so he is off the air temporarily. W4AAE cancelled his schedules during the DX tests. W4TO leads in traffic with a FB crystal-controlled outfit. W4AVT now has a bug. W4BCG, a new ham, must be a born traffic hound by the looks of his total. Sixth dis-

trict stations must have their guns trained on Greensboro since W4AGD reports hearing 42 of them in an hour and a half recently. We welcome a report from W4ATS, a new station in Greensboro. W4ZH keeps hoping he will sometime "hear" Asia. W4NP is going to start on crystal-controlled outfit soon. W4AOE is still on 7126 ke. W4ALK and W4ALT are on the air now at Tarboro. W4ALT is ex-W2AEL. W4AJT, W4AIT and W4LD are on the air only occasionally. W4ADZ moved to the country. W4ACY and W4PW are a little upset about having to move their 'phones. W4TN-W4PN says a man cannot learn law and pound brass at the same time. W4ATC is on 7200 ke. with a crystal-controlled outfit, due in part to the generosity of Bethesda Crystal Laboratory, who donated to the club a calibrated crystal.

Traffic: W4TO 163, W4DW 106, W4BCG 84, W4PBN 75, W4AVT 55, W4AAE 38, W4ZH 31, W4AHS 30, W4AOE 19, W4ABW 12, W4AGD 11, W4RE 8, W4NP 6, W4TR 6, W4ATS 4, W4MR 3, W4IF 1.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING — SCM, C. R. Miller, W6DPJ — Much activity at W1ZZA again results in a fine traffic total. W6DAM is in trunk line "B." W6EXL has an AC receiver. W6BLE keeps three daily schedules. W6BSE has much trouble with his note, W7AAH moved his station again. W6FEB is NCS of the Utah first district A-A Net. W6FAE is a new station in Hoytville, Utah. W7ADF says the Casper Amateur Radio Club is doing well with W7NY, President, W7ADF, Vice-President, and W7AMU, Secretary-Treasurer. W7BO went back to the farm in Nebraska. W7AMU and W7ACG have new transmitters. W6APM built a 1.75-mc. transmitter. W6EZD at last has his crystal rig working. W6AHD has his new transmitter completed. W6DTB worked lots of DX during the DX tests.

Traffic: W6DPJ 342, W1ZZA 206, W6DAM 54, W6EXL 23, W6BLE 21, W6BSE 11, W6FEB 6, W7AAH 6, W6FAE 2, W7NY 2.

COLORADO — SCM, E. C. Stockman, W9ESA — W9DQD is looking for QSO with New Hampshire to make all states worked. W9CND is on the air again. W9BFP's ticket expired. Too cold at W9APZ's shack to do much this time. W9GNK and W9CWA are keeping southern part of state alive. W9EAM is keeping regular schedules with Army Corps Area stations. W9EII rebuilt his transmitter. W9EHC is new station at Colorado Springs. W9DNP, W9CDE, W9FPZ, W9FCK and W9EHZ report.

Traffic: W9ESA 259, W9EAM 82, W9GNK 48, W9EHZ 27, W9CWA 23, W9EII 16, W9FCK 14, W9DQD 11, W9FPZ 11, W9JB 11, W9CND 3, W9APZ 2, W9CDE 2.

SOUTHEASTERN DIVISION

EASTERN FLORIDA — SCM, Ray Atkinson, W4NN — W4FZ and W4UX have nice crystal transmitters. A brand new 150-watt job is at W4AZB. W4DE suddenly came to life and worked five Europeans the first few days of the JAROC's DX Contest. W4NN has had a lot of luck with DX. Reports from W4GS indicate that the A.R.R.S. Net has been keeping schedules 100%. W4AEM sends his report via radio. A new ham is W4BBG, located at St. Petersburg. W4VP sports three transmitters. W4GR, W4ASH and W4BDM are now active at Daytona Beach. W4ABZ is one of the JAROCs who handles traffic. W4AER is fast becoming a good traffic man, and along comes W4HY with a nice total. And the 'phones, well, have a look: Totals were received from W4DU, W4MF and others. W4ASA sends in traffic report. W4NK not heard yet. W4TK is busy at WJAX. W4BBB and W4AKH are on 14 mc. W4LI is taking on traffic. W4AGB is awaiting renewal of station license. Please renew your ORS appointments, fellows, or they will be cancelled. W4BBX sent in his first report. W4AGP worked two EAR's and one Englishman during the DX Tests. W4WJ has a 50-watt job. W4DT has a new pentode receiver. Let's have a better showing of traffic next month!

Traffic: W4GS 51, W4NN 50, W4AER 44, W4DU 36, W4ABZ 31, W4AEM 25, W4VP 23, W4ALI 22, W4UX 22, W4BBX 15, W4ASA 15, W4FZ 9, W4AGP 6, W4DE 6, W4HY 5, W4BDN 4, W4DT 4, W4BBB 2, W4AGB 2.

ALABAMA — SCM, Robert E. Troy, Jr., W4AHP—Ladies and Gentlemen, meet the new SCM W4KP, Mr. L. D. Elwell, 1066 Waverly Street, Tarrant, Alabama. Give him your cooperation. W4RS comes through with the highest traffic total. We welcome a new crystal station, W4ALG. W4ASM will have a 'phone in the new band and C.W. on 7 mc. W4APU is getting out well on 7 mc. W4ADJ had the hard luck to blow his receiver power supply. W4LM provided pleasant company on a visit to the SCM. Paul Duncan is waiting for his license in Montgomery. W4ZX is taking his 'phone to 1750 kc. W4AZH is getting out well. John Andrews is on now in Montgomery with the call W4BFU. W4AAQ says screen-grid detectors are FB. W4AHP is going back to private life. Hi. W4AP will have a 'phone in the new band. Ex-W4CB has returned to Tuskegee. Well, fellows, I wish to thank each of you for your reports and cooperation. Now — so long. — W4AHP.

Traffic: W4RS 141, W4KP 23, W4ADJ 2, W4APU 2.

WESTERN FLORIDA — SCM, Eddie Collins, W4MS-W4ZZP — Route Manager W4ACB-W4PCN, W4FV-W4ZZR reports a FB traffic total. W4ATN reports a FB QSO with Cuba. Hi. W4AUW reports DX FB on 14,000. W4AUV was on several times during month. W4BCB wants the gang to keep an ear open for him. W4AUA is doing FB U.S.N.R. work on 3500 kc. W4ACB and W8BGX aided greatly in getting W4AUA on the air. W4ASG is still off. W4AXP is going in for CW on 7000 kc. W4AOO gets out FB on 1750 kc. W4AQY is still knocking them out in fine style. W4AQY had a narrow escape when his mast broke with him. W4ML is operating 'phone only now. W4AFT wants to know where we hear European stations. W4AGS-W4ART is stepping out FB on 3500 kc. W4ARV continues to work DX with low power. W4SZ is rather silent. W4QR-W4AQG has a FB new tower. W4ACB-W4PCN is busy arranging traffic routes. W4SC still holds its high place in the FNG Net. W4BFD is a new ham. W4QU is on the 'phone and CW. W4QK lost his power supply. W4AXF will work CW until June, when she will apply for her unlimited license. W4BGA is on again after a seven-year layoff. He was ex-NU4QT in the spark days. W4BEW is another newcomer in Pensacola. W4VR has his receiver built. W4ABJ is still at the U. of F. W4OE is kept busy by WCOA. W4MS-W4ZZP received a report of QSA5 R8 from F8PZ. Fellows, now that the contests are over, let's see if we can boost our traffic totals. Remember, only good traffic though. Don't forget the hamfest at W4KB's Memorial Day, C U there.

Traffic: W4FV 40, W4QR 14, W4SC 4, W4QU 10, W4KB 6, W4UW 12, W4ML 2, W4ASV 1, W4ATN 8, W4AXP 3, W4AGS 8, W4AUW 13, W4AUV 4, W4AQY 6, W4AOO 8, W4ZZR 8, W4ZZP 6, W4AXF 8, W4ACB 37, W4MS 32, W4ARV 6, W4ART 1.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, J. C. Hagler, Jr., W4SS — CM8YB leads the list with W4PM and W4SM second and third. CM8AZ is still working the 14-mc. gang. K4RK sends in the following dope about the gang in his part of the world: K4RJ and K4AXG have the NCS station of the U.S.N.R., "NEC," and K4BU has the alternate station "NEJ." K4KC has gone to the states to enter the R.C.A. Institute. K4PH kept schedule with Norwegian tankship signing XLA18. K4RY is on another vacation. In Guayamilla, K4PCI/W2FN hopes to be on by 1934. K4AOP wants to sell out lock, stock and barrel, as he, too, is going to return to the States. K4KD/W9CCB is plugging away at "WPR." K4JA is coming on in hopes of working Southern California, where his family is. The one high spot in traffic handling for the month was a message for K4JA, given to W6BBO, Los Angeles, who phoned it to Riverside, getting a reply in ten minutes; the elapsed time being 25 minutes. K4BU called CQ one morning using instead of the usual intermediate, "DE," the Navy intermediate "V." W1MK got all hot and bothered, calling "VK4BU" Hi. W4AAY was reported QSA5 R6 in England on 3.5 mc.

Traffic: CM8YB 215, W4PM 69, W4SM 55, CM8AZ 52, K4RK 22, W4AAY 17, W4WB 12, W4SS 11, W4DV 8, W4GB 7, W4BO 7, W4ST 4, W4BW 2.

WEST GULF DIVISION

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — I want to take this time to thank all of the gang for their fine cooperation in making the Oklahoma Section the leader in the West Gulf Division. It is with regret that, due to business, I have had to resign as your SCM. W5VQ is still leading the state. W5ALD, keep up the good work. W5BLT is a new station in Okmulgee. W5ATB is rebuilding. W5AAV is still plugging away. W5BOE has his CC rig perking on 14 mc. W5BMU comes in with a nice report. W5BHQ comes in with the information on the fine quality 'phone signals from the 5th District. W5BPM has been somewhat on the sick list. Glad to hear from W5AUA at Stigler. W5BBL and W5AIR are both operators at KGPH, Okla. City Police Dept. W5BEP and W5BMT are new stations in Okla. City. W5AND and W5AOW are rebuilding. W5BRD is on 14-mc. 'phone. W5ABO is still a MIC specialist. W5QL is in the SCM race. Luck to you all, gang. 73.

Traffic: W5VQ 1227, W5ALD 105, W5BMU 90, W5BHQ 18, W5BPM 17, W5AYR 14, W5ATB 11, W5BOE 9, W5AND 8, W5AAV 3, W5AUA 5.

NEW MEXICO — SCM, Jerry Quinn, W5AUW — W5AOD is again high traffic man. He makes BPL as does W5AUW. W5BHY is putting in 250-watt 'phone. W5AOE is on regularly with low-power 'phone. W5BQE worked K6BAZ on 3655 kc. W5AOP likes traffic. W5BUY wants an ORS. W5BVC is our new ORS. W5AOD has been appointed RM. All fellows who want reliable schedules with NM, please write him.

Traffic: W5AOD 640, W5AUW 584, W5ZM 38, W5AOE 9, W5BQE 6, W5AOP 5, W5BUY 5, W5BVC 3, W5ASR 1.

SOUTHERN TEXAS — SCM, H. C. Sherrod, W5ZG — Until further notice all communications to your SCM should be addressed to 2609 Ave. O½, Galveston, Texas. Houston: W5TD is handling a bit of traffic. W5ADZ has been hearing lots of DX. W5BHO has been keeping schedules in the A.A. Net. W5CDJ is a newcomer in these columns. Orenshaw has been reported by J3DM in Japan. San Antonio: W5RV has put in a buffer stage. W5VL is rebuilding. W5AUC, W5CAS, W5AWY, W5ARQ, W5CCF and W5CD are heard regularly. W5NU and W5BLE are newcomers. W5AX is back on the air. W5CS has 50-watt MOPA. W5EU, W5BQH, W5CAP and W5RKI are on occasionally. W5UX is building around a '61 for final stage. W5MN is heard handling traffic daily. W5BVG now is using a '10. W5JC is considering changing to 'phone. W5BBC came back for the tests. Wharton: W5BKV, Miss Wilhelmina Owen, is using a '10 in a Hartley circuit. W5CCI is also using a '10 Hartley rig. W5AHK is working on a 50-watt 'phone rig. Corpus Christi: W5MS had W5AEV and W5BY for visitors recently. Bryan: W5AQY has just made application for WAC. El Paso: W5NT has been handling expedition messages from PYXXX1. Gemoets and W5AUI are developing a new type of transmitter. W5ES sends in the usual nice report. W5AAQ is busy cutting crystals. W5AEC is busy with OBS work. W5AEP has an epidemic of income tax. 7 mc. W5BXH is trying CW on 3.5 mc. TC of W5VV sends a very nice report. W5AXY is a newcomer. W5VV has been QSO EAR, HC and VK. Kerville: The DX tests have been holding W5BKE down and traffic is below normal. W5BKO, Western Union operator at Overton, is a new comer. The other op at W5BKE is W5AGV.

Traffic: W5BKE 396, W5VV 6, W5CT 25, W5ES 64, W5AFN 3, W5AOT 5, W5BNJ 5, W5BQU 176, W5DE 8, W5DS 93, W5FW 235, W5NT 70, W5AQY 69, W5MS 12, W5MN 122, W5BUV 41, W5BVG 27, W5BUU 19, W5YH 41, W5BHO 48, W5TD 7, W5ADZ 2.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — Many thanks, fellows, for the wonderful showing that you all have made this month. This is the best report since the SCM has held office. W5VE makes the BPL in a big way. This was the call used at the Southwestern Exposition and Fat Stock Show held in Ft. Worth in early March. The following are a few of the many that were on the job almost daily taking traffic from W5VE: W5VQ, W5BKE, W5AUL, W5AOD, and others. W5SH comes close to BPL. W5AVF makes the BPL on deliveries. W5BKC is W5AFV's brother.

(Continued on page 86)

• CORRESPONDENCE •

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

More About Tripling

Box 247, Hicksville, L. I., N. Y.

Editor, QST:

I have read the communication in February QST in which Mr. Shane complains of having difficulty in tripling frequency in accordance with my article in August QST. The following comments may be of general interest, as I believe they bring out some points that have not had much light.

Anything one can think of to give rotten quality in an audio amplifier should be tried on a frequency multiplying stage *and it will like it!* Monkey with the grid bias to make it anything but Class A, preferably making it higher for better efficiency; pull out one tube if push-pull; and *above all*, overload the grid so it generates plenty of rectified grid current — then, and only then, will you get lots of harmonics, called distortion if in the audio range, but called successful frequency multiplication if in the radio-frequency range.

I do not know Mr. Shane except from his communication, but I know many other engineers in the broadcast field and understand them as having an inbred horror of doing all such distorting things to a tube. Also, successful broadcast engineers at good stations have been schooled in maintaining high carrier-frequency stability, and rule number one seems to be not to try to get more than one flea-power out of the crystal stage. Now a kitten-power or dog-power stage would have flea-power harmonics, but the harmonics from a flea-power oscillator are microbes or vitamins or something by comparison.

It may be a psychological hunch, but I suspect Mr. Shane was not obtaining very much power out of his crystal stage, and as he says he was trying to triple in the next tube no doubt he was not driving enough rectified grid current into the second tube with high bias, for it takes a fair "sock" to do this, but it goes to make the real frequency multiplier, especially the tripler where you are trying to save a stage.

A quite efficient circuit refinement is to provide a d.c. return from the grid of a frequency multiplier tube via a choke to keep the r.f. on the grid, a resistance leak to provide extra bias when needed, and a bias source, all connected in series in the order named.

Regarding transmitter design, it is not considered good practice to convert the frequency immediately after the crystal tube and then follow this with many stages of straight singling amplification. There is liable to result great in-

stability and tendency for self-oscillation due to stray feed-back because of the great over-all gain from input to output of the series. Practical adjustments are usually made for stability that reduce this over-all gain. In modern receiver design, by way of analogy, we do not use a large number of audio stages preceded by little radio amplification. Anything but near perfect stability might give a terrible howl. Instead, we divide the amplification to reasonable degrees at different frequencies, and in the case of a modern super-het we amplify some at the incoming radio frequency, some more at the intermediate frequency and some more at the audio modulation frequency without running into extremely high gain at any one frequency. I do not recall ever seeing this point brought out, but it certainly seems advisable to do the frequency converting not too near either end of a series of amplifiers. In the case of five stages, as Mr. Shane used, the middle one for the tripler would seem the best from this standpoint. This would also improve the conditions outlined above so that the energy on the crystal frequency would then be boosted up to the point where it could properly load up the grid of a $7\frac{1}{2}$ -watt tube. The remaining stages working on the antenna frequency would be reduced by one 865 stage and the stability possibly would be so improved that nearly as much amplification could be obtained at this frequency as before.

In the March issue just received I note in two articles an endorsement of tripling and wish to mention that a number of commercial and Navy transmitters have found it useful. The communication of Mr. Shane is the only case of complaint that has come to my attention. Unusual factors often enter into individual sets, but it is believed the above explains his difficulty. Practically everything said herein applies equally well to doubling or tripling, especially the emphasis on the point that successful frequency multiplication is the result of r.f. wave distortion. Frequency multiplying stages are considered by other engineers as being able to produce a slight gain in power when doubling and about breaking even when tripling.

