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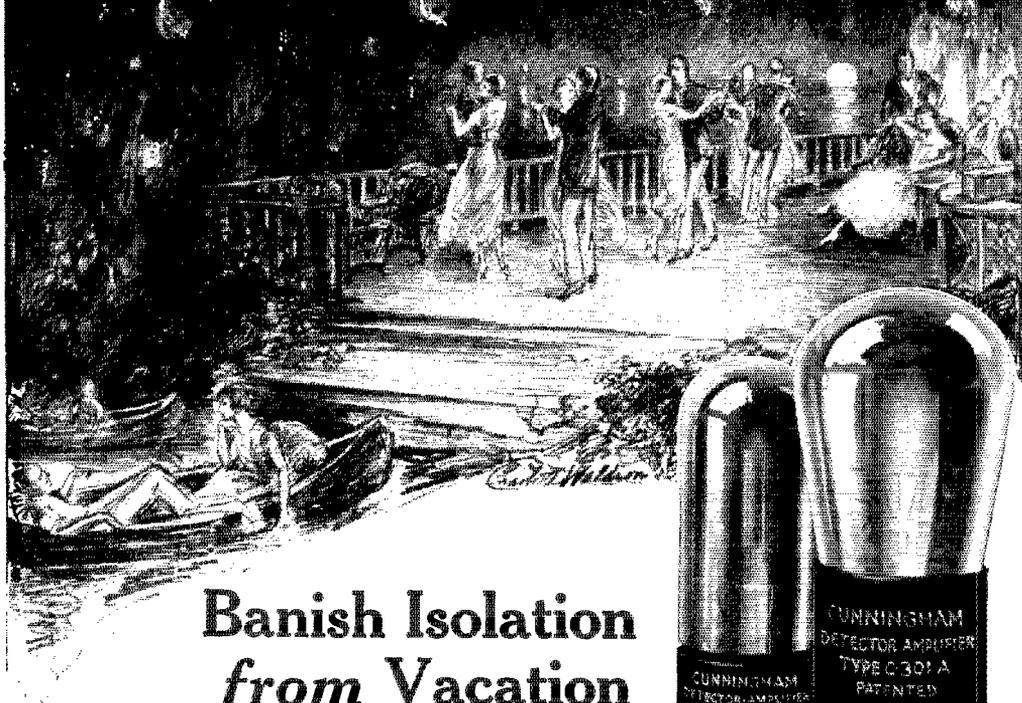
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AUGUST
1925

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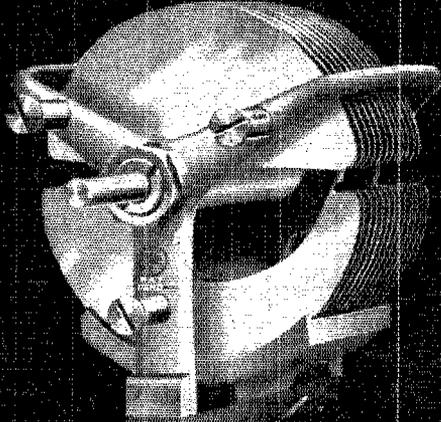
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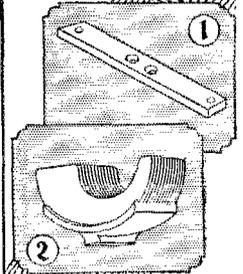
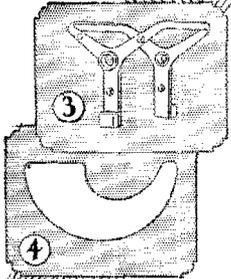
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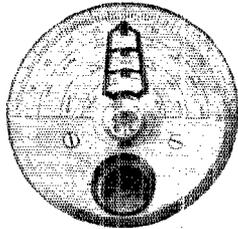
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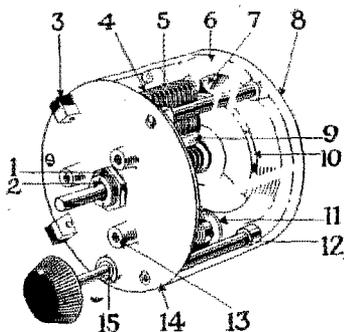
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The Jewett Receiver



QST



The Official Organ of the A.R.R.L.