— Boyd Phelps, W2BP

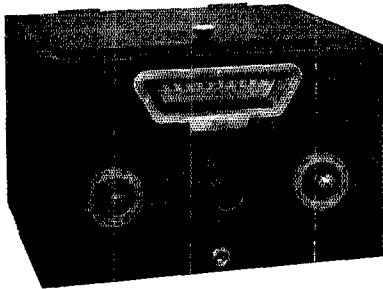
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Editor, QST:

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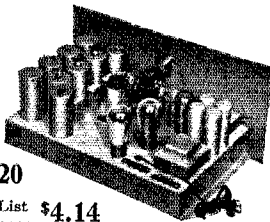
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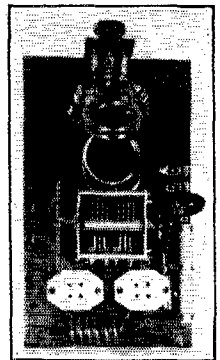


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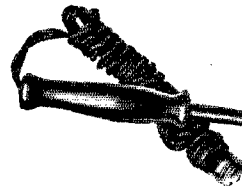
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| 2 Flechtheim 1 mfd condensers, each \$.52..... | 1.04 | 1 Oscillator coil as specified wound on bakelite form..... | 1.25 |
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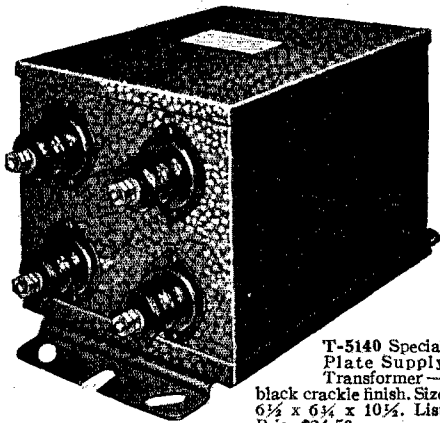
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Transformer —
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6½ x 6¼ x 10½. List
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THIS special and entirely new plate supply transformer, T-5140, is designed for use with Class "B" amplifier. When used in the recommended circuit it supplies practically constant output voltage at the filter terminal over the rated load range.

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a large proportion have replied to the notice with such remarks as "My monitor said I was OK," or "I was not working that band." I should like to suggest that after each CQ or call every station sign with a figure indicating his frequency. If the exact frequency is not known at least the band in which the station is operating could be indicated — anything so long as the other fellow will know he is not listening to a harmonic.

In other words, it is possible that a 7400-kc. signal really is 3700 kc. and the owner of the station doesn't know a strong harmonic is being radiated. Many of the 14-mc. signals are 7-mc. harmonics.

Yours for a better frequency check.

— Robert York Chapman, W1QV

Rotten Notes

Editor, *QST*:

With due respect to *QST* and the A.R.R.L. and all the good work that has been done in the past, I still note the absence of any definite attempt to stamp out the numerous raw a.c. "Buzz-Saw Specials."

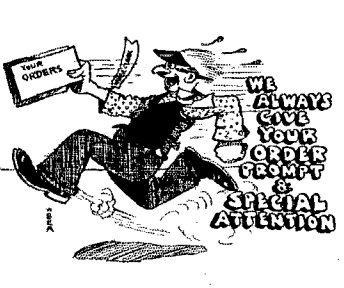
What is the Federal Radio Commission's ruling in regard to output and power supply? Listen in at any time on any of our bands and hear the answer — just so many printed words. Are they all m.o.p.a. jobs with RAC on the final stage?

In July, 1931, *QST* you demanded control of out-of-band operation by demanding the suspension of those operators who tune their transmitters by the "hit and miss" method. Why not draw up another resolution and start to clean up the amateur bands, eliminating these brother (?) amateurs who have no consideration for the rest of the gang that try to abide by the ruling set down by the Commission. Why should we show consideration to them with their rotten broad notes that cover such a portion of the band that it reminds one of the old straight-gap spark days?

How many times have you been tempted to tear the log book in two when one of these RRRAC (raw-ragged-rotten a.c.) notes will cover up a dandy QSO, when you have to pound out the amateurs' theme song, that old time-worn alibi — "Sorry OM QRM." You don't mind it so much when you lose out to a decent signal. Hurrah for these Amateur Oscillating 60-cycle Power Houses; I'd rather take our old broken down carpet sweeper and copy that; it sounds better and covers the whole dial.

I might be radical on this subject, but the offenders are radicals themselves, so why tolerate them? Your column of "Prehistoric" signals was a good idea and was directly responsible for a lot of better signals because a great many were ashamed to see their calls listed under that heading.

Closing with the knowledge that the above are fighting words, sent by one of the majority who will help you fight if you will start it, because



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RCA LICENSED TUBES

UY227.....	\$.35	247 - Pentode.....	\$.75
UX245.....	\$.55	222 - Screen Grid.....	1.00
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UX171A.....	\$.45	UY224.....	\$.55
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236 - Screen Grid.....	1.00
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UX250's - 100% Modulator.....	\$1.50	UX281 - 110 milliampere Rectifier.....	\$1.50
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D.C. Voltmeters, 0-300, 0-600, **\$3.00**. 0-750. **\$5.00**

100 Watt } 5,000, 10,000, 20,000 ohm... **\$1.40**

Bleeder } 50,000 or 100,000 ohm... **\$2.00**

Resistances } 75,000 ohm with six taps... **\$2.20**

9 1/2" long } 100,000 ohm with six taps... **\$2.30**

500,000 ohm Frost Gain Controls..... **\$6.60**

Closing out stock of Navy 5 watters, type CG1162, each... **\$2.25**

Latest Amateur Club Books..... **\$8.20**

Pilot plug-in coil forms. Complete..... **\$3.39**

Air King short wave Coils, 15 to 210 meters. Set of four... **\$1.75**

50 watt sockets, porcelain base, nickel shell... **\$1.50**

1/16" aluminum for panels 6/10c per square inch..... **\$9.90**

Stand-off insulators, \$.09 ea. Doz..... **\$9.90**

85 watt grid leas, 10,000, 15,000 ohms, Each... **\$3.65**

Enameled aerial wire No. 12 - any length. Per foot... **3/4c**

20 ohm Kurz Kasch rheostats with knob, Each... **\$2.20**

Special 1000v Dubilier mica condensers .002... **\$3.25**

20,000, 50,000, 100,000, 250,000 ohm potentiometers... **\$3.50**

Pilot Midget Condensers 15, 17, 113, \$.50, 123, 0001... **\$3.55**

Copper coil 3/4" diameter 1/4" tubing, per turn... **\$0.8 1/2**

5" dials for transmitter, Each... **\$2.20**

.01, .25, .5, 400v bypass condensers... **\$2.25**

GE 1/2 or 1 watt G10 neon lamps... **\$3.55**

800v fixed mica condensers. All capacities... **\$3.15**

CT resistors 10, 25, 50, 75 ohm... **\$3.15**

85 milhenry RF chokes... **\$3.15**

Electric soldering irons... **\$1.00**

9 plate midget condensers (18 mmfd Max. Capacity)... **\$3.35**

Acme 30 Kc intermediate transformers... **\$1.20**

High frequency buzzers... **\$3.75**

7 x 18 solid walnut cabinets... **\$1.00**

Microphone springs. Set of eight... **\$2.29**

WE VT tubes, 5 watters, each... **\$3.75**

Solid No. 18 pushback hook-up wire. 25' roll... **\$2.20**

1000 volt oil impregnated condensers, uncased. Make up your own condenser units. 1/2 mfd, \$.20; 1 mfd, \$.30; 2 mfd, \$.40; 3 mfd, \$.50; 4 mfd, \$.60.

All condensers guaranteed as rated.

RADIOBUILDERS PRODUCTS TRANSMITTING FILTER CONDENSERS

Mfd.	800v.	1000v.	1500v.	2000v.	3000v.
1	\$1.10	\$2.00	\$2.95	\$4.75	\$6.95
2	1.55	3.00	3.95	5.00	12.50
4	2.75	4.00	5.50	14.00	19.95

Above condensers tested at 40% overload. All sealed in heavy metal containers with crystalline finish; large terminal insulators. Above ratings are actual DC working voltages. All are guaranteed.

POWER CHOKES

Henries	Mils	Weight	Size	Price
			4" x 3" x 6"	\$2.50
30	250	12 lbs.	5 1/2" x 6" x 7"	3.50
30	400	20 lbs.	5" x 7" x 9"	4.30
15	400	15 lbs.	3 1/2" x 6" x 7"	3.95
60	125	12 lbs.	5 1/2" x 6" x 7"	3.50

POWER FILAMENT TRANSFORMERS

Voltage	Amperes	Weight	Price
7.6 CT	1.75	1 1/2 lbs.	Unmounted \$1.00
7.6 CT	1.75	2 1/2 lbs.	Fully Cased 1.45
2.6 CT	10	4 lbs.	For 2-866's - Uncased 2.75
2.6 CT	10	5 1/2 lbs.	For 2-866's - Cased 3.50

All 866 transformers have 18,000 volt insulation breakdown. 11 CT 10 12 lbs. For 3-50 watters - Cased **5.50**

12.5 CT 10 13 lbs. For 2-250 watters - Cased **6.00**

All cased transformers fully mounted and shielded in metal containers black crystalline finish; large terminal insulators.

5 METER RECEIVER

Completely wired and tested super regeneration receiver - extra sensitive. Built on aluminum chassis. Aluminum panel with full vision dial **\$18.50**

Available in kit form **\$13.50**

5 meter push-pull 112 - 245 or 210 transmitter - wired and tested. **\$9.45**

Available in kit form **\$5.45**

UX210 tubes that oscillate on 5 meters. **\$1.75**

Write for details on above.

NEW AMATEUR PHONE BAND CRYSTALS

3900-4000 KC pure Brazilian Quartz "X" cut 1" square crystals, Each... **\$4.40**

Radiobuilders plug-in crystal holders, each... **\$1.50**

Crystals anywhere in 80 meter band, each... **\$4.40**

Calibration accuracy guaranteed 1/10 of 1%.

WE SPECIALIZE IN OBTAINING COMPLETE KITS, ETC. - ALL MERCHANDISE GUARANTEED

TERMS: CASH OR C.O.D.

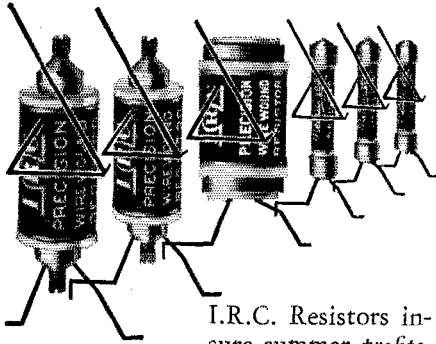
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I.R.C. Resistors insure summer profits.
Metallized Resistors

for replacements. Wire Wound Resistors for meters and test equipment. Make for yourself valuable apparatus which will speed up your service work, build your reputation and add satisfied customers.

Mail coupon today for FREE charts. They will save you hundreds of dollars in equipment.

INTERNATIONAL RESISTANCE COMPANY
Philadelphia Toronto

IRC
Metallized
and
**PRECISION WIRE WOUND
RESISTORS**

International Resistance Co., Q-5
2006 Chestnut St., Philadelphia.

() Please send your money-saving charts. () I am interested especially in making the apparatus below. (Name the equipment you wish below coupon.)

Name

Address

City.....State.....

they believe that regulations are something else besides a bunch of printed words.

— F. K. McKesson, W3KE

Glass Houses

Jumbo Mine, Kennecott, Alaska
Ye Ed, and Brother Hams:

This a.m. did hie me to my own pet static-inhaler, headache producer, or what have you as a monikor for the heap which is at times the pride and joy of ye op's youth, and did plough from one end to the other of the 7-mc. band. And all the nice sigs I did hear! Yeah, seven big powerful commercials right in OUR band! Decided to enter a complaint via QST, but, before doing so, explored the regions outside the edges of the bands, thinking my receiver might be off, and there, oh! and there, as far as 100 kc. off the band were seventeen little hams chirping along, having a beautiful time with their nice CQ's, made in the regulation 3 x 3 manner, and probably wondering why they were getting no answers.

Now, I ask you, ham to ham, how can we complain of the commercials being in our bands when we persist in getting into their bands? Well, brethren, such a complaint would be very similar to suicide, giving the comms a nice chance to come right back and tell us to get off the air if we can't keep within our own boundaries.

Come on, fellows get in the bands and give us a chance to yell about these commercials hogging our territory.

— A. C. Domenico, K7BLI

Pirates

6708 53rd Road, Maspeth, L. I., N. Y.
Editor, QST:

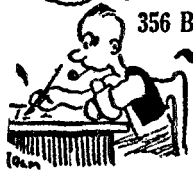
There are many so-called "pirate amateurs" who do not possess an operators' license or station license but, however, use fictitious calls or borrow another's. These "pirates," not being familiar enough with the practice of amateur radio, are found mostly outside the assigned bands. They are the ones who are putting a smear upon the name of amateur radio, which is struggling to keep its name clear of anything which would cause the public to look upon as a nuisance instead of a great boon to public welfare.

In these times when amateur radio must come into the limelight at the coming conference it must have a standing that will show the rest of the world that it is indispensable as an asset to science.

How can this be done?

It can be done with the coöperation of amateurs in helping to get rid of these "pirates." This can be done by getting enough evidence against the "pirates" so that a case can be brought to the attention of the Supervisors of Radio who will in turn take the necessary steps to have justice administered by having the violators punished.

UNCLE DAVE



356 Broadway

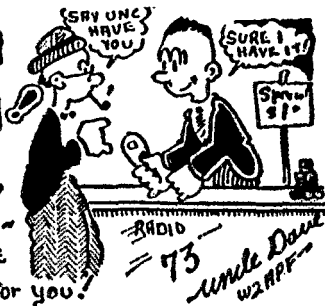
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SHIP ANY PLACE

If we have not got it we will get it for you!



Milliameters, black flange type, flush mounting, 25, 30, 100, 150, 200, 300, 400..... \$.65
 AC voltmeters, 0-10 or 0-15 volts, each..... 1.50
 Thermostats for crystal ovens..... .95
 Right angle thermometer (bent) for Xtal ovens..... 1.65
 Arco Jr. 1N7 245 transmitter complete with power supply and tubes ready to go..... 13.95
 Arco Sr. push pull 245 transmitter complete power supply and tubes..... 18.95
 Arco 2 tube Junior receiver with 2 volt tubes..... 8.75
 5" x 9" x 6" metal cabinets..... .95
 Baldwin phones type C \$4.50; type G..... 4.95
 Laboratory instruments, write for sheet

JUST OUT! latest model mershon 8 mfd. electrolytic condensers, inverted type..... .69
 7 1/2 Pyrex insulators 70c, 12"..... 2.00
 Weston slightly used 0-100 or 150 mill meters..... 4.25
 Weston 0-100 current sq. galvanometer..... 7.50
 Weston precision Pattern 440, 30-0-30 galvanometer..... 15.00
 Super Het. 3 tube AC short wave converter, comp. with RCA tubes, SP'EC..... 12.00
 Baird short wave 3 tube converter..... 14.00
 Jewell 0-100 volts DC meter..... 4.00
 Arco Temperature Control Ovens comp. with crystal ground to frequency, holder \$13.35. Oven only..... 9.25
 Jones 10 wire plug, receptacle and cable..... 1.00
 Standoff insulators 10c each, per dozen..... .75
 REL short wave receivers..... 27.50
 Used Wheatstone bridges..... 17.50

NEW PHONE BAND CRYSTALS!

Crystals ground to any frequency you specify also the new 3900-4000 kc. fone band, FREE moulded bakelite, dustproof, adjustable holder - extra special

Your present phone crystals exchanged for new bands
 Your pet crystal ground to any higher frequency..... 4.50
 Arco finished and oscillating crystal blanks, guar..... 2.00
 Arco unfinished blanks, guaranteed..... 1.50
 Arco bakelite, dustproof, adjustable crystal holder..... .89
 Arco same as above, but plug-in crystal holder..... 1.15
 Arco comm. precision, plug-in crystal holder, beautiful job (G. R. plugs)..... 1.50
 Relays, Arco unmounted, 1000 uses, will follow 40 WPM, double one-eighth inch contacts..... 1.39
 New Samson Pam 19-20 Amplifiers..... 46.50
 New Samson Pam 16-17 Amplifiers..... 35.00

Heavy duty MV 866 tubes, guar. 1st quality..... \$2.50
 Extra heavy duty MV 866 tubes, our own Arco Brand, 1000 hours, unconditionally guaranteed 3.35

Weston pattern 301, 0-50 milliammeters..... \$3.75
 Teleplex with three rolls of tape..... 13.00

ARSCO TRANSMITTING CONDENSERS

One Year Unconditionally Guaranteed

1500 volt	2000 volt	3000 volt	3500 volt
1 mfd...\$1.95	1 mfd...\$4.50	1 mfd...\$8.50	1 mfd...\$9.50
2 mfd... 3.50	2 mfd... 6.50	2 mfd...12.50	2 mfd...14.00
4 mfd... 5.25	4 mfd...12.50	4 mfd...22.00	4 mfd...26.00

Very sturdily built, finest material, all cont. working d.c. voltage

600 volt	800 volt	1000 volt
1 mfd......20	1 mfd......30	1 mfd......50
2 mfd......25	2 mfd......40	2 mfd......70
3.5 mfd......35	3.5 mfd......50	3.5 mfd.....1.00
4 mfd......40	4.5 mfd......60	4 mfd.....1.50

Western Electric 211E's, Slightly used, each \$3.89

Make all money orders and checks payable to

Uncle Dave's Radio Shack

INCLUDE POSTAGE WITH ALL ORDERS AND 20% DEPOSIT AGAINST C.O.D. SHIPMENTS

Visit Uncle Dave's New Radio Shack When in Town. Good Time Assured, his Four Story Building with over 35,000 square feet of space, devoted to nothing but parts. For Goodness' sake, what do you need? We sure got "it." - What have you for sale or trade? Wanted: Used Teleplexes and Omnigraphs.