VOLUME IX

AUGUST, 1925

NUMBER 8

Editorials	7
Official Wavelength Stations	8
WWV and 6XBM Schedules	8
Come to Chicago!	9
Plug-In-Coil Receivers	<i>John M. Clayton</i> 11
MacMillan Shoves Off	15
The De Forest D-17 Receiver	<i>Edward A. Livingstone</i> 16
New England Division Convention	19
Vancouver Division Convention	19
The Mysterious WJS	20
Measurement of the Voltage Ratio of Audio and R.F. Transformers.	<i>E. R. Ramsey</i> 24
2nd Annual Western New York Convention	25
The Eowdoin's Generators	<i>Edward W. Berry</i> 26
A.R.R.L. Information Service Rules	27
NRRL Homeward Bound	<i>A. L. Bullong</i> 28
The Interference Muddle	<i>W. J. Williams</i> 30
Smoothing Circuits for Half-Wave Rectification.	<i>F. S. Dellenbaugh, Jr.</i> 33
Experimenters' Section Report	35
Loss Comparisons	<i>W. J. Seibert</i> 37
R.C.C.	38
Amateur Radio Stations 2ZOD, 6LJ-6CFT-6XP, 8ASE	39
I.A.R.U. News	42
Traffic Department	45
Communications	64
QST's Directory of Advertisers	95

QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.

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Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.00 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$2.50 per year, postpaid. 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 8, 1922. Additional entry as second-class matter, acceptable at special rate of postage provided for above, at Springfield, Mass., authorized September 17, 1924.

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THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is 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.

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EDITORIALS

150-200

IN connection with the discussion of the congestion on broadcasting waves, much hue and cry is being raised these days about extending the broadcasting band down to 150 meters. The publicity given the subject in certain sections of the radio press has created the impression that amateurs no longer use the waves in this region assigned to them by law, that they are perfectly willing to give them up, and that it is as good as agreed that broadcasting will move down to 150 meters by the end of the year. Idle talk of this kind is so often better left alone that we have delayed in making any comment upon this particular subject. The talk does not seem to down, however, and some reply from us seems in order.

First let us examine the rumors that it has been all but formally agreed by the Department of Commerce that the waves between 150 and 200 meters will be taken from amateurs and assigned to broadcasting at an early date. The Department writes us: "The suggestion that the broadcasting range be lowered to possibly 150 meters has received some consideration in the Department, as have dozens of other plans for improving radio conditions. There is at present no intention whatever of making any radical change in the wavelength assignments." Again, our Traffic Department in a recent questionnaire to the several thousand Official Relay Stations of the League asked the question: "Would you enjoy amateur radio less if the 150 to 200-meter band were taken away?", their purpose being to determine the value placed upon this band by the average amateur. Some amateurs became so concerned, what with the rumors flying around, that they wrote the Department of Commerce at once in direct inquiry, so that we received a letter of mild protest from the Department: "The amateurs apparently are left under the impression that the Department is considering removing the amateurs from this band. You have been informed that the suggestion has been made to the Department that the 150 to 200 meter band now used by the amateurs be allocated to the broadcasting service but that the Department has not given the matter serious consideration."

So much for the notion that it's all cut and dried. It may be proposed at the Fall national radio conference, and it may

happen, but it certainly is not agreed upon now and the skids don't seem to be half as well greased as they looked.

And now let us look into the statements that have been made for us, that we no longer use the 150-200 band anyway. An editorial in June *Radio News* says: "Until very recently the radio amateurs were in possession of the band below 200 meters. Of their own volition, however, because they found that their communication was vastly improved thereby, they have abandoned the 200-meter wave band entirely, and most amateurs are now transmitting on 80 meters and below." This statement has caused an avalanche of indignant letters; and no wonder, for it isn't correct. In the first place it is probable that 50% of the amateur message traffic of the country is handled on the 150-200 meter band. Then, neglecting our two shortest-wave bands which have not yet proved very useful, let us consider for a moment the cyclage distribution in our four other bands, embracing a total of 4,000 useful kilocycles. In the so-called 20-meter band we have 2000 kilocycles, or 50% of our useful territory; around 40 meters we have 1000 k.c. or 25%; from 75 to 85.6 we have 500 k.c. or 12.5%, and between 150 and 200 meters the same, 12.5%. For best working and for minimum QRM, stations should be distributed in accordance with these percentages. Altho, as everybody knows, there has been a wholesale downward movement and much congestion on the 80-meter band, with perhaps 50% of all amateur operation now occurring there, there is still something over 12.5% of the active amateur stations operating in our topmost band and, rather than having abandoned it, it is still carrying a little more than its share of the operation.

It is of course true that we have found the waves below 150 meters better than those above, for super-DX. But there are other things in amateur radio than super-DX, and for many of those things the waves above 150 meters have advantages. It is much easier to get stable emission on such waves and stability is of the first importance in radio-mechanical work where relays must be operated, etc., also in picture-transmission, a field that is creating much interest in amateur circles, and likewise in amateur telephony. Furthermore, the modulated types of amateur transmission operating above 150 meters have no

other place to work—they are not permitted to operate on the shorter waves, and wisely so. We daresay all this activity above 150 meters might be accommodated at some other place in the spectrum if there were any object in so doing, but it is unjust and incorrect to say that amateurs have abandoned the 150-200 band and accommodated themselves in their remaining bands. And as all the territory below 150 meters has been divided into

neat little slices and allotted to different services, there is nowhere to go unless there is a general reallocation—which T.O.M. forbid.

The A.R.R.L. protests any proposal to reallocate the band between 150 and 200 meters, on the grounds that this always has been and still is active amateur territory.

—Kenneth Bryant Warner.

Official Wavelength Stations

THE A.R.R.L. Official Wavelength Stations that have been appointed by Messrs. D. C. Wallace and C. M. Jansky, Jr., are as follows:

1	NKF	30	9EIB	
2	1XAM	31	7GQ	
3	6BQB	32	2DS	
4	7BK	33	1BZQ	
5	5MN	34	6BGM-6CVO	
6	9AAL	35	2XI	
7	2AC	36	9IG	
8	2WC	37	7ACI	
9	9ZT-9XAX	38	1ZL-1AVX	
10	1MK	39	2CLA	
11	8GU-8XC	40	6ZE	
12	9XI	41	6TS-6XAG	
13	1CK	42	8GZ-8ZG	
14	1AWW	43	9BKG	
15	3RE-3ZW	44	6XAD-6ZW	
16	8AA	45	8ZNM	
17	8EQ	46	6TI	
18	3APV	47	c3NI	
19	4XE	48	c9AL	
20	5ZAV	49	6CDN	
21	9DXN	50	WNP	
22	9EGU	51	6CGW	
23	6ZH	52	NRRL	
24	5AKN-5XHU	53	6LJ	
25	2MU	54	5OX	
26	4BY	55	9BMR	
27	9ZA	56	6BCP	
28	7GE-7ZX	57	1AAC-1ZO	
29	1IV	58	8BZT	

The number is now so large that everyone can use these O.W.L. stations to spot calibration points on wavemeters and tuners. As we have explained before—there will be no schedules, the stations will simply carry on their regular work on the 5, 20, 40, 80 and 150 meter bands, announcing the wave they are using at the close of each sending. For instance, 9ZT will finish up.