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WE CARRY EVERYTHING FOR THE HAM IN STOCK

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Long Distance Phone 4-5746

ALBANY, NEW YORK

The New National SW3 d.c. or a.c. New National SW5 d.c. or a.c. National power pack and all other National products in stock. Write for Lowest Prices in the Country

Mercury Vapor 280M tubes..... \$1.45
 281 Mercury Vapor..... 2.95
 Genuine new Pilot Universal all-wave Super Wasp A.C. complete in cabinet, list \$95.00, 6 tubes, special..... 32.50
 New type RE rectobulbs, each..... 6.00
 New type R-81 rectobulbs, each..... 3.50
 Arco calibrated monitors with three coils and individual calibrated charts, tube..... 9.35
 Arco calibrated wave meters..... 6.25
 Arco r.f. transmitter chokes..... .50
 Arco 50 watt sockets..... 1.35
 Arco 75 watt sockets..... 1.95
 Arco 204-A sockets..... 3.50
 Arco socket for 212A or D tubes..... 5.65
 Universal model X..... 14.00
 Universal Microphones, model BB..... 28.00
 Universal Microphones, model KK..... 40.00
 Universal Microphones, Model LL..... 14.50
 15 dial Omnigraph, used..... 2.00
 Fully mounted Samson filament and plate transformers
 No. 132, delivers 200 volts and 5 v. c.t..... 2.50
 No. 217, 1-3 volt and 1-7 1/2 volt..... 2.50
 No. 463, 1-1 1/2, 2 1/2, 5, 7 1/2 volt fil. trans. C.T. 35 watts, special..... 2.75
 New 239 Auto tubes..... 1.65
 Wavemeters, dynatrons, calibrated, 50c per point
 Bunnell 150 ohm heavy duty relays..... 4.50
 Used G.R. 1000 cycle audio oscillator..... 12.50
 Cunningham UX-281 tubes..... 2.90
 Write for special prices on Cunningham tubes
 Silver Marshall Round the World Four..... 20.00
 National 4 Tube Thrill Box..... 20.00
 Arco 1000-1500 volts each side of C.T., 375 watts transformer..... 8.00
 Arco 1500-2000 volts each side of c.t., 850 watts transformer..... 11.00
 5 dial Omnigraphs..... 8.50
 New triple twin No. 295 RCA licensed tubes. Special..... 2.50

ARSCO FILAMENT TRANSFORMERS

Wound to your specifications. State voltage and amperage desired. Perfect regulation, perfect regulation, center tapped resistor, supplied as most accurate means of obtaining true center.

These are standard types in stock

2 1/2 volt 10 amp..... \$2.25	10 volt 6 1/2 amp..... \$2.25
5 volt 10 amp..... 2.25	11 volt 6 1/2 amp..... 2.25
7 1/2 volt 7 amp..... 2.25	12 volt 3 1/2 amp..... 2.25

Special types in stock

2 1/2 volt 20 amp..... \$3.25	14 volt 3 1/2 amp..... \$3.25
15 volt 3 amp..... 3.25	

Power transformer, Arco, with voltages: 575 each side of C.T. 2-7 1/2 v. C.T. filament winding, 1-2 1/2 v. 12 amp. C.T. winding, special..... 5.00
 Power transformer, Arco, with voltages: 350 each side of C.T. 2 1/2 volt 12 amp. fil. winding, 5 volt. C.T. filament winding, special..... 3.75
 National coils for SW-3 or 5 up to 2000 meters SPECIAL Monitor cans 5 x 6 x 7 covers drilled, ready to go..... 1.20
 UX 222, UX 210, UX 250, special guarantee..... .95

BUILD A BUSINESS FROM YOUR HOBBY!



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YOU, as a reader of *QST*, very likely realize more than most what's ahead for radio. The surface is barely scratched. Business possibilities are unlimited. Soon television will be here. Talkies in the non-theatrical field are becoming important. Aviation radio advances rapidly. Radio daily becomes more promising. Yet all these new developments need trained men!

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Please send me your General Catalog.

I am checking below the phase of radio in which I am interested.

- Television and Sound Aircraft Radio Operating
 Servicing Home Entertainment Equipment
 Broadcast Operating Check which:
 Resident School Home Study

Name.....

Occupation.....Age.....Call.....

Address.....

Furthermore, we must remember we are doing this for the common cause. Therefore we must take the initiative and help prevent any further violations by having the present violators brought to justice.

In conclusion, may I say that licensed amateurs should follow the regulations carefully, thereby keeping the name of amateur radio clean in the public eye.

— Frank J. Mayernik, W2ASM U. S. N. R.

Radio and Terrestrial Magnetism

1040 Willett St., Schenectady, N. Y.

Editor, *QST*:

Yes, sir, when that little bug "curiosity" bites a fellow it's hard to be immunized. W2CJP tried several months working on 40. Results! Curiosity. After 9 a.m. the DX began to lessen and locals came in, averaging around 400 miles. From 9 to 4 during the day the reception characteristics showed a predominance of stations located east and west of this address. After 4 p.m. stations from the south began to roll in. From 5 to 8 p.m. the reception progressed gradually from direct south to southwest with Texas and New Mexico predominating around eight. Also at this time Northeast Canada and Newfoundland would be heard (opposite southwest). After eight the DX stations would start from South America, Panama, Cuba, and the west coast with a European once in a while.

I've noticed this same action night after night.

The fact has been established that magnetic lines of force exist throughout the terrestrial sphere. Do you suppose that these would have any effect on the transmission or reception of radio frequencies? I have an idea that radio frequencies have a tendency to travel along the lines of force indicated in the earth rather than in any other direction. Of course the transmitting antenna has a lot to do with such characteristics. Do you know of any station whose antenna is placed so that it is in line with these lines of force and what results that station has had with transmission and reception? I don't know whether I'm getting into something deep or not, but, anyway, would appreciate comments.

Perhaps some information might be obtained from the International Good Will Tests.

— E. H. Kanzelmyer, W2CJP

Seconding the "DX Hour" Suggestion

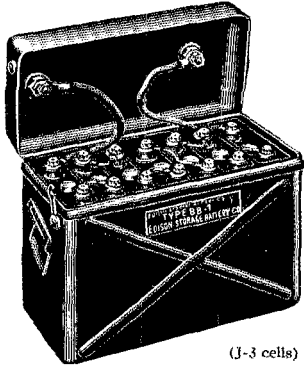
1136 Penna Ave., Elmira, N. Y.

Editor, *QST*:

A letter in the February issue strikes me as being a fine idea. I refer to the one from Mr. Herrick Brown, W4ABR, entitled "The DX Hour."

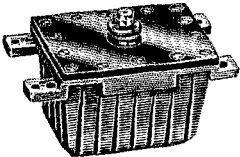
As one of the "old-timers" (starting in 1907) I get rather fed up on "Ur XDC sigs QSA5 R8 pse QRK es QRA ————— QRU hr cul 73, CQ CQ. . . ." and if I could work some DX, of which there is plenty on 40 meters now, I might get the old bug polished up again.

BARGAINS ARMY AND NAVY RADIO SURPLUS



(J-3 cells)

NEW — Edison Storage Battery, Type BB-1, 10 volt, 37 amp., contains 7 cells. Complete in steel portable case... \$15.00

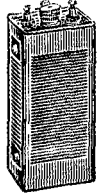


Condensers, mica, op. volts 12,500, cap. 0.4
 Dubilier, new... \$17.50
 Dubilier, used... 15.00
 Wireless spec. new... 15.00
 Wireless spec. used... 12.50
 Condenser, Dubilier, mica, volts 40,000, cap. .0012-.001-.0008 or .003... \$10.00
 Condenser, Dubilier, mica, op. volts 4,500, cap. .004... \$5.00
 Condenser, Dubilier, mica, op. volts 4,500, capacity .0004 mfd... \$5.00
 Condensers, Murdock .002 mfd. .000 volt... \$1.00



Desk Phone, Kellogg, Single button microphone, 70 ohm receiver... \$2.50

Complete with polarized ring-er, in metal case... \$4.00



Edison Storage Battery Cells



Type A-4, 1.2 volts, 175 amp., nickel alkali... \$3.50
 Type A-6, 1.2 volts, 225 amp., nickel alkali... \$4.00
 Type A-8, 285 amp., 1.2 volts... \$5.00
 Type L-40, 25 amp... \$1.50
 Type M-8, 1.2 volts, 11 amp., never used, per cell... \$1.00

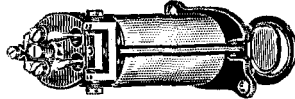
Voltmeter, Weston, No. 269 D.C., 0-50... \$6.00
 Ammeter, Weston, No. 269 A.C., 0-10... \$6.00
 Ammeter, hot wire, Gen. Radio, 0-5, Model 267... \$1.50
 Ammeter, R. Freq. Koller Smith, 0-10... \$3.50
 Amp. hour meter — Sangamo, bat. charge and discharge, type MS 2 size, 0-300 and 0-500. List \$50.00... \$10.00

METERS

Voltmeters, D.C. portable new Weston model 45, 3 scale 0-3-15-150, guaranteed 1/4 of 1% accurate... \$35.00
 Ammeters, D.C. portable, new Weston model 45, 3 scale 0-1-5-15-150 with 3 scale external shunt and leads, 1/4 of 1% accurate... \$35.00
 Thermo-ammeter, Weston, Model 412 portable, 3 sizes: 0-10, 0-20, 0-30. All new. List \$150.00. Our price... \$45.00

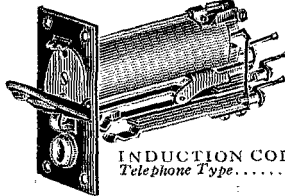
RELAYS

Relay, low voltage line, cap. 2 amp. 60c each, two for \$1.00. Silver contacts.
 Relay West. Elec. low voltage, 2 upper and 3 lower platinum point screws, 3 contact arms... \$5.00
 Relays, West. Elec. types, 123-AB, 122-DH, 149-T, 172-B... \$2.50
 Transformers, G.E. current type, 135 to 2500, with center tap, 60 cycle, 200 watt... \$7.50
 Gasoline Engine, 2 cylinder 2 cycle Sterling 3 horse-power, complete, new... \$25.00



SPECIAL

Can be used with the new Vacuum Contact when operated on 45 volts. Western Electric Signal "Drops," 1000 ohm, type D-12... \$1.00

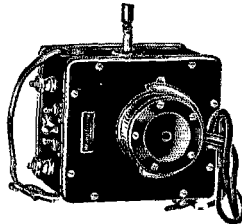


INDUCTION COILS, Battery Telephone Type... \$7.50

Relay and Jack Combination 350 ohms, 1/2 volt, \$1.00

W.E. TELEPHONE TEST SET

No. 175-125 W. has large variety of uses. Price... \$4.50



RECEIVERS

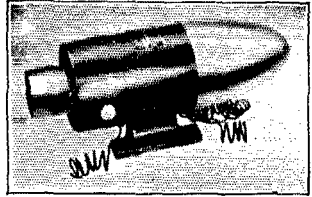
S.E. 143 and 1 P. 500, 1420... \$100-\$150.00
 150-1200 meters, Navy S.E. 1440A... \$45.00
 177-775 meters, Marconi... 15.00

EXTRA SPECIAL

Pyrene, 1 qt. size U. S. Army fire extinguishers, with 1 qt. Pyrene liquid. (Safe to use on "live wires.") Every station should have one. Reg. \$12.00... \$4.50



ANTI-CAPACITY SWITCHES
 W.E. 12 and 16 Terminals, all with Platinum Contacts, value \$3.50 each. Our price, 95c each... \$5.00
 Lots of 6... \$5.00
 Also 12 Terminal, one side momentary, other closed... \$9.50



Navy Aircraft Dynamotor, Gen. Elec., new, 24/1000 volts, 1 amp., extended shaft with pulley, can be driven by motor, or propeller, giving 24 volts output for filament and 1000 volts for plate or driven by its own input of 24 volts. Value \$250.00. Our special price \$50.00

DYNAMOTORS

24-750 volt Gen. Electric 200 mills \$27.50
 24-1500 Crocker-Wheeler 300 mills \$5.00
 24-1000 Gen. Elec. 1000 mills... 50.00
 24-1500 Gen. Elec. 2 1/4 kw. output 95.00
 12-350 volt 80 mills... 18.00
 12-750 volt 200 mills... 30.00
 32-350 volt 80 mills... 9.00
 32-300 volt 60 mills... 7.50
 Dynamotor armatures, General Electric triple commutators, d.c. 24/1500 volt, complete with ball bearings (build field and save \$30)... \$12.50

GENERATORS

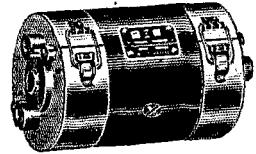
110 volt a.c. 900 cycle, self-excited 200 watts... \$15.00
 105 volt a.c. 600 cycle, self-excited 250 watts... \$15.00
 110 volt a.c. 500 cycle, self-excited 250 watts... \$25.00
 1500 volt d.c. 600 mills, 1 kw. Esco 1750 r.p.m... \$45.00
 240 volt 500 cycle, self-excited 2500 r.p.m. 250 watt, (also hand drive)... \$25.00
 120 volt d.c. 3 kw... \$60.00
 120 volt d.c. 20 kw... 115.00
 600 volt d.c. 2 kw... 45.00
 250 volt a.c. 500 cycle 1 kw... 45.00
 230 volt a.c. 500 cycle 2 kw... 60.00
 12 volt d.c. 60 amp... 15.00
 12 volt d.c. 33 amp... 7.50

MOTOR GENERATORS

120 d.c., 110 or 220 a.c., 500 cycle, 250 watt... \$30.00
 120 d.c., 110 or 220 a.c., 500 cycle, 500 watt... \$40 to \$75.00
 120 d.c., 110 or 220 a.c., 500 cycle, 1 kw... \$75 to \$100.00
 120 d.c., 110 or 220 a.c., 500 cycle, 2 kw... \$50 to \$150.00
 120 d.c., 110 or 220 a.c., 500 cycle, 5 kw... \$95 to \$250.00
 120 d.c. to 20 d.c. 2 kw... \$60.00
 120 d.c. to 400 d.c. 2 kw... 45.00
 120 d.c. to 600 d.c. 2 kw... 65.00

CONVERTERS

120 d.c., 120 a.c., 60 cycle, 2 kw... \$85.00



NEW LOW PRICE

Dynamotor 32/350 volt, ball bearing, 80 mills. Special \$9.00. Per pair... \$15.00

Thermocouple ammeter, 0-2 or 0-10 model 425 Weston... \$6.50
 Voltmeter, Westinghouse, 2 scale 0-5-150. List \$6.50... \$1.00
 Voltmeter, Weston, No. 267 D.C., 0-70... \$4.50
 Ammeter, Weston, No. 267 D.C., 30-140... \$4.50

Condensers, W. Elec. type 21A, 1000 volt A.C. test, 1 mfd... \$7.50

WE WILL NOT SHIP ANY ORDER AMOUNTING TO LESS THAN \$1

Special: — Only a few left — Magnets, W. Elec. four bar hand crank... \$2.50

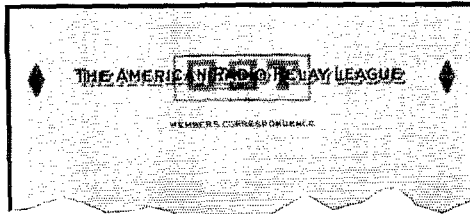
Largest Radio Electric Supply House in U. S. on Army Navy Surplus. Sufficient postage and deposit of 20% required on C. O. D. orders. No orders shipped for less than \$1.00. CANADIAN ORDERS MUST INCLUDE FULL REMITTANCE; — WE DO NOT ISSUE CATALOGS.

MANHATTAN ELECTRIC BARGAIN HOUSE, DEPT. Q, 105-7 Fulton St., New York City

Say You Saw It in QST — It Identifies You and Helps QST



A.R.R.L. SUPPLIES FOR THE AMATEUR



MEMBER'S CORRESPONDENCE STATIONERY
One color (black) heading now being used at greatly reduced cost to members.

Write your radio letters on League stationery — it identifies you.

Lithographed on 8½ x 11 heavy bond paper.

100 sheets.....50c
250 sheets.....\$1.00
500 sheets.....\$1.75

Postage Included

UNITED STATES DEPARTMENT OF COMMERCE		F. I. SERVICE		U. S. GOVERNMENT PRINTING OFFICE		
THE AMERICAN RADIO RELAY LEAGUE						
HEADQUARTERS, WEST HARTFORD, CONN. U. S. A.						
RADIOGRAM						
TO: FROM: DATE: CLASS: NUMBER: DATE: CLASS:	HARTFORD CONN.		514X	394	MARCH 24	5/
TO: CASL FRANK WOODS 14 NORTH STREET N. E. ROCHESTER MINE NEW YORK			THIS MESSAGE WAS RECEIVED AT STATION NAME PHONE: CITY STATE ZIP: CITY STATE ZIP:			
KINDLY ADVISE PRESENT STATUS OF THE ORIENTAL TRAFFIC ROUTE RUNNING FROM THE EAST COAST TO THE ORIENT STOP IS NOW STILL A MEMBER OF THIS CHAIN QUERY LATEST ROUTE MANAGERS BULLETIN MAILED TODAY 23						
P. L. BATTERY						
REC'D	FROM STATION	LOCALITY	DATE	TIME	OPERATOR	
Sent	PHOTO	KENMORTH, PITTSBURGH, PA.	3/25/31	8:54 P.M.	RP	

OFFICIAL A.R.R.L. MESSAGE BLANKS

Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size 8½ x 7¾. Put up in pads of 100 sheets. One pad postpaid for 35c or three pads for \$1.00.

MESSAGE DELIVERED, SEND FOR RADIOGRAM AMERICAN RADIO RELAY LEAGUE		
From:	Date:	
Time received:	Date:	At Radio Station:
Phone		
THIS MESSAGE WAS TRANSMITTED FREE OF CHARGE BY AMATEUR RADIO STATIONS OF THE AMERICAN RADIO RELAY LEAGUE. ANSWER WILL BE SENT FREE BY FILING AT THE STATION.		

MESSAGE DELIVERY CARDS

Neatest, simplest way to deliver a message to a near-by town. On U. S. stamped postals 2c each. On plain cards (for Canada, etc.) 1c each, postpaid.

AMERICAN RADIO RELAY LEAGUE
WEST HARTFORD, CONN., U. S. A.

Why can't we start a campaign to set aside one hour, say 4 to 5 or 5 to 6 p.m. Saturdays or Sundays or both, in which W de W contacts are barred? This need only be on 20 meters and 40 meters, and since most of the traffic is moving on 80 it will not interfere to any great extent with the traffic hounds.

E. D. Miller, W8CJJ, W4QL

Radio Golf

State College, Pa.

Editor, QST:

Here's another contest (ahem) idea. Not "golf by radio" but "radio golf" as follows:

1. The nine districts constitute the nine holes. The length of the holes in yards, and the corresponding pars, to be determined thus: Adjacent districts equivalent to 150-yard holes. District one removed, 350 yards. Other district combinations, 500 yards, etc.