"u 9ZT 76" or "u 9ZT 180" or "u 9ZT 42"

This is *not* the same thing as the Bureau of Standards system, since there are no regular schedules and there is no attempt to secure the extreme accuracy that is provided by WWV, 9XI and 6XBM. The O.W.L.s can be depended on to 1% however in most cases and 9ZT-9XAX checks them up regularly to see that their waves are correct.

All correspondence regarding O.W.L.s should go to D. C. Wallace, 54 Penn. Ave., Minneapolis, Minn.

WWV and 6XBM Schedules

THE standard frequency signals from WWV, Washington, D. C., and 6XBM Stanford University, California, are as follows. For further information regarding these signals see page 34 of the March issue of *QST* and Bureau of Standards Letter Circular No. 92. The former can be obtained from *QST* Circulation Manager, Hartford, and the latter from the Bureau of Standards.

Time*	Schedule of Frequencies in Kilocycles (Approximate wavelengths in meters in parentheses).				
	Aug. 20	Sept. 5	Sept. 21	Oct. 5	
10:00 to 10:08 p.m.	2000 (150)	125 (2400)	300 (1000)	550 (545)	1500 (200)
10:12 to 10:20 p.m.	3300 (91)	133 (2254)	375 (852)	630 (476)	1650 (182)
10:24 to 10:32 p.m.	3600 (83)	143 (2097)	545 (559)	750 (411)	1800 (167)
10:36 to 10:44 p.m.	4000 (75)	155 (1934)	375 (800)	830 (353)	2000 (150)
10:48 to 10:56 p.m.	4400 (68)	165.5 (1809)	425 (705)	890 (396)	2200 (136)
11:00 to 11:08 p.m.	4900 (61)	205 (1463)	500 (600)	1130 (285)	2450 (122)
11:12 to 11:20 p.m.	5400 (55)	250 (1183)	600 (500)	1300 (232)	2750 (111)
11:24 to 11:32 p.m.	6000 (50)	315 (952)	665 (450)	1500 (200)	3000 (100)

*Eastern standard time for WWV, Washington, D. C.
Pacific standard time for 6XBM, California.

Strays

If you have heard a flock of new "4" stations signing off, part of them are probably the newly assigned Tennessee calls. Tennessee has been taken out of the 5th Inspection District and placed in the 4th. All Tennessee "5" calls have been cancelled and "4" calls substituted. Forty-six new 4's have thus been created.

The Midwest Division gang are publishing a divisional magazine called "Midwest Radio". It's a dandy journal with C. W. Klenk of 9AAU fame as Editor and W. F. Schoening, 9DXN, Technical Editor. Surely wish them luck. Address them at 3963 Shaw Avenue, St. Louis, Mo.

Flivver-coil I.C.W. is attractively economical but not so good. Ford never taught his coils to be musicians.

Come to Chicago!

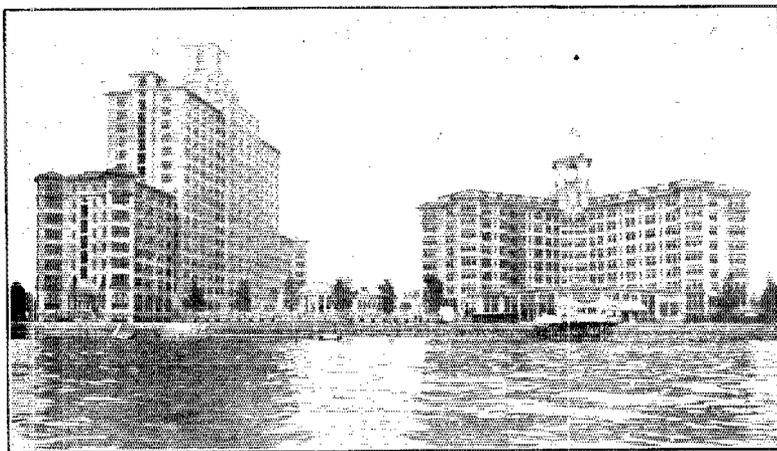
Third National A. R. R. L. Convention Meets August 18 to 21st—Biggest Ham Event Ever Held—Wonderful Time for Everybody