2. The order of the holes to be determined by lot (from a hat) for the two ops that pair up for a game.

3. One plays a hole by starting messages for the districts in order.

4. A message landed in the town of address counts as an eagle.

5. A message landed in the district of address counts as a birdie.

6. A message landed in an adjacent district counts as par, if only relayed once.

7. Messages relayed more than once count that many times over par.

8. A message undelivered counts as a lost ball.

9. A message started in the wrong direction counts as out of bounds.

10. A game of nine holes should be finished in two evenings, using any band as desired.

11. Winning score determined by addition, as some golfers do. Hi.

12. YL's and OW's, where available, to act as caddies, collecting their own fees, too, if they can!

13. A 204-A tube scores as a driver; an 852, brassie; a 210, midiron; 245's in push-pull score as lofting mashies; smaller tubes as putters; a postage stamp counts as a niblic. For explosion shots from band bunkers use a TNT transmitter!

14. No doubt serious and prolonged consideration would suggest better rules and regulations.

15. Score cards, bolstered up by QSLLs, etc., — you know the rest, of course.

— E. C. Woodruff, W8CMP

P.S. Extra-flash: 'Phones barred from such contests as no talking is allowed while a player is addressing the ball or otherwise equivalently busy. Hi.

The Daily Good Turn

DeQueen, Ark.

Editor, QST:

From some letters that I have read in QST condemning off-wave operation it seems that the

LOOK INSIDE!

... and be sure that you are getting what you pay for!

★ Look for the three tube set — not a one or two tube receiver. The HAWK employs three tubes; Screen Grid R.F., Screen Grid Det., Pentode Audio.

★ Look for the most recent development in low loss coils — three wound Isolantite coil forms with convenient grips are included with the HAWK.

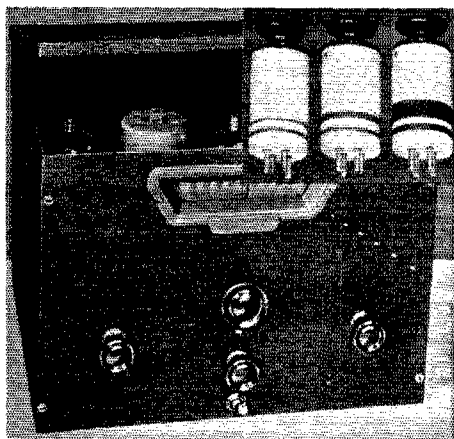
★ Look for the best in condensers — The three variable condensers used in the HAWK are Isolantite insulated.

★ Look for quality parts thruout — The HAWK was designed for absolute efficiency, hence no expense was spared and you will find only the finest materials in the HAWK receiver.

Three tube HAWK receiver including set of three coils wound on Isolantite forms covering range of from 17.5 to **\$22**
110 meters

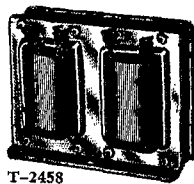
A set of matched 6 volt tubes tested in your set **\$3.60**
6 volt filament transformer **1.75**

Write for descriptive circular



THE CHOKE YOU HAVE BEEN LOOKING FOR

THORDARSON Heavy Duty double filter choke consists of two 18 Henry 250 mil chokes. D.C. resistance only 108.5 ohms. Size 3" x 7" x 5 1/4". BRAND NEW. Ideal for choke input filter systems. Saves the price of an extra choke. Especially suited for use with that class "B" power supply to give better regulation \$7.50 and pass heavy current. Only 7



T-2458

only 90c for a dandy transmitting key

Nice clean job — real bargain — silver contacts — best key you have ever seen at the price.

Yes! We have the New Hammarlund Comet "PRO" on demonstration and ready for immediate delivery. Write for our special price.

YOU CAN'T DRILL HOLES IN ISOLANTITE

Genuine Hammarlund

Isolantite coil forms have sufficient holes for any winding. Beware of the cheap type without this feature.

Genuine Hammarlund Isolantite coil forms 58c

- Neutralizing condensers 50 mmfd. \$.25
- Eveready air cells 2 volts. 5.95
- Weston D.C. Milliammeters 2" bakelite case any range from 10 to 300 m.a. 4.46
- Kurz-Kasch 2 3/4" dials.45
- Kurz-Kasch 4" dial.55
- Universal Double Button mikes. 4.95
- 50 watt sockets side wiping contacts. 1.50
- Federal 1424-W Anti-capacity switches. 1.90
- 7" natural bakelite spreaders.25
- Sheet aluminum 1/16" 7/10c, 3/32" 5/4c, 1/8" 1c.
- Monitor with batteries, coils and tube. 10.50
- Enamel copper antenna wire No. 14 any length 30c 100 Ft.
- Enamel copper antenna wire No. 12 any length 45c 100 Ft.
- Enamel copper antenna wire No. 10 any length 90c 100 Ft.
- 280M mercury full wave rectifiers. \$1.25
- 281M mercury half wave good up to 1200 V. 2.00
- 866's guaranteed firsts. 2.95

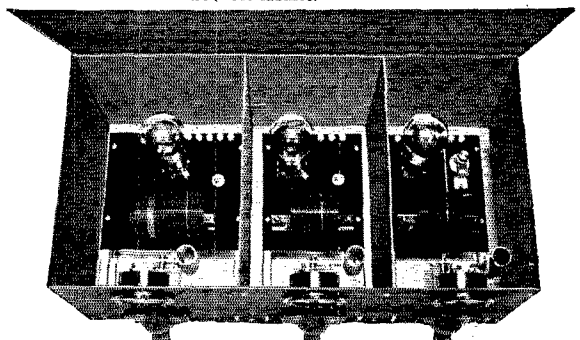
COPPER TUBING INDUCTANCES

WOUND AND ENDS DRILLED FREE

Inside dia.	3/16"	1/4"	5/16"
1 1/2"	7c turn	8c turn	
2 1/2"	7c turn	8c turn	12c turn
3 1/2"	10c turn	12c turn	14c turn

a real transmitter bargain

"Get in the swim" with the proud owners of the GC-30 transmitter — enjoy the safety of crystal control at this low price — Compact, neat, completely shielded in a beautiful dust proof cabinet.



GC-30 Crystal control transmitter

your choice 210 oscillator 210 buffer 210 amp.

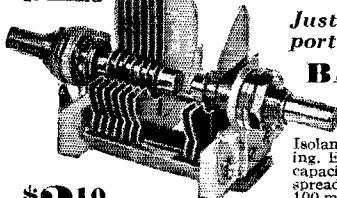
or Pentode oscillator 210 buffer 210 amp.

Completely assembled ready for you to wire with three Read-rite meters. **\$29.50**

with three Weston meters \$42.50

Write for descriptive circular

100 mmfd
20 mmfd



\$2.10

COMPACT . . .

Just the thing for that portable—The Midget

BAND SPREAD CONDENSER

Isolantite insulated single hole mounting. Extremely compact in size. Tank capacity is variable besides the band spreading section capacity one side 100 mmf other 20 mmf. The only band spreading condenser that can be ganged.

A COMPLETE LINE OF STANDARD AND "HARD TO GET" PARTS

"JERRY'S PLACE"

25 WARREN STREET, N. Y. C. TELEPHONE BARCLAY 7-6698



SENSATIONAL LOW PRICES!

On High Grade Equipment

Oil tank condensers — made by world's largest mfr. — 6 mfd. 1200 d.c. working voltage — slightly used — guaranteed.....\$5.98
50 watt tube socket — heavy glazed ISOLANTITE.....\$1.58
852 or 860 tube sockets — high grade, ea.....\$1.65
New REL No. 271 "Globe Girdler" xmitters in stock — write for prices.

CeCo 866 m.v. NEW — 6 months guarantee — heavy duty.....\$3.65
210, 281, 250 RCA licensed NEW tubes — guaranteed, each.....\$1.00
New RCA licensed tubes — guaranteed — 230 at \$.75; 231 at \$.75; 232 at \$.85; 233 at \$.98; 235 at \$.75; 236 at \$.98; 237 at \$.85; 238 at \$.98; 239 at \$.98; 247 at \$.75; 245 at \$.50.
SPARTON type tubes, new: S84 at \$.75; S85 at \$.75; S83 at \$.85; S82B at \$.85.

Brand new! 866 m.v. heavy duty, guaranteed.....\$2.25

4-gang .00035 mfd. var. conds. bath-tub type — new.....\$1.95

Midget var. conds. 15 plates.....\$.29

Ameco Monostat with black knob 1000 ohms — new.....\$.25

250 power transf. heavy duty type, 575 v. on each side of c.t. 7 1/2 v. — 3 amp. c.t.; 7 1/2 v. 3 amp.; 2 1/2 v. 12 amp.....\$3.95

2 1/2 v. c.t. 12 amp. filament transf. heavily cased.....\$3.98

Filament transf. 2 1/2 v. 12 amp. c.t.; 2 1/2 v. 3 amp. c.t.; 5v. 2 amp. \$1.75

Filament transf. 10v. c.t. at 7 amp. heavily cased.....\$3.98

Filament transf. 2 1/2 v. at 12 amp., heavily cased.....\$3.98

"Erpces" German imported phones — weighs 5 1/2 oz.....\$1.75

Baldwin type C phones — genuine — original cartons.....\$4.25

Brandes Superior phones.....\$1.75

Victor ABC power transf. ideal for 245 push-pull xmitters.....\$1.79

New Pilot super wasp a.c. short wave kits.....\$29.95

New Pilot super wasp d.c. short wave kits.....\$28.00

New Pilot K-111 power pack for a.c. super wasp.....\$15.50

Hardwick-Hindle 10,000 ohm 60-watt grid leaks — new.....\$.49

Signal keys and relays.....Prices very special

Allen-Bradley Radiostats for 500-watt xmitters — new — Special

New ESCO dynamotors, motor generators and converters in stock.

Plate supply transf. cased 375 v.a., Sec. 1500-1000-0-1000-1500 volts.....\$10.98

Plate supply transf. cased 850v.a., Sec. 2000-1500-0-1500-2000 volts.....\$13.75

Plate supply transf. cased 850v.a. Sec. 2500-1500-0-1500-2500 volts.....\$14.95

Filter chokes cased 30 hry. 300m.a. \$7.50; 30 hry. 150 m.a. \$3.25

Modulation chokes cased 10 hry. 300m.a. \$21.50; 10 hry. 150 m.a. \$12.50

Allen-Bradley E-210 fila. controls for 10-watt xmitters.....Special

Filter conds. all capacities and working voltages — best quality Special

New 12 ga. enameled copper wire — 100 ft. 50c; 200 ft.....\$.90

Stand-off insulators — best quality, dozen.....\$1.00

Write for our LOW PRICES on Electroalloy and also Aluminum shield cans and panels. Special low prices on copper tubing — all sizes.

OM, Here's Money Saved!

Power oscillating crystals, precision-made. Absolutely guaranteed. Calibrated to 0.1%. "A product of the world's greatest electrical city." 3500-4000-kc., \$3.95; 1715-2000-kc., \$3.95; 4606-4800-kc. triple to 20 meters, \$5.95; oscillating and finished blanks, \$2.25; unfinished blanks, \$1.25; re-grinding to new phone band, \$1.75. Dust-proof crystal holders (money refunded if not the best made) \$2.50. Long and short wave receiver complete with Cunningham tubes, guaranteed, \$15.50 complete. 280M mercury vapor tubes, new, guaranteed, \$1.25.

Crystals and crystal holders in stock. Write for prices.

Everything for the amateur stocked. Our prices always lower. Foreign orders solicited. Send your requirements in, and let us quote prices. Include postage with all orders, and 20% deposit against all C.O.D. shipments.

"IF IT'S RADIO—WE HAVE IT"

MAURICE SCHWARTZ & SON

710-712 Broadway

SCHENECTADY, N. Y.

"The home of the largest electrical plant in the world"

ham is operating off-wave on purpose, but this is not the case 99 times out of 100. A fellow who is outside of the assigned frequency really thinks that he is safely inside the band. Some fellows do not have the remotest idea what their wavelength is. About a week ago I heard W5 — off wave and calling CQ. I called him and told him that he was dangerously near the edge of the band, if not completely off wave. Then he came back asking which end of the band he was on. Hi!

And now for the main idea of this letter. First, keeping inside of the assigned frequency bands. This is very simple. *QST* has had several articles on monitors, frequency meters and calibration methods. If you have a good calibrated meter and check your frequency every day before going on the air you need never fear receiving a card from the O.O.

Second, helping the other fellow keep inside the bands. We have the O.O.'s scattered all over the country to check off-wave operation. They send a card to the off-wave station warning him. This is usually effective but it is slow, and, besides, the O.O.'s can't watch for all of the off-wave operation.

Now here is where everyone can do a daily good turn. You have probably noticed that the off-wave ham is usually calling someone or calling CQ. Now if we could all just spend a few minutes of our time listening for the off-wave hams and give them a call, warning them that they are off-frequency, it would be a great help to all concerned. That should be the Ham's motto as well as the Boy Scout's: "Do at least one good turn each day."

— Norman Willis, W5JK

I. A. R. U. News

(Continued from page 44)

Memorandum and Articles of Association prepared at that time, form the basis upon which all Society business is transacted. 1926 will also be remembered as the year during which the first R.S.G.B. Annual Convention was held. This initial meeting was attended by numerous provincial amateurs and is regarded now as the date upon which amateur radio in Great Britain began to advance along more democratic lines. Up to that time the majority of Britishers interested in amateur radio were of an academical turn of mind, and had possibly little interest in the promotion of their hobby into circles which we can regard now as "low brow." At this first Convention, however, many barriers were broken down and the leading amateurs of the country met and conversed on common ground (in the awe inspiring lecture theatre of the Institution of Electrical Engineers, London) with "juniors," many of whom had little or no knowledge of the theory of radio communication.

At this first Convention a proposal was made that the scope of the Society should be further extended into the British Empire, but no serious effort to put this proposal into practice was made until the year 1928.

THE NEW QST BINDER

Announced in January QST, it met with immediate success and much praise. You'll like this binder.

A Dupont fabrikoïd material of waterproof and oilproof imitation leather in a rich wine color, which matches the color of your present binders. Instead of metal wires, it has well-designed strong metal strips to conveniently place your copies in the binder—13 such strips, too—12 for the yearly supply of QST and one for your QST index. It doesn't cost any more either.

Holds 12 issues of QST and index

\$1.50 each, postpaid

AMERICAN RADIO RELAY LEAGUE

38 LaSalle Road, Hartford, Conn.



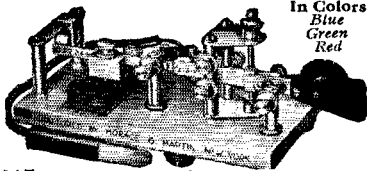
YOU CAN'T AFFORD TO BE WITHOUT THE NEW

Easy-Working Genuine Martin

No. 6 VIBROPLEX

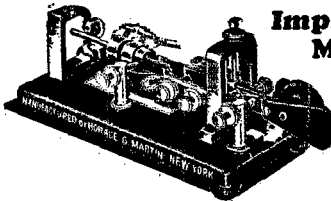
Reg. Trade Marks: Vibroplex, Bug, Lightning Bug

Makes sending easy. Easy to learn. Easy to operate.



In Colors
Blue
Green
Red

Black or Colored, \$17. Nickel Plated, \$19



**Improved
MARTIN
Vibroplex**

Black or Colored, \$17

Nickel-Plated, \$19

Special MARTIN RADIO Bug—Extra large Specially Constructed Contact Points for direct use without relay. Black or Colored. \$25

Liberal allowance on old Vibroplex
Remit by Money Order or Registered Mail

THE VIBROPLEX CO., Inc. 825 BROADWAY
NEW YORK CITY
Cable Address: "VIBROPLEX," New York

HAMMARLUND *Isolantite* SOCKETS



A NEW precision product for radio constructors. Electrical efficiency not affected by temperature or humidity. Top and sides glazed. Perfect contact by reinforced side-gripping rustproof springs. Four, five and six prongs, with standard mounting centers.

Hammarlund presents also, a new short-wave tuning condenser, with Isolantite insulation, and an efficient Isolantite coil form.

Write Dept. Q-5 for Details

HAMMARLUND MFG. CO.
424-438 W. 33rd St. New York

For Better Radio
Hammarlund
PRECISION
PRODUCTS

Jewell Radio Company

POWER AMPLIFIERS **PACKS** SUPPLIES **A SPECIALTY**

Exclusive Eastern Distributors for

PURADYNE PRODUCTS

Reg. U. S. Pat. Office

The PURADYNE Plate supply transformers have been designed so that they may be adapted to the most common applications in rectifying and transmitting circuits. The primary windings are designed for operation from a 60 cycle 110-115-volt supply. All units are designed for continuous operation at full load. The insulation test at a potential of 10,000 volts insures satisfactory operation under all possible conditions.

No.	Out Put Voltage	Filament Voltages	Watts	Price
30	350-0-350		850	\$11.95
	1500-0-1500			
50	1500-0-1500		500	8.50
	1000-0-1000			
10	750-0-750	7 1/2 V. c.t.-7 1/2 V. c.t.	325	5.00
10A	600-0-600	7 1/2 V. c.t.-7 1/2 V. c.t.	200	4.00
45	375-0-375	2 1/2 V. c.t.-2 1/2 V. c.t.	100	3.50

PURADYNE filament transformers, 10,000V. insulation in metal cases with stand-off insulators: All guaranteed for one year against any defects.

ALL CENTER TAPPED:

2 1/2 V. — 12 amps for 660's	\$3.50
2-2 1/2 V. c.t., 10 amps each winding, for four 660's	4.50
5V. — 20 amps, for 872's	6.00
7 1/2 V. — 7 amps, for 210s, 250s, 281s	3.50
2-7 1/2 V. c.t. at 6 amps each	4.50
10V. — 7 1/2 amps for 203As, 211s, 852s, 860s, 845s	4.00
12V. — 10 amps for 204As, 212Ds	4.50
14V. — 12 amps	5.50

Special filament transformers with stand-off insulators tapped at 2 1/2 V. — 7 1/2-10-12-14-18-20 Volts. **\$12.50**

PURADYNE microphone transformers in neat shielded cases, single button **\$1.75** — double button **\$3.50**. Mike stands, cable model **\$2.00**. floor model adjustable to eighty inches, statutory bronze or silver finish **\$4.50**

PURADYNE 30 Henry 125-mil choke 260 ohms d.c. resistance. **\$1.00**

PURADYNE 250 mil choke 30 Henrys 110 ohm d.c. resistance in metal case with stand-off insulators. **\$3.00**

PURADYNE 30 Henry 250 mil double chokes. **\$5.00**

PURADYNE 500 mil choke 30 Henrys 110 ohm d.c. resistance in metal case with stand-off insulators. **\$7.50**

PURADYNE .001, .002, .006 plate-blocking condensers with stand-off insulators. **.75**

PURADYNE guaranteed transmitting filter condensers, metal cases with stand-off insulators. All condensers rated at a continuous working Voltage.

Capacity	1000 Volts	1500 Volts	2000 Volts	3000 Volts	4000 Volts
1 mid.	1.25	2.00	3.00	5.00	6.00
2 mid.	2.00	3.00	5.00	12.00	
3 mid.	2.50	4.25	6.50	28.00	
4 mid.	3.25	5.50	9.00	36.00	

PURADYNE 200-watt center tapped transmitting gridleaks in metal case with stand-off insulators:

5,000 Ohms. **\$1.75** 20,000 Ohms. **\$2.50**

10,000 Ohms. **2.00** 30,000 Ohms. **2.75**

15,000 Ohms. **2.25** 50,000 Ohms. **3.75**

PURADYNE Portable Microphone and Pre-Amplifier for Public Address Systems and Transmitting Phone Work. Consists of Microphone, Transformer, Control. All compactly installed in neat metal case. Ideal for Home Recording Systems. **\$9.50**

NOTE: JEWELL carries the most complete line of power supplies and P.A. Systems in the city. Send for literature.

PURADYNE heavy duty 50 watt sockets, porcelain base, metal shell, double contacts. Very special. **\$1.00**

PURADYNE 281 Mercury Vapor rectifying Tubes. **\$4.00**

PURADYNE Mercury Vapor AAA heavy duty 866 Rectifying Tubes. **\$4.50**

SUPER SPECIALS!!!

AMERTRAN 250 P.P. POWER TRANSFORMER 700-0-700, 7 1/2 V.C.T., 7 1/2 V.C.T., 225 MILLS **\$2.75**

WATS **\$4.75**

AMERTRAN T.250 BLEEDER 41000 OHMS. **\$1.25**

LAST MINUTE SPECIALS!

THORDARSON Fil. Transformers 12V. 2 1/2 V. 5V. **\$1.25**

R.60A. 2 Henry 300 mls, 20-ohm key click and filter choke. **\$1.25**

Enameled aerial wire No. 10, 100 feet solid. **.90**

W.E. Shielded three wire microphone cable, per foot. **.06**

MERSON electrolytic Condensers, metal cases, 8 mid, 450V. **.45**

Voltage Divider 18,000 ohms for 245 P.P. 5 amps. **.35**

EVEREADY RAYTHEON Photo Electric cells, List **\$35.00** **9.50**

We Can Supply Anything — At Jewell's Prices — Ask For It. Compare the Prices

Include postage with all orders and 20% deposit against C.O.D. Shipments

Jewell Radio Company

New Address: 110 Chambers St., N. Y. City

Phone Barclay 7-8937

Dept. S

During that year Mr. Arthur Watts (Vice-President, 1931 & 1932), who had joined the old General Committee, offered to undertake the duties of Publicity Manager. From that date the Society has made tremendous strides both at home and abroad.

Mr. Watts' first duty was the personal circulation of letters to hundreds of British Empire amateurs, outlining the advantages to be gained by association with the R.S.G.B. The response was particularly gratifying and in the first year about 250 active Empire amateurs joined our ranks.

The appointment of overseas representatives followed during 1929 and 1930, whilst in the latter year an Empire Link Station network was put into operation. The home end of the Link comprises 25 specially selected stations who are scheduled to work with predetermined parts of the Empire.

With an increase in overseas membership it was considered desirable to issue a special certificate for award to amateurs who had effected two-way contact with some part of the British Empire in each of the five continents. This is known as the W.B.E. certificate and has been awarded to over 100 B.E.R.U.—R.S.G.B. members situated in every part of the Empire.

Probably one of the most outstanding advances during the year 1931 was the great increase in interest shown by non-transmitting amateurs. To cater for this class of member the Society many years ago issued B.R.S. numbers to identify them as British Receiving Stations, but few people could have visualized the growth which was to come. By the end of 1931 over 600 of these members had been registered, representing just over a third of the full Society membership.

During the same year it was decided to reorganize the method of District Representation. It was felt that owing to the all-around increase in home membership it would be advisable to appoint representatives for each English county. The duty of these County Representatives is to coördinate the work of the members in their county, and to arrange social events from time to time for the purpose of keeping the members in close touch with one another.

The County Representatives are themselves responsible to District Representatives who are appointed annually by the Council of the Society. Each D.R. is in charge of a group of from four to seven counties, except in the case of London where D.R.'s are appointed for the four postal districts, North, South, East and West. Scotland is represented by an Honorary Manager who reports direct to Council, but the interests of all English provincial districts are represented on Council by one country member entitled the Provincial Districts Representative.

Conventionettes are held yearly in each Provincial District, whilst the Annual Convention takes place in London during the early autumn.

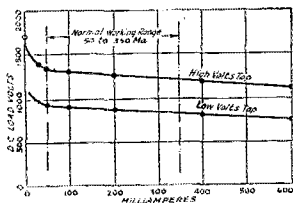
Probably one of the most useful and interesting divisions of the Society's work concerns the organization known as Contact Bureau. Founded

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SOLVE REGULATION PROBLEMS

WITH THE FOLLOWING ADVANTAGES: —



10% Regulation Actually Obtained with Swinging Choke

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long-lived performance*

The uniformity, performance and unique construction of Arcturus transmitting tubes establish a new basis for considering operation cost per hour. The exclusive "unitary structure" principle of interlocking the elements maintains the precise interrelation of parts through interdependence. This assures unvarying uniformity even under most rigorous conditions.

These tubes are interchangeable with other makes whose last two digits are similar.

Write for technical data bulletins on the Arcturus Types E703-A, E711, E711-E, E745 (50-watt tubes) and E766 and E772 (mercury vapor rectifiers).

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ARCTURUS

Quality Tubes for Transmitting,
Receiving and Industrial Uses

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If you can't do all this in the column to the right you should take THE CANDLER SYSTEM Course in High-Speed Telegraphing. It trains your Brain, Muscles and Nerves to CO-ORDINATE in doing fast, accurate work. It gives you CONFIDENCE, natural CONCENTRATION and banishes Nerve Strain. Original CANDLER METHODS have developed over 45,000 of world's fastest Morse and Radio operators including the champion. TELEGRAPH-TOUCH-TYPEWRITING—only method for operators. Shows how to use "mill" in receiving, how to copy several words behind easily at high speed.

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Your A.R.R.L. EMBLEM



The League Emblem comes in four different forms. Its use by Members is endorsed and encouraged by the League. Every Member should be proud to display the insignia of his organization in every possible way.

THE PERSONAL EMBLEM. A handsome creation in extra-heavy rolled gold and black enamel, $\frac{1}{2}$ " high, supplied in lapel button or pin-back style. The personal emblem has come to be known as the sign of a good amateur. It identifies you — in the radio store, at the radio club, on the street, traveling — you can spot an amateur by it. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, \$1.00, postpaid.

THE AUTOMOBILE EMBLEM. $5 \times 2\frac{1}{2}$ ", heavily enameled in yellow and black on sheet metal, holes top and bottom, 50c each, postpaid.

THE EMBLEM CUT. A mounted printing electrotype, the same size as the personal emblem, for use by Members on amateur printed matter, letterheads, cards, etc. \$1.00 each, postpaid.

THE "JUMBO" EMBLEM. How about the shack wall or that 100-footer? Think of the attention this big yellow-and-black enamel metal emblem will get! $19 \times 8\frac{3}{4}$ ", same style as Automobile Emblem. \$1.25 each, postpaid.

**The American Radio
Relay League
West Hartford, Conn.**

in 1928 by Mr. T. Palmer Allen of Belfast, Northern Ireland, its main object is to put members interested in specific radio problems into contact. At the end of 1931 some 12 separate groups were operating, each group comprising from one to eight sections of six members each. Typical subjects now being studied are "Fading, Skip Distance and Blindspot Effects"; "Weather and Barometric Effects"; "Aerial Design and Wave Propagation"; "56-mc. Work"; "28-mc. Work"; "3.5-mc. Work"; "1.75-mc. Work"; and "Low Power Transmission."

Responsibility for this section is vested in a Contact Bureau Manager who is a member of Council. Group managers are responsible to him for the individual group reports and the compilation of Group Letter Budgets.

The Letter Budget idea is also followed out by most of the District Representatives who circulate all station activity reports received each month amongst the members in their districts.

The Society's QSL service is perhaps the best organized in the world, handling on an average 120,000 cards per year, and gives a free distribution to Society members.

Changes of address are registered for publication in the "T & R Bulletin" by a QRA Manager, who also provides up to date lists of calls to the several call book publishers.

An efficient and up-to-date frequency meter is possessed by the Society and operated by a leading London member. Accuracies up to one part in 10,000 are guaranteed. Calibration services are also transmitted by members at regular intervals.

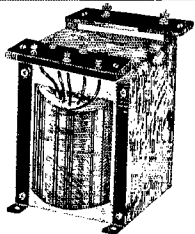
Numerous competitive tests are organized each year and valuable trophies presented to the winners. The three most important awards are known as the Rotab Cup, the Wortley Talbot Trophy, and the B.E.R.U. Challenge Trophy. The former is presented to the member carrying out the most consistent DX (long distance) work of the year; the Wortley Talbot is given to the member making the most important contribution to our radio knowledge during the year; whilst the handsome B.E.R.U. Trophy is awarded to the winner of the Annual British Empire Contest held in the springtime.

The Powditch Trophies for 28-mc. work are also very valuable awards, and are presented to the winners of the Society's 28-mc. transmitting and receiving tests.

Special listening tests for the B.R.S. membership are being organized during 1932 and awards are to be made dependent upon the number of entrants.

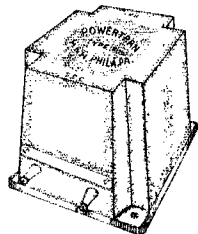
Outstanding achievements in connection with licensing matters have been attained by Mr. Gerald Marcuse (Past President 1929-1930). The recent opening up of the 3.5-mc. band for daily use during eight months of the year, and the reduction of the "guard bands" are but two examples of the excellent work carried out by the "Pioneer of Empire Broadcasting."

The conduct of the Society's work is in the hands of voluntary officials who are called upon

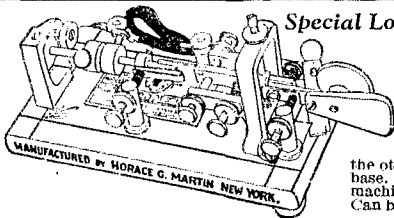


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Save Space Save Money
All Filaments from One Transformer



Type	Sec. No. 1	Sec. No. 2	Sec. No. 3	Sec. No. 4	Open Mounting	Cast. Alum. Mounting
2210	2 1/2 V 10A	7 1/2 V 3A	7 1/2 V 3A		\$6.75	\$9.75
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2212	2 1/2 V 10A	7 1/2 V 3A	7 1/2 V 3A	7 1/2 V 3A	\$6.00	\$9.50
2213	2 1/2 V 10A	7 1/2 V 3A	10V 7A		\$8.25	\$12.00
2214	2 1/2 V 10A	7 1/2 V 3A	7 1/2 V 3A	10V 7A	\$10.10	\$14.25
2215	2 1/2 V 10A	2 1/2 V 6A	7 1/2 V 3A		\$6.75	\$9.75



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Suitable for all classes of transmitting work where speed and perfect Morse are prime essentials. New style, single lever. Two pairs of contact points; one for dots, the other for dashes. Weight, 3 lbs. 8 oz. Japanned base. A handsome and efficient transmitting machine, with unlimited sending possibilities. Can be furnished in red, green or blue.

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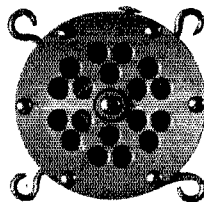
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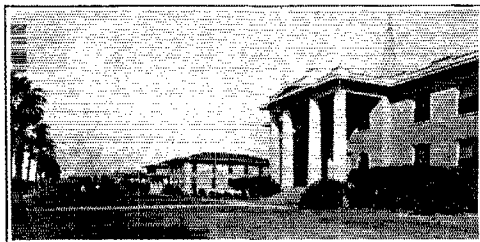


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AMERTRAN POWER PACK

Heavy power transformer and two 25 Henry, 150 MA chokes in a compound filled metal case. Delivers 600 volts each side of center-tap at 120 MA and four 2 1/2 Volt windings. Tapped primary, FB for use with the new 871 (888) rectifiers. Weighs 21 Lbs. \$11.95

THORDARSON 200, 220, 240 Volt primary transformer. Delivers 8 volts CT, 2 1/2 Volts at 10 amps., and 350 volts each side of CT. 3 1/2" x 3 1/2" x 5". 5 1/2 lbs. \$2.45

UNGASED POWER TRANSFORMER. 600 volts at 80 MA, 7 1/2 CT, 7 1/2, and 2 1/2 volts at 12 amps. 8 1/2 lbs. \$2.95

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Made of highest grade materials and insulated for 10,000 volts. In compound filled metal case 4 1/2" x 4 1/2" x 5" high with neat crackle finish. Large porcelain insulators. Weigh 7 1/2 lbs. Fully guaranteed.

2 1/2 Volts at 12 Amps. Center-tapped. For 866 tubes. \$3.45
7 1/2 Volts at 6 Amps. Center-tapped. For 210's, etc. \$3.45
10 Volts at 8 Amps. Center-tapped. For fifty Watters. \$3.95
SPECIAL FILAMENT TRANSFORMERS. Completely mounted in metal cases. Conservatively rated. All windings center-tapped.
2 1/2 Volts at 4 Amps. \$1.90. 2 1/2 Volts at 12 Amps. \$1.95
7 1/2 Volts at 4 Amps. 1.90. 10 Volts at 4 Amps. \$2.95
2 1/2 Volts at 10 Amps and 2 1/2 Volts at 4 amps. \$2.20
7 1/2 Volts at 3 Amps and 7 1/2 Volts at 3 amps. \$2.55
ROYAL Class B Modulation Transformers. Per Pair. \$8.10

MAY SUPER-SPECIALS

Genuine ELKON Bone Dry Electrolytic Condensers! Metal-Cased, with mounting bracket, 500-volt peak. Put a quantity in series-parallel for high voltage filter condensers. Brand new stock!

8 Mfd. — 49c each. Eight for \$3.60. Sixteen for \$6.90
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RCA LICENSED TUBES. UX-245 and UV-227. Five day replacement. FIVE for \$1.00.

Short Wave RF Chokes. Unmounted. 9c
100 Turn Honeycomb Coils. 22c each. Six for \$1.00.

NEW ROYAL FILTER CONDENSERS

In attractive crackle finished heavy steel case with large porcelain stand-off insulators. Very conservatively rated and guaranteed against any defect.

Capacity Mfd.	1000	1500	2000	3000	5000
1	\$1.85	\$2.25	\$3.95	\$8.20	\$9.95
2	2.65	3.85	6.45	13.25	15.25
4	3.85	5.75	10.95	24.05	28.35

AEROVOX 2 Mfd., 1250 Volt working. Metal cased filter condensers. \$2.45

THORDARSON double chokes. Two 30 Henry, 150 MA power chokes in a metal case. 7 lbs. \$1.95
30 Henry, 120 Milliamperes chokes. Mounted.95c

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Brand new 211, 203-A, or 845 Tubes. \$14.00
First grade UX-866 Mercury Vapor. \$2.20
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to give up practically the whole of their spare time in dealing with a mass of detail which we believe is greater than that passing through any other similarly organized radio society.*

The financial side of the Society's work has since 1929 been in the able hands of Mr. E. Dawson Ostermeyer. The present state of the Society's funds is a true indication of the excellent work done by the Treasurer.

The Society's prospects have never been brighter than they are to-day, and ere many years are past it may well be found desirable to change our title to the Radio Society of the British Empire — "The Society upon which the sun never sets."

* (Much credit for the recent advances in British amateur radio is due to Mr. Claricoots, R.S.G.B.'s Honorary Secretary. A comparative stranger to amateur circles, although an old R.F.C.-R.A.F. wireless operator during the war, he has set himself the task of welding together the older and newer interests among British amateurs. First one of the London D.R.'s, and later as social manager and vice-chairman of the old General Committee, he succeeded to the secretaryship in 1929. Since January 1, 1929, nearly 1200 new members have joined the Society. — C.B.D.)

Calls Heard

(Continued from page 46)

W9ECP, Don Friend, 911 Fairview, Boulder, Colo.

(1715-kc. c.w.)

w5bmi w5bui w6bxc w7axg w7ayh w8ceo w9acr w9asa w9bbs w9bii w9oni w9ouc w9dov w9dlt w9chw w9exp w9ewc w9fvr w9glc w9hch w9hgn

(1715-kc. 'phone)

w4ad w5abt w5als w5alj w5bjp w7awz w9amz w9aqr w9bxc w9cwg w9cdw w9dgb wdctz w9eca w9eal w9fgw w9flk w9fli w9fln w9fot w9frd w9hcg w9hng w9hmv w9iad

W4ABR, Herrick Brown, Greeneville, Tenn.

7- and 14-mc. bands

g2ay g2by g2dc g2nh g2nu g2hd g2ow g2dz g2vq g2kf g2yd g5by g5bz g5dd g5di g5ml g5ni g5yg g5yh g5yk g5vm g5vl g5ta g5mu g5dh g5lk g5ll g5oh g5gb g5rb g5rg g5vp g5wk g5wn g5wt g5yk g5wy g5xn g5fn g5fl g5tr g5bs g5dt g5eo g5eq g5ex g5fr g5fo g5fr g5fi g5jz g5oc g5odm g5pm g5pv g5px g5pz g5rj g5rx g5tv g5sx g5ts g5wk g5wv g5wz g5xv g5yq g5zq g5aa g5ab g5ac g5ad g5ae g5af g5ag g5ah g5ai g5aj g5ak g5al g5am g5an g5ao g5ap g5aq g5ar g5as g5at g5au g5av g5aw g5ax g5ay g5az g5ba g5bb g5bc g5bd g5be g5bf g5bg g5bh g5bi g5bj g5bk g5bl g5bm g5bn g5bo g5bp g5bq g5br g5bs g5bt g5bu g5bv g5bw g5bx g5by g5bz g5ca g5cb g5cc g5cd g5ce g5cf g5cg g5ch g5ci g5cj g5ck g5cl g5cm g5cn g5co g5cp g5cq g5cr g5cs g5ct g5cu g5cv g5cw g5cx g5cy g5cz g5da g5db g5dc g5dd g5de g5df g5dg g5dh g5di g5dj g5dk g5dl g5dm g5dn g5do g5dp g5dq g5dr g5ds g5dt g5du g5dv g5dw g5dx g5dy g5dz g5ea g5eb g5ec g5ed g5ee g5ef g5eg g5eh g5ei g5ej g5ek g5el g5em g5en g5eo g5ep g5eq g5er g5es g5et g5eu g5ev g5ew g5ex g5ey g5ez g5fa g5fb g5fc g5fd g5fe g5ff g5fg g5fh g5fi g5fj g5fk g5fl g5fm g5fn g5fo g5fp g5fq g5fr g5fs g5ft g5fu g5fv g5fw g5fx g5fy g5fz g5ga g5gb g5gc g5gd g5ge g5gf g5gg g5gh g5gi g5gj g5gk g5gl g5gm g5gn g5go g5gp g5gq g5gr g5gs g5gt g5gu g5gv g5gw g5gx g5gy g5gz g5ha g5hb g5hc g5hd g5he g5hf g5hg g5hh g5hi g5hj g5hk g5hl g5hm g5hn g5ho g5hp g5hq g5hr g5hs g5ht g5hu g5hv g5hw g5hx g5hy g5hz g5ia g5ib g5ic g5id g5ie g5if g5ig g5ih g5ii g5ij g5ik g5il g5im g5in g5io g5ip g5iq g5ir g5is g5it g5iu g5iv g5iw g5ix g5iy g5iz g5ja g5jb g5jc g5jd g5je g5jf g5jg g5jh g5ji g5jj g5jk g5jl g5jm g5jn g5jo g5jp g5jq g5jr g5js g5jt g5ju g5jv g5jw g5jx g5jy g5jz g5ka g5kb g5kc g5kd g5ke g5kf g5kg g5kh g5ki g5kj g5kl g5km g5kn g5ko g5kp g5kq g5kr g5ks g5kt g5ku g5kv g5kw g5kx g5ky g5kz g5la g5lb g5lc g5ld g5le g5lf g5lg g5lh g5li g5lj g5lk g5ll g5lm g5ln g5lo g5lp g5lq g5lr g5ls g5lt g5lu g5lv g5lw g5lx g5ly g5lz g5ma g5mb g5mc g5md g5me g5mf g5mg g5mh g5mi g5mj g5mk g5ml g5mn g5mo g5mp g5mq g5mr g5ms g5mt g5mu g5mv g5mw g5mx g5my g5mz g5na g5nb g5nc g5nd g5ne g5nf g5ng g5nh g5ni g5nj g5nk g5nl g5nm g5no g5np g5nq g5nr g5ns g5nt g5nu g5nv g5nw g5nx g5ny g5nz g5oa g5ob g5oc g5od g5oe g5of g5og g5oh g5oi g5oj g5ok g5ol g5om g5on g5oo g5op g5oq g5or g5os g5ot g5ou g5ov g5ow g5ox g5oy g5oz g5pa g5pb g5pc g5pd g5pe g5pf g5pg g5ph g5pi g5pj g5pk g5pl g5pm g5pn g5po g5pp g5pq g5pr g5ps g5pt g5pu g5pv g5pw g5px g5py g5pz g5qa g5qb g5qc g5qd g5qe g5qf g5qg g5qh g5qi g5qj g5qk g5ql g5qm g5qn g5qo g5qp g5qq g5qr g5qs g5qt g5qu g5qv g5qw g5qx g5qy g5qz g5ra g5rb g5rc g5rd g5re g5rf g5rg g5rh g5ri g5rj g5rk g5rl g5rm g5rn g5ro g5rp g5rq g5rr g5rs g5rt g5ru g5rv g5rw g5rx g5ry g5rz g5sa g5sb g5sc g5sd g5se g5sf g5sg g5sh g5si g5sj g5sk g5sl g5sm g5sn g5so g5sp g5sq g5sr g5ss g5st g5su g5sv g5sw g5sx g5sy g5sz g5ta g5tb g5tc g5td g5te g5tf g5tg g5th g5ti g5tj g5tk g5tl g5tm g5tn g5to g5tp g5tq g5tr g5ts g5tt g5tu g5tv g5tw g5tx g5ty g5tz g5ua g5ub g5uc g5ud g5ue g5uf g5ug g5uh g5ui g5uj g5uk g5ul g5um g5un g5uo g5up g5uq g5ur g5us g5ut g5uu g5uv g5uw g5ux g5uy g5uz g5va g5vb g5vc g5vd g5ve g5vf g5vg g5vh g5vi g5vj g5vk g5vl g5vm g5vn g5vo g5vp g5vq g5vr g5vs g5vt g5vu g5vv g5vw g5vx g5vy g5vz g5wa g5wb g5wc g5wd g5we g5wf g5wg g5wh g5wi g5wj g5wk g5wl g5wm g5wn g5wo g5wp g5wq g5wr g5ws g5wt g5wu g5wv g5ww g5wx g5wy g5wz g5xa g5xb g5xc g5xd g5xe g5xf g5xg g5xh g5xi g5xj g5xk g5xl g5xm g5xn g5xo g5xp g5xq g5xr g5xs g5xt g5xu g5xv g5xw g5xx g5xy g5xz g5ya g5yb g5yc g5yd g5ye g5yf g5yg g5yh g5yi g5yj g5yk g5yl g5ym g5yn g5yo g5yp g5yq g5yr g5ys g5yt g5yu g5yv g5yw g5yx g5yy g5yz g5za g5zb g5zc g5zd g5ze g5zf g5zg g5zh g5zi g5zj g5zk g5zl g5zm g5zn g5zo g5zp g5zq g5zr g5zs g5zt g5zu g5zv g5zw g5zx g5zy g5zz

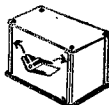
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Who Wants to be an Amateur—And Who Asks You to Explain What It's All About

Of course you can take the time to tell him. But why not save yourself a lot of trouble and at the same time make your friend happy by suggesting that he get a copy of the new second edition of the League's special beginner's booklet — "How To Become A Radio Amateur?" In its 32 pages it briefly tells the story of amateur radio, how to learn the code and build a simple station. A single transmitter, receiver, power supply and antenna are described with clear illustrations and easily-followed building instructions — and there's concise dope on getting licenses and operating properly, too. An inexpensive introduction to ham radio, and preliminary to the *Handbook*. The price is 25c postpaid.

AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Genuine "ALCOA" stock, silvertip finish. 5 x 9 x 6 \$1.80 — 9 x 14 x 7 \$4.65. 10 x 6 x 7 Monitor size \$2.95. 5 x 5 x 5 Shield (like picture on the left) **\$1.00**

ANY SIZE TO ORDER

Genuine BRANDES Phones using handles instead of headband. Made for R.C.A. \$1.95
Handles to fit all phones each45

Hedgehog Transformers

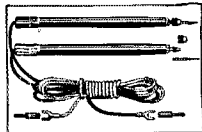
Keying Relay for A.C. or D.C. double pole. \$1.95
19 R.P.M. Motor, A.C. or D.C. for remote control, etc. \$3.50
Selenium Cells. \$3.50
Skinderviken Button.65c

"BUDDY" Test Prods Always sharp pointed, using phonograph needles, 4-ft. wires, spade or phone tips. Colored nipples identify each lead. \$1.50 pair.

G. R. L. IMPEDANCE COUPLED 1 STAGE AUDIO AMPLIFIER for Short Wave and Television. \$2.95

LARGEST VARIETY OF RADIO PARTS IN THE WORLD

BLAN, The Radio Man, Inc.
89 Cortlandt St. Box Q3
New York City



A Complete New Line of

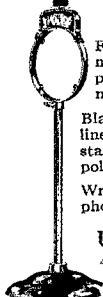
UNIVERSAL Microphone Stands

For best results use only mechanically perfect microphone stands made by an established microphone manufacturer to meet exacting needs. Not made up of lamp or fixture parts.

Blank call letter name plate is furnished on the new line of desk stands, suspension rings, banquet stands and adjustable floor stands. Finished in highly polished chrome plate.

Write for new catalog listing complete line of microphones and microphone accessories.

UNIVERSAL Microphone Co., Ltd.
424 Warren Lane, Inglewood, Calif., U.S.A.



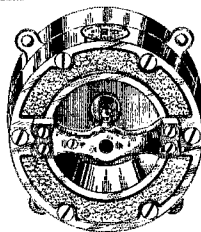
Mayo Type 'Q' Microphones

Formerly offered only to broadcasters, recording studios, etc.

This is truly an instrument you will be proud to own. It uses the new ground center, heat treated, duraluminum diaphragm which insures sensitivity, absence of hiss, and a frequency response equal to microphones listing up to \$75.00. This new and improved microphone is a precision instrument built to rigid specifications and is broadcast size, measuring 3 1/8" diameter x 2" thick, 100 or 200 Ohms per button and finished in pure silver.

Guaranteed

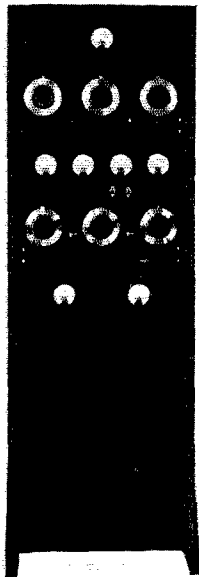
MAYO INSTRUMENT CORPORATION
1 Madison Avenue
New York City



\$9.50
NET
To
Amateurs

For Really FINE EQUIPMENT

150-Watt
Phone Transmitter
Class B
Modulated



— insist on COLLINS design

Send for Bulletin 100 describing complete transmitters priced from \$73.60 to \$285.70, with power supplies; or Bulletin 101 listing relay racks, power transformers and full line of transmitting parts.

Collins Radio Transmitters
CEDAR RAPIDS, IOWA

NEW *Amazing* **ALL-METAL SOLDER**

Solders aluminum, cast iron, pewter, copper and bronze. Replaces riveting of aluminum cabinets. Used for soldering copper wires to aluminum. Positively guaranteed to work every time. Alumaweld kits, containing enough solder for 40 average jobs, sell for \$1.00. Send for one today.

W6GG — 710 E. Broadway, Glendale, Calif.

ALUMAWELD

WSBFG, Ed. Roberts, 65 Genesee St., Skaneateles, N. Y.

14,000-ke. band

fm8eg lu3dh lu8dje lu9dt py1ba py1dy py2ac py2aj py2as py2ay py2bn py2bo py2qa on4au on4fe ve4dj ve4du ve4es ve4ft ve4gu ve4ha ve4hr ve4ij ve5cf ve5cp ve5ff ve5fg ti2fg ti2lc em2ai en2jm em2lc em2mm cm2sv k6aa k4rk k4rj g2ak g2bm g2vq g5bj g5by g5la g5ml g5vl g5yh g6gb g6nk g6qb g6vp g6yk f3mta f8eg f8ex f8od f8ax f8tv x1aa x1b x9a ear96 ear185 ear224 holfg hj1ak rx1aa nylab ct1aa ct1ae vp2pr la1g pa0ld en8mi yv2vs vp2pr et8fa

Murray C. Lesser, 242 Penn St., Brooklyn, N. Y.

Phones heard on 14-, 35- and 1.75-mc. bands

w1aah w1aar w1aci w1ady w1ahd w1ajs w1aub w1awz w1ayb w1br w1bes w1bic w1btu w1cjr w1cmp w1crw w1ewh w1dbe w1dbm w1dtj w1ld w1wk w2ace w2ahp w2ahu w2aih w2aim w2alk w2ait w2aqp w2asq w2au w2awc w2awy w2bka w2blu w2bok w2bro w2beb w2bxo w2bzc w2bm w2ceg w2cej w2cf w2cgl w2cgy w2chb w2che w2cjc w2cle w2cmh w2coj w2cqn w2cjr w2cva w2cze w2dka w2fi w2fr w2gl w2go w2hb w2hn w2hs w2jp w2mb w2ng w2rr w2sh w2tp w3abn w3aby w3aex w3ahr w3ake w3alq w3alz w3aqr w3aqz w3at w3bca w3beb w3bjc w3blb w3blc w3bd w3bqb w3bro w3btg w3cc w3cgm w3drs w3gy w3qv w3sm w3tk w3ud w3ux w3wi w3zi w3zy w4aah w4acy w4acz w4ad w4adf w4aed w4afz w4aiy w4ahn w4ala w4alh w4amq w4aun w4aur w4avy w4axz w4ban w4bm w4bs w4ff w4kx w4lu w4mu w4oa w4pk w4qo w4rb w4rs w4ta w4wc w4wm w4wn w5aay w5abo w5aof w5aef w5api w5ath w5bax w5bjc w5hoc w5hrd w5bst w5btt w5ga w5gl w5pp w5qo w5rd w5yh w5za w6aj w6cjq w6ahw w6ajw w6aqt w6ar w6avp w6axb w6bae w6bfh w6ban w6bjm w6boe w6bsw w6caw w6cdj w6cfw w6ci w6clm w6cmf w6con w6cpd w6cpl w6cvq w6cxz w6dde w6dfi w6doc w6dul w6edy w6seo w6eft w6eku w6elm w6etf w6ex w6eyz w6fbz w6fcn w6fm w6fpv w6fw w6fxj w6fxx w6go w6io w6is w6oj w6pnd w6rl w6rs w6sw w6wi w6aai w6aao w6aeg w6afq w6agg w6agx w6ajf w6aok w6asg w6ajb w6axz w6bbj w6bel w6bhd w6bky w6blr w6bmw w6brs w6bu w6bzf w6cju w6ckz w6cmr w6czm w6daq w6dje w6dmx w6dqe w6dqw w6drd w6drs w6dtp w6dvd w6dwl w6dzp w6dec w6ddl w6edl w6edw w6edz w6eew w6ehd w6ejd w6ejv w6em w6ewx w6fca w6fbl w6fdm w6fgx w6fke w6fku w6fra w6get w6gku w6grb w6gtt w6gxj w6hmr w6ij w6jj w6kr w6lb w6ld w6mvi w6pk w6twm 9yh 9zet 9zzb ve3vd ve3fp ve3gm

W4AEM, H. D. Burman, 610 Lee Ave., Waycross, Ga.

7000-ke. band

cm2ay cm2es cm2ef cm2wd cm7sh ct1az ct1gd ear4 ear86 ear96 ear121 ear177 f8pz f8wk fm8da lh7c hi8x k4kc k4ry k5aa k5ab k6ac k6au k6ccs oa5p sm7rv ti2fg ti3la ve2er ve3au ve3el vk2oc vk3vl vk3xi vk3zx vk4ju vk5aw vk6jk vk6sa vk6ad vk6ah vk6aw vk6ar vk6av vk6aw vk6bx vk6bbf vk6bc vk6ba vk6bh vk6bob vk6bp vk6by vk6ero vk6cp vk6cu vk6db vk6dl vk6dob vk6dou vk6duc vk6dz vk6dza vk6ebz vk6egh vk6evm vk6exn vk6eyf vk6fal vk6fnx vk6kh vk6ku vk6so vk6to vk6zzg w7ayo w7kq w7vt x1aa x1af x1ax x1d x1n x3a x9a z13aj w7

G6YL, Miss B. Dunn, Felton, Northumberland, England

(Heard during February)

7000-ke. band

w1afb w1ajm w1eqq w2amr w2avp w2bi w3ado w3bux w3dc w3nk w4eg w6cxw w6ed w6nk fm4ab fm8cr fm8ev fm8gt cm8md cm8mi cm8mj cv5ey cv5vm kaljr kaljr kalzc pk3bq sulch au1de au7kaf au7kao ve1df vk2bm vk2oc vk2ru vk3lq vk3vl vk3zx va2af va6ah va7ap vs7gt vu2fx vu2jp yi2de yi6wg zu5b xearz x1als fnbh xx1jp xx1yj

14,000-ke. band

w1ae w1asl w1avj w1bkw w1bte w1cjd w1lz w1mk w1rr w1vc w1wv w2ajj w2azo w2br w2cjm w2fd w3odk w3ekt w3de w3fq w4awo w4cs w8afp w8aqg w8blp w8dho w8esy w9adn w9aeh w9gfj w9gfz w9gv w9ij w9ot fm8bip fm8gk fm8vd frear149 cm8mi k4rk pk3bm sulaq un7ft velbr velbt veldm veldq ve2ap ve2ca ve2cq ve2cx vk2lz vk2oc vk2xg vk2zu vk3vl vk4xn vk6gf vk6vi w08mc v6ah vs7ap vs7gt vu2fx yi2de yi6kr yi6wg z12af z44m z6zy zu5w cm2ra sjba xx1yj xzn2a

FOR BETTER QUALITY PHONE

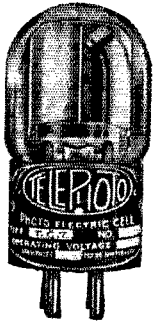
Any old transformers in your speech input equipment will give you understandable speech. But if you want more than understandable speech, if you want quality to be proud of, if you want to hear "like a broadcaster" from those whose opinion counts — nothing less than General Radio transformers will satisfy you.

They are designed, built and tested by the strictest engineering standards. Yet you pay at most but a few cents more, frequently you pay less for General Radio.

Write for a copy of our amateur catalog and see for yourself how much frequency range you can buy for your money.

GENERAL RADIO COMPANY CAMBRIDGE A, MASSACHUSETTS

Pacific Coast Warehouse, 274 Brannan Street, San Francisco, California



— high speed RESPONSE

is an essential requirement in all experimental work—both in Sound and Television. This is assured by the use of

Telephoto Photoelectric Cells
(Caesium Argon Type)
Pamphlet on Request

TELEPHOTO & TELEVISION CORP.
133-135 WEST 19TH STREET • NEW YORK



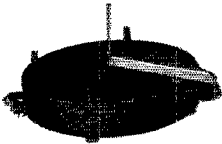
A Real Universal Meter

— using 11 Super Akra-Ohm Resistors and a Weston A.C. and D.C. Type 301 Universal Meter — will do the job of 22 separate meters. Send now for **Bulletin 150-C** which contains a complete diagram of this circuit and full information on its construction. Actual working drawing and construction diagrams supplied with the Type 600 Resistor Kit.



ROCHELLE SALT CRYSTAL SPEAKERS

The most advanced development in piezo-electricity



Speaker motor \$6.50

Extreme sensitivity and range. No field current required. No polarising voltage. Impedance matches pentode tube.

Transformers for 245's push-pull..... \$3.00
Transformers for 500 ohm line..... \$3.00

Shipped postpaid for cash or money order

THE BRUSH DEVELOPMENT COMPANY
3715 EUCLID AVENUE



Speaker complete \$10.50

Manufacturers of Brush Crystal speakers, microphones, phonograph pickups and crystal elements

(Heard aboard S. S. San Gabriel off Panama)

3500-kc. band — Mar. 14th-17th

w1akd w1bae w1bfo w1bkl w1bjm w1brb w1bun w1cju
w1eva w1dbu w1ddz w1drb w1se w1yu w2a0z w2bc w2bdr
w2bhr w2bjo w2ejl w2dly w2dof w2dqd w2dsg w2ul w3acn
w3arn w3bbd w3bdo w3bep w3bkq w3ble w3bnf w3btp
w3buu w3cfh w3cxl w3ej w3tr w3zy w4aay w4bq w4cc
w4jo w4kp w4ox w4to w4ex w4pj w4vp w5yk w8aaq w8bve
w8blj w8cz w8eqn w8emp w8egf w8daq w8dmj w8dtw
w8dva w8eq w8elz w8fq w8fu w8fqa w8bqx w8bge w8cmf
w9emy w9epi w9ejd w9ffm w9fo w9hmb w9in w9ib vp2pa

VE4JX, Mrs. A. J. Ober, Calgary, Alberta

14,000-kc. band

w1mk w2el w2ago w3apn w3edk w4aa w4aby w4ajx w4awz
w4to w5abp w5bzc w5btu w5cdm w5e3a w5efr x1aa py1ba
py1fl py2ak py3aa em2sv t13la fp6yt lu3fa k6fg f8ex w8ora
w8od w8w w8ekh

7000-kc. band

w2fa w2gw w2ouq w2bwd w4si w4oi w4mk w4kw hclfg
hh7c om1tb k6arb k6auq z1ct z13cc vk3nm vk3bz vk2zb
vk5aw ve3yh

Communications Department

(Continued from page 65)

W5RSY made an excellent showing. W5BUH-W5BYN was operating at W5VE a lot. W5AUL handled his share in fine style and has plenty of schedules. He reports a club is now going in Abilene with W5BST as Pres., W5QA, Vice-Pres. and W4AUL, Secy-Treas. W5ARK and his '10s are doing wonders. W5RJ pounds out a few. W5AGQ is building a 14-mc. 'phone. W4JG has applied for ORS. W5QY has a PDC note at last. W5WW is still going strong down at Center. W5BTU wants a schedule with El Paso, and reports a new ham at Big Springs, W5BJ. W5BII is on approx. 3600 kc. between 5 and 6:30 p.m. daily looking for traffic. W5AQI comes through with first report. W5CF, "Dad," reports his schedules inactive. W5BJX wants reports on his OBS broadcasts. W5ASA has moved to Mineola. W5ALS is a new ham at Henrietta. W5HY handled several death messages this month. W5CDG says that "SPARKS" is what the hams need and wants to stay on mailing list. W5BXY is having plenty of grief with his battery. W5NW is working plenty DX. W5AID has a bi-weekly schedule with W5BED. W5AXK replaced '10 with '45. W5BWW reports for first time. W5BYF is handling traffic. W5BIV reports QRM from BCL service work. W5AWT wants a remedy to keep neighbors' chickens out of his yard. Hi.

Traffic: W5VE 1302, W5SH 421, W5AVF 318, W5BSY 240, W5BYN 200, W5AUL 194, W5ARK 164, W5RJ 140, W5AGQ 101, W5AJG 90, W5QY 83, W5WV 73, W5BTU 62, W5BII 53, W5AQI 49, W5CF 41, W5BJX 25, W5HY 20, W5CDG 22, W5BXY 20, W5NW 17, W5AID 11, W5AXK 11, W5BWW 10, W5BYF 12, W5BIV 9, W5AWT 16, W5BKH 57, W5BCW 4, W5IT 4, W5AZB 3.

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — VE1BV again leads the Division with a large traffic total. VE1AI is new man at Joggins. VE1AX has been laid up with the flu. VE1BR has been busy with BCL sets. VE1BW is now using a '45. VE1BC recently dropped in on the SCM. VE1CV has been doing great low power DX on 14 mc. VE1DM has new crystal outfit on 14 mc. VE1DN is exVE3MI now in Amherst. VE1DQ was very active in the DX tests. VE1DQ received his ORS appointment. VE1ER keeps daily schedules with VE1BV. VE1BM reports for the Cape Breton gang. VE1BN keeps nightly schedule with VE1AX on 3.5-mc. 'phone. VE1AL is getting out well with flea power transmitter. VE1CK is on the air again on 14 mc. NEW BRUNSWICK — VE1AE piled up a nice total. VE1CT, formerly VE5CL of Vancouver, is now in Sackville. VE1DU is on 7 mc. VE1DV is new man in St. John. VE1AY, VE1AM, VE1BQ, and VE1CG are on 3.5 mc. CW. VE1CY reports by radio to VE1AE. VE1CK, VE1DC and VE1DP are on both 'phone and CW. Let's have your reports, gang!

COLUMBIA STILL LEADS

COLUMBIA MONITOR. Accurately Calibrated. Completely shielded in a metal case. Equipped with Vernier dial. Real band spread. Three coils supplied for 20, 40, and 80 meter bands. Complete with tube and batteries. **RCA licensed TUBES \$9.00**

Real good tubes, made to stand the gaff. Unconditionally Guaranteed for 90 days!

UX112A.....55c	280M.....1.50	238......90c
UX120.....70c	UX226......45c	240......90c
UX171A.....55c	UV227......45c	245......50c
UX199.....65c	230......70c	247......50c
UX199.....65c	231......70c	250.....1.45
UX201A.....45c	232......85c	551......85c
UX210.....1.35	233......90c	280......50c
UX222.....1.10	235......85c	281.....1.25
UY224.....60c	236......90c	566.....2.75
	237......75c	

COLUMBIA CLASS B MODULATION TRANSFORMERS for 210's. Pair, \$6.50

COLUMBIA POWER TRANSFORMERS

A quality line of transformers. All mounted, with leads brought out to lugs on terminal boards. Guaranteed for One Year.

Type	Voltage	Voltages		Price
A	200	600-0-600, 7 1/2 ct. & 7 1/2		\$3.75
B	250	750-0-750		4.95
C	350	1000-0-1000		7.00
D	500	1500, 1000-0-1000, 1500		9.35
E	800	2000, 1500-0-1500, 2000		12.85
F	250	750-0-750, 7 1/2 ct. & 7 1/2		5.75
G	400	750-0-750, 7 1/2 ct. & 7 1/2 ct		7.45
H	150	285-0-350, 5, 2 1/2 ct, 2 1/2 ct		3.75
K	100	285-0-285, 5, 5 ct, 2 1/2 ct		3.45
L*	250	350-0-350, 5 ct		4.45
M	150	400-0-400, 5, 2 1/2 ct, 2 1/2 ct		3.95
N	150	300-0-300, 5, 1 1/2, 5 ct, 2 1/2 ct		3.75
R	750	2500, 1500-0-1500, 2500		14.35

* Type L is specially built for the 280M tube.

STAND-OFF INSULATORS, Each 9c, Dozen 85c.

COLUMBIA FILAMENT TRANSFORMERS. An efficient, sturdily constructed job. All secondaries center-tapped. Deduct 10% from these prices if no center tap is desired. **10,000 VOLT INSULATION!**

Voltages	12 watts	25 watts	50 watts	100 watts
2 1/2	\$1.25	\$1.95	\$2.50	.....
2 1/2 & 2 1/2	1.50	2.25	2.75	\$3.75
7 1/2 & 7 1/2	1.25	1.95	3.25	4.45
10	.....	2.25	3.95	4.95
5	.....	.....	3.40	4.50
	.....	.....	3.25	4.00

SPRAGUE ELECTROLYTIC CONDENSERS. 8 mfd, peak voltage 500 volts. Each, 65c.

GENERAL ELECTRIC 30 henry, 150 mill chokes, \$1.50.
COLUMBIA 30 henry chokes. Very efficient, ruggedly built. Mounted, Special, 200 mills, \$2.40; 120 mills, \$1.30.

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TERMS: Cash or C.O.D. No deposit required.

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Learn Telegraphy—the most fascinating profession — by hearing real messages—sending them. Interesting—simple—you learn quickly—at home.

TELEPLEX—the Master Teacher is used by U. S. Army, Navy and leading radio and telegraph schools. Entirely new code course in 12 rolls of tape.

During last ten years, **TELEPLEX** has trained more operators than all other methods combined.

Write for Folder Q-5

TELEPLEX COMPANY
76 Cortlandt Street New York

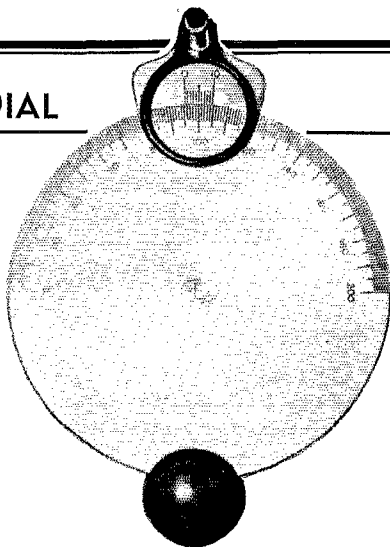
R. E. L. 292 MICRO VERNIER DIAL

Permanency of calibration in modern frequency meters depends on the accuracy of the dial. R. E. L. 292 is the Micro Vernier Dial that does the job.

Reads directly to one part in two thousand without guess work.

Complete elimination of metallic friction noises — smooth non-backlash Vernier control — ratio 12 to 1 — 6" diameter accurate engine engraved scale — scale and indicator on same plane eliminates Parallax* errors due to overlapping of indicator and scale. Fitted with magnifying glass allowing dial to be read at distances from two to four feet. Easily attached to any well designed variable condenser having 1/4" diameter shaft.

Reasonably priced. Inquire at your local radio dealer or write direct to R. E. L.



* "Parallax is the apparent difference in readings obtained when the dial is viewed from different angles. It is negligible when the indicator and the dial are in the same plane and becomes worse when the two are farther apart." — "QST," Oct., 1930.

RADIO ENGINEERING LABORATORIES, INC.

100 WILBUR AVENUE

LONG ISLAND CITY, NEW YORK

Export Department: 116 Broad Street, New York City

QST Oscillating Crystals

"Superior by Comparison"

New Price List Effective Immediately

New prices for grinding power crystals in the various frequency bands, said crystals ground to an accuracy of plus or minus .03% mounted:—

Frequency range	New list
100 to 1500 Kc.	\$40.00
1501 to 3000 Kc.	\$45.00
3001 to 4000 Kc.	\$50.00
4001 to 6000 Kc.	\$60.00

Above prices include holder of our Standard design. If crystal is wanted unmounted deduct \$5.00 from the above prices. Deliveries can be made within two days after receipt of order. In ordering please specify type tube, plate voltage and operating temperature. *Special prices will be quoted in quantities of ten or more.*

POWER CRYSTALS FOR AMATEUR USE

The prices below are for grinding a crystal to a frequency selected by us unmounted (if wanted mounted add \$5.00 to the price list) with a calibration accurate to BETTER than a tenth of one per cent. Immediate shipments can be made and all crystals guaranteed.

1715 to 2000 Kc. band	\$12.00 each
3500 to 4000 Kc. band	\$15.00 each

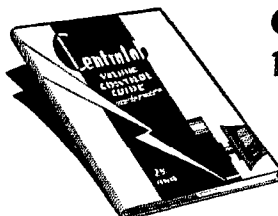
LOW FREQUENCY STANDARD CRYSTALS

We have stock available for crystals as low as 13 Kc. Prices upon receipt of specifications.

SCIENTIFIC RADIO SERVICE

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HYATTSVILLE, MD.

"Crystal specialists since 1925"



Get these 2 books —

should be on every
serviceman's
bench and
amateur's desk



The CENTRALAB VOLUME CONTROL GUIDE is now in its 3rd edition. Priced at 25c. The "Baptism of Fire" tells how Centralab Fixed Resistors are made. It is FREE.

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Centralab

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929E Keefe Ave., Milwaukee, Wis.
I enclose 25c for your Volume Control Guide
Please send me your Free booklet "A Baptism of Fire"

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Address.....

City.....State..... QST

MIDGET RELAYS

for remote control of
AMATEUR TRANSMITTERS

Time Delay Relay

For use with mercury vapor rectifiers. Adjustable thermal time element delays application of plate voltage. Relay operates on 110 volts, 60 cycles. 3 1/2" x 4" x 2 1/2"—Price \$12.75

Remote Control Relay

A two pole single throw relay. Coil operates on 6 volts, 60 cycles. 2" x 2 3/8" x 1 1/8"—Price \$6.00

Keying Relay

A single pole single throw relay. Coil operates on 6 volts D. C. 2" x 2 3/8" x 1 1/8"—Price \$5.00

WARD LEONARD ELECTRIC CO.
Mount Vernon, N. Y.



"CQ" "CQ" "CQ"

Amateur Fone Hams

Properly engineered transformers for Class "B" Modulation using 210 tubes (see December issue of QST).

Type A1-910 Transformers. Weight 2 1/2 lbs.

Type AM-911 Modulation Transformers. Weight 6 lbs. Standard Package containing one each of these transformers, price, net \$9.00. Shipping weight 10 lbs. Mail orders filled promptly.

We can also supply filament, Plate Transformers and Chokes for small and medium powered "ham" transmitters.

Transformers for Class "B" modulation using 203A and 841 tubes will be ready very shortly.

WEBSTER ELECTRIC COMPANY

Established 1909

Racine, Wisconsin, U. S. A.

Traffic: VE1BV 126, VE1AE 119, VE1ER 25, VE1CY 18, VE1DM 8, VE1DW 7, VE1CL 4, VE1BW 3, VE1BM 4, VE1AL 20.

NEWFOUNDLAND — Acting SCM, James Moore, VO8AW — VO8MC is on occasionally. VO8WG is on every day. VO8AN keeps in touch with VE1. Nothing heard from VO8AE for about two months. We are also looking for VO8C. VO8Z is still our busiest man. VO8WG and VO8Z handled a message and a reply which saved a man's life in Labrador. FB. VO8AW says nothing new there.

Traffic: VO8Z 70.

ONTARIO DIVISION

ONTARIO — SCM, H. W. Bishop, VE3HB — The All-Ontario QSO Party held February 28th has been declared "no contest," as only four contestants sent in their scores. When reporting traffic please give the number of messages originated, delivered and relayed; don't just send in the total. VE3GT says his slump in traffic is due to the International Goodwill Tests. VE3IW sends his first report. VE3HZ has been busy with a radio exhibition at the London Technical School. VE3SA is going back to TNT. Mrs. VE3DW wants to know if Toronto is going to have a Ham-fest this fall, and also wants the other lady ops to get in on the fun. VE3JS has dreams of becoming WAC. VE3EL has been QSO with VK and ZL. VE3BV has spring fever. VE3DB has been blowing rectifier tubes, VE3VM is QRL at school. VE3AU was heard in Germany on 7 mc. with a '45. VE3AD is QRL with music. VE3CE is rag-chewing. VE3LM is building a crystal job. VE3JI schedules VE3GX and VE3IG. VE3HW would like to hear from any VE3s using 1.75-mgc. band. VE3BG worked London, England. VE3PN's antenna is "hors de combat." VE3HM says that during a recent snowstorm there was more RF on the air than there was on the transmitter tank. Hi. VE3IR has a new 1.75-mgc. job. VE3HY reports a new ham with the call VE3JK. VE3GX is QRL helping the OW around the house. VE3MR and the Northern gang are organizing a Northern-Southern Ontario traffic route. VE3CD is building a new AC receiver. VE3HV worked FM8EG in Algeria. VE3CP is an ORS now. VE9AL has a FB 'phone on 14 mgc. Anyone wanting schedules in PM get in touch with VE3IB. VE3IG has rebuilt. VE3IH has the DX bug. VE3YH, an old-timer, is back in the game. VE3IO has YLitis. VE3BM worked four continents in DX tests. VE3HB is highly pleased with his MOPA. VE3GL will soon be on with a crystal job.

Traffic: VE3GT 895, VE3BV 53, VE3HB 43, VE3DW 35, VE9AL 23, VE3IG 34, VE3HV 14, VE3CD 11, VE3CP 11, VE3IW 9, VE3JS 9, VE3SA 8, VE3IB 8, VE3AU 6, VE3AD 3, VE3EL 3, VE3IH 3, VE3CE 2, VE3MR 47, VE3GX 142, VE3HY 47, VE3HM 9, VE3IR 24, VE3IM 10, VE3JI 29, VE3GL 8.

QUEBEC DIVISION

QUEBEC — SCM, Alphy L. Blais, VE2AC — The YL at VE2HV is on daily from 4:00 to 5:30 p.m. looking for schedules on 'phone. VE2AP is handling plenty traffic. VE2BE is proud of his new crystal outfit. The following use crystal control: 2A2-2BE-2EM-2CX-2AX-2CD-2CU-2BO-2BD-2DQ-2AC. VE2co is bagging DX. VE2AX is back from Bermuda. VE2DW is going strong. VE2BF, VE2DB, VE2AB are forming a net of their own. VE2BB keeps plugging ahead. VE2CA is waiting for his crystals. VE2CQ got his share of traffic this month. Twenty-five VE2's were on during the W-VE Contest. Too bad I don't get a report from them. They could furnish plenty material for my monthly report. VE2AC is working steadily at perfecting a 28-mc. receiver.

Traffic: VE2AC 119, VE2AP 98, VE2BB 65.

VANALTA DIVISION

ALBERTA — SCM, C. H. Harris, VE4HM — Many thanks for the honor of being appointed SCM. Please remember a new broom needs cooperation, so do not fail me. You can be assured of my duties being performed to the best of my ability. VE4DT heads the traffic list. The OW at VE4EI handled message re car accident. VE4HM handled one re a safe-cracking job. We welcome back VE4GM on 'phone. VE4FJ is a new ham at Jasper. VE4DQ handled a horse trade by radio. VE4CZ is new ham at Red Deer. VE4IZ has a rectifier at last. VE4BI is putting out FB signal. VE4EC and VE4BW QRL BCL sets. VE4EW is back on CW. VE4GY works PY and LU. VE4HQ sure has dandy 'phone station. VE4GT and VE4EA are crystal converts.

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In recent issues of QST we have given space to the available back issues of QST. As a result we have experienced an unprecedented demand for them. We now bring the list up to date and again present it. The stock of many of the issues listed below is very low in number and it is suggested that you act promptly.

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RELAY LEAGUE**
West Hartford, Conn.

VE4FR and VE4BV are headed for crystal, too. VE4DX is a prospective ORS. VE4HA is on occasionally. VE4BD rode 16 miles on horseback to turn in his report. VE4GD reports for Calgary gang. VE4JK, VE4HV and VE4JW are getting out with low power. VE4IT has new transmitter. VE4CY is rebuilding 250-watt 'phone. VE4JI is busy editing "Keaklix." VE5BV visited Calgary gang.

Traffic: VE4DT 108, VE4HM 42, VE4DQ 34, VE4JQ 29, VE4EI 17, VE4HQ 13, VE4DX 12, VE4BD 4, VE4FR 4.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — Prince Rupert's budding club, called "The Skeena Amateur Radio Club," is out to populate that city with numerous hams. VE5GT is "master of ceremonies" and uses 'phone into Vancouver. VE5EI also uses 'phone. VE5HP again tops the traffic list. VE5AG gave him a close call. VE5HR is an ORS. VE5FG is doing his part nobly. VE5EH is DXing. Sure glad VE5EC is back again. VE5EW says the interior seems to fail badly on schedules. Write the SCM or RM if you can handle a schedule of any kind. KA3AA and KA7AHI were visitors in Vancouver recently. VE5AL had traffic for Asia, but couldn't clear on account of the DX Contest. VE5BR still remains the model traffic man who keeps schedules on the dot. The Vancouver club is checking up on VE5's notes. How is yours?

Traffic: VE5HP 123, VE5AL 44, VE5BR 13, VE5FG 81, VE5HR 5, VE5AG 115, VE5EH 11, VE5EW 48, VE5FF 5, VE5AC 12.

PRAIRIE DIVISION

MANITOBA — SCM, J. L. Green, VE4BQ — VE4FT gets out FB on 14 mc. VE4IU now hears DX. VE4DK is active on 14 mc. VE4DJ is consistent on 7 mc. VE4DU and VE4FN are rebuilding. VE4AG worked his first DX, ZL. VE4BQ is on 7 and 14 mc. VE4GQ is building. VE4CI is getting out fine. VE4IS expects WAC soon. VE4JE is a new amateur. VE4IC dismantled for a few weeks. VE4AE is building an AC receiver.

Traffic: VE4DJ 9, VE4IC 7, VE4BQ 4, VE4IU 1. SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — VE4EL is doing fine work. VE4BB schedules VE4FC. VE4HX says conditions better for working VE's. VE4EM is at last on the air. VE4AT sends in a nice picture of his layout.

Traffic: VE4IH 25, VE4EL 21, VE4BB 19, VE4HX 7, VE4AT 1.

Strays

NIGHTMARE

'Twas three o'clock in the morning
I'd danced the night most through,
But I thought I would mess with the outfit
And perhaps work an Aussie or two.

The night was as clear as a bell;
Not a sound could be heard for miles,
And I heard a CQ from China
As I sat down and twirled the dials.

I called and had just raised this fellow
When out of the ether there came
What I'll swear was the rawest and durndest
Of rough a.c. notes in the game.

It buzzed and it ripped and it snorted
For an hour it sawed a CQ
Whilst 'round the band it cavorted
Till nary a sig could come through.

I deserted the outfit for bed
My hopes of a QSO spoiled,
And prayed that my dreams might be led
To a way that this bird could be foiled.

— W6DIP

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THE finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone cw transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ensell Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

BILLEY Crystals: It's wise to know who makes your crystals. Quartz crystals engraved with "Billey" and the Exact Frequency (within 0.1%) positively identifies the finest quality. A Good crystal is the best assurance of real satisfaction. Wherever you buy yours, be sure it's a "Billey Crystal." Guaranteed, power-type, inch square, supplied approximately to specified frequency: — 1715-2000kc. \$5.50; 3500-4000kc. \$5.50; 4667-4800kc. \$7.50; 7000-7300kc. \$10.00. Mountings (D-P, P-1), \$2.50. We are equipped to manufacture crystals to any frequency-precision requirements: 20kc — 8000kc. Billey Piezo-Electric Co., Masonic Temple Bldg., Erie, Penna.

LEARN Wireless (Radio) and Morse telegraphy. School, oldest, largest, endorsed by telegraph, radio and government officials. Expenses low. Can earn part. Catalog free. Dodge's Institute, Wood Street, Valparaiso, Ind.

QUARTZ — make your own crystal oscillators. Write us for full details. Direct importers from Brazil of best quality pure Quartz suitable for cutting into Piezo electric crystals. The Diamond Drill Carbon Co., 720 World Building, New York City.

PREMIER crystals: Powerful oscillators made from selected Brazilian Quartz — 80 and 160 meter bands "X" or "Y" cut — stated calibration guaranteed accurate to 0.1% or better: plus or minus 5 kc. of requested frequency \$7.50; 0.5% of requested frequency \$6.50; random frequencies selected by us within the bands \$5.50; 175 kc. Stenode crystals \$3.50. 40 meter "X" cut crystals plus or minus 1% of frequency requested \$10.00; one inch oscillating blanks \$3.75; unfinished blanks \$2.00; dustproof holders with nickel-silver electrodes \$2.50; High or low frequency crystals of all descriptions. Write or wire for particulars. Premier Crystal Laboratories, Inc., 74 Cortlandt Street, New York City.

TOURMALINE crystals: We can supply tourmaline crystals, for which your inquiries are solicited. Premier Crystal Laboratories, Inc., 74 Cortlandt St., New York City.

QSLs, 85¢. Free samples. W8AKY, 2857 Amherst St., Cleveland, Ohio.

QRG crystals for the new phone bands are now ready. Order yours early, \$4. each, o.d. 80 and 160 meter bands. QRG Crystal Labs., Roseland, N. J.

BEAUTIFUL rack job — 210 transmitter and power supply, \$30. Chester Teichman, 21 Everett St., Allston, Mass.

SELL or trade xtals, parts. W9ACO, West Lafayette, Indiana.

CRYSTALS: 1' sections, good oscillators, 0.1% accuracy. X cut, \$6, Y cut \$4. Finished blanks, \$2. Money back guarantee. R. L. Tedford, 3838 Columbia Ave., Cincinnati, Ohio.

WANTED — 700-1000 volt motorgenerator. W1CCP, Norwood, Mass.

QSL's with a personality. Buy from us and be satisfied. Prices higher than some but hundreds of hams say quality and service well worth it. An armful of samples free. W8CUX, Millington, Mich.

SELL back issues of QST. Complete your files. Write advising issue wanted and price willing to pay. C. G. Hay, Ridgway, Pa.

SELL — excellent 3-tube s.w. set, regenerative 224-227-245, 14-225 meters, a.c. power supply built in, tubes, \$22. Details furnished. Carl Fastje, Denison, Iowa.

BOUGHT parts Navy 500 cycle spark transmitters much surplus stuff useful to constructors, experimenters. Pancake tuning coils wild copper strip; .004 mica condensers 12,500 volt; hard rubber sheet, rod, tubing, forms; motor generators ¼, ½, 1 kw; transformers same and to 5kw; Weston large thermoammeters, frequency meter; heavy key, antenna switch, protective devices. Also Kennedy 110 and equivalent SE1899A Navy receiver vid SE1071; Navy GE 12" incandescent searchlight 500 watt. No reasonable offer refused or will trade. W1CTE.

SILVER-MARSHALL, 739 short wave converter for sale or trade. What have you? Alvin C. Holmes, c/o Bureau of Reclamation, Rupert, Idaho.

COMPLETE a.c. super-wasp, \$35. W9APO.

QSL cards, message blanks, stationery, snappy service. Write for free samples to-day. W1BEF, 16 Stockbridge Ave., Lowell, Mass.

SELLING out: 100 watt, crystal controlled, 100% modulated phone transmitter, Weston meters, aluminum racks, parts cost \$400, sell \$250; 2 kw. water-cooled tube, \$25; G. E. mercury arc, \$7.50; 25 pound, 15 ampere, ¼ Henry choke, \$4; National .0001 6000 volt tank condenser, \$3.50; Tobe surgeproof 1300 volt 4 mfd. condenser, \$5; Tobe 4000 mfd. "A" block, \$2.50; new 211E, \$7.50; New Raytheon Kino lamp, \$3; New bakelite case Weston meters, 0-3 volts, a.c. \$4.50; 0-300 volts a.c. \$6; laboratory Weston model 280, 0-500 mils. list \$2850, sell \$8; Jewell 54, 0-50 mils. \$4; 0-200 mils. \$4. All sold on trial. Harold Zeitlin, W1AXD, 1751 Massachusetts Ave., Cambridge, Mass.

SWAP — one new Audak theater professional pick-up, list \$100, for two Jewell or Weston 0-5 thermoammeters, or sell \$20. Or what have you? W2AMI.

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VIBROPLEXES. All models. Rebuilds, \$9. Guaranteed. Lydeard, 28 Circuit, Roxbury, Mass.

SELL or trade for high power equipment, National AC5, factory built, complete. Lloyd L. Moore, Fort Pierre, S. Dakota.

BACK issues wanted: September, October, November 1919-January, October, December 1921-April 1922-August, September 1923. Harry Lindgren, 908 S. Plymouth Blvd., Los Angeles, California.

BEST offer takes 287W Western Electric double button mike, new diaphragm in perfect condition. Condenser mike head only \$8. W9ER, Timken, Kansas.

KENNEDY Universal receiver and amplifier, for sale. Best cash offer. Schreiber, 914 Orange, Wilmington, Del.

CANADIANS — sell receiver built around Aero automatic tuner. Write for description. VE4BU, Pointe du Bois, Manitoba.

WANTED: March and May 1929 copies of QST. Warren Frye, Celilo, Oregon.

TELEPLEXES, Omnigraphs, receivers, tubes, meters, Vibroplex, transformers, converters. Bought, sold, traded. Ryan Radio Company, Hannibal, Mo.

W8BAH says: traffic work requires a real receiver. How about a National or REL? New dope sheet ready now. Call books and Handbooks in stock. Complete catalogue folder 25¢. Fifty crystals in stock. Write to-day. W8BAH, Harry Tummonds, Northern Ohio Laboratories, 2073 West 85, Cleveland, Ohio.

SELL — WE212D, perfect condition, \$18; WE211D, \$7.50; 203A, \$12.50; 211E, \$4.50; d.c. Superwasp, \$12; 200 watt oscillator tube, \$16; G.E. 24/1500 dynamotor, \$15; condenser mike, complete, \$20. List. W. C. Newman, 423 So. Estelle, Wichita, Kans.

POWER transformers — chokes. Coils wound for your core. Condensers, crystals, holders, meters, postal brings quotation any part. W6ELA, 105½ E. Ave. 38, Los Angeles.

NEW signal Corps U. S. Army radio generators type GN1, \$12.50; type GN4 radio generators \$5. Also large stock motors, generators and converters. Queen City Electric, 1734 Grand Ave., Chicago.

QSLs. T. Vachovetz, Elmsford, N. Y.

ATTENTION phone bams! Condenser microphone heads, with an average response curve from 30 to 8000 cycles. Guaranteed. No background noises, \$15. W5ABO, 2924 West 21st, Oklahoma City, Okla.

WANTED — high power xtal xmmitter. Must be complete and cheap. Prefer factory built. W9CJR, Mt. Vernon, Mo.

NATIONAL SW4, d.c. handsread, pole transformer, 2200 center tapped, 1 kw plus. \$10 each. W1DFS.

SELL — Majestic B eliminator. Write W9DIB, 2617 Tremont Ave., Davenport, Iowa.

QSL cards! Superior quality! Samples? W9DED, Ham Print Shop, Holland, Mich.

TWELVE pages latest parts for stamp. Over six pounds data, 50¢. Prepaid, Kladag, Kent, Ohio.

QSL cards, wall cards, log books, stationery, etc. Hillcrest, Cranesville, Pa.

TRADE: \$18. tennis racket with press, 860, 872. Want 212D, 203A, 866s, etc. W9EXJ, Atkinson, Nebr.

SELL complete xtal controlled transmitter, \$45. 80 cw. W9HAY, Hillsboro, Ill.

QSLs, two color, 90¢ first 100. Samples. QSL Service, 2220 Linden Ave., Baltimore, Md.

WE211D, WE248A, good fifty watt oscillators, \$6. W9FJB.

TRANSMITTING tubes. New. Types 210, 15 watters, also 250s, 251s, 222s. \$1. each. Guaranteed. Brewster Radio Co., Grafton, N. H.

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QSLs. Request our samples and prices before ordering. Maleco, 1512 Eastern Parkway, Brooklyn, N. Y.

SELL — 204A \$45.00; 211 \$10.00; Jewell 0-1 RF \$5.00, 0-300 m.a. \$3.50, 0-15 v.a.c. \$3.50; G.R. 558 frequency meter \$10.00; Roller Smith 750 wattmeter \$5.00; G.E. 1kw transformer 1100, 2200, 4400 each side c.t., dry \$12.00; R-3 rectobulbs \$5.00; 250 watt filament transformer 10, 15 volts \$4.00; condensers 4 mfd. 1500 v.d.c. working in metal \$2.00, 2 mfd. 1000 v.d.c. working \$1.00; all used but perfect; cash only. Write for complete list. Elmer Turner, Southboro Road, Marlboro, Mass.

CONDENSERS — New RCA superproof 1000 volts d.c. working, fibre encased, pigtail connections, 2 mfd. \$1.00 six for \$5.50; 4 mfd. \$1.85 six for \$10.00; guaranteed, cash only. Elmer Turner, RFD2 Marlboro, Mass.

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100 QSLs, 90¢. Stationery, samples. W3BHG, 3536 Roland Ave., Baltimore.

QSLs, 90¢ per hundred, two colors. W9DGH, 1816 Fifth Ave., N., Minneapolis, Minn.

SHORTWAVE — all a.c. new, 4 tubes, loud speaker, phone jacks, bandspread, neat cabinet. Complete with tubes, \$18.90. Express paid. Electric key, \$2. Money back guarantee. Southern Products, 664-S University, Ala.

PHOTO QSLs, samples, 2¢. Southern Products, 664-T University, Ala.

RADIO equipment, simple baseboard layout or fully mounted commercial type, designed and built to specification. Your parts used if desired. Engineering and construction guaranteed. Write for quotations. State your requirements in detail. Holmes C. Miller, Radio Engineer, Box 105, Palo Alto, California.

SELL — to settle estate of the late U. E. Duval, ex WIBKQ, WIRL. 15 watt TNT transmitter, Jewell meters, National 3000V condenser, rugged power supply using U7866s full wave, large filter. Tubes and all equipment nearly new. Both units baseboard mounted ready to run, coils for three bands. Also receiver and many parts. Everything reasonably priced. Alma Moge, 72 Russell St., Worcester, Mass.

QSLs, 85¢ per 100. Message blanks, \$1 per 500. Samples. W8DDS, 2155 W. 81st St., Cleveland.

MODERN Radio, outstanding experimenters magazine edited by Robert S. Kruse and L. W. Hatry, useful information every issue. Hams recommend it everywhere. Articles by Reinartz, Phelps, Batchler. Only 20¢ copy, \$2 year. Modern Radio, Hartford.

SHIELDED microphone cable. Braided covering, 5 wire, 15¢ ft., 3 wire, 10¢ ft. Guaranteed satisfactory. E & H Radio Supplies, 2924 West 21st, Oklahoma City, Okla.

DURALUMIN .001 inches thick. Plenty for two microphones, \$1. W5ABO, 2924 W. 21st, Oklahoma City, Okla.

TUBES: 203A, 211, \$12; 845, \$13; 852, \$17; 866, standard \$2.50; heavy duty \$2.85. Vacuum Tube Exchange, Ridgefield, N. J.

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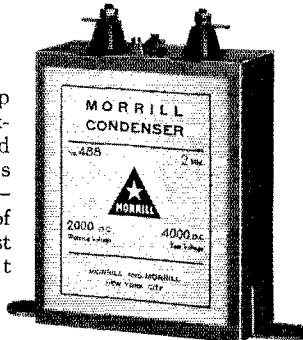
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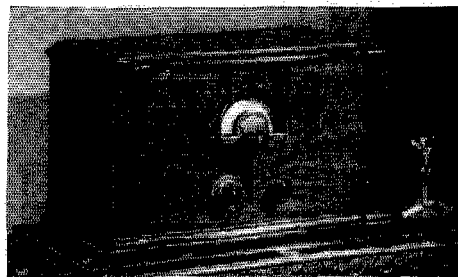
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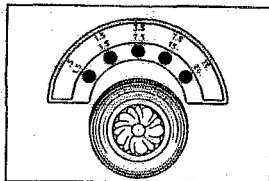
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