IT IS a favorite thought of ours that one of the finest things about amateur radio is the friendships we make in it, and amateur radio friendships can have no finer setting than an A.R.R.L. National Convention. As we close our forms for this issue, plans are rapidly being perfected for the greatest amateur affair ever staged, the Third National A.R.R.L. Convention, which will be held at the Edgewater Beach Hotel in Chicago from August 18th to 21st, under the auspices of the Chicago Radio Traffic Association. A convention committee of this society, headed by Wm. E. ("Bill") Schweitzer, 9AAW, has been at work for months and is now putting the polishing touches on the details that will make this convention bigger and better than either of the previous two held in Chicago—which is saying a lot. It has been two years since we had a national get-together

tors, officers, Division Managers and A.D.M'S will attend, and from Headquarters there will be Treasurer Hebert, Acting Traffic Manager Handy, Secretary-Editor Warner, *QST*'s Managing Editor Beekley, and Technical Editor Kruse. It is hoped that Secretary of Commerce Hoover will attend and address us. Many prominent engineers, physicists and leading amateurs will deliver technical talks and papers. "The gang" will be there from coast to coast and, we are informed, with a number of amateurs from other countries.

Here is the program, still subject to slight modification:

First day, August 18th. Registration, getting settled, etc. At 3 p.m. will be the Opening Session of the Convention, with addresses by prominent guests and League officials, and at 7 p.m. the big banquet will be held.



CONVENTION HEADQUARTERS. EDGEWATER BEACH HOTEL, CHICAGO.
See the nice water! Bring your bathing suits, fellows, and make the convention your vacation.

and much has happened. For one thing short waves have opened new worlds of friends to us and there are many we have never met in person before. And of course all the old-time friends will be there!

The Edgewater Beach, the site of our two previous conventions, again will be our home, and this year everything on the program will be at the one spot. It is an ideal place at which to stay, and rooms may be had at very reasonable charges, as announced in last *QST*. Every indication is that the old E.B. will be full of hams from basement to roof. Many A.R.R.L. Direc-

Second day, August 19th. At 9:30 a.m. Supervisor of Radio Beane of the Ninth District will give license examinations in a special room at the hotel. Here is your chance to get your ticket renewed or to qualify for the next higher grade. At 10 a.m. there is to be a *QST* meeting," conducted by Mr. Beekley, to discuss *QST* and get your ideas for its betterment. The hot back of this is that *QST* belongs to you folks, the membership, and we want to make it the kind of mag you want by finding out what you like and what you don't like. The big auto tour gets under weigh at 12 noon, to

visit points of interest about the city, particularly radio stations and things that will interest the amateur. The first of the two technical sessions occurs that night, at 7:30, when all the talks relating to receiving apparatus will be given. Mr. Paul H. Davis, Vice-President of the Chicago Radio Traffic Asso., will preside.

Third day August 20th. The big traffic meeting will be opened at 10 a.m. by Division Manager Mathews, who will present Acting Traffic Manager Handy, who will lead the discussion. Every station operator is wanted at this meeting. Some time during the convention there will be a conference of the D.M.'s and A.D.M.'s present, too, but the time for this has not yet been set. At 1:30 p.m. there will be another traffic meeting, this time to discuss railroad emergency communication service in particular, with representatives of the railroad association participating. Opportunity to discuss receiving problems, with particular reference to the papers delivered the previous evening, will come at 3 p.m., with the authors of papers present to answer questions; Prof. Jansky will preside. That evening, at 7:30, the transmitting talks and papers will be delivered, under the chairmanship of Mr. Davis. There will be all manner of good amateur dope at these technical meetings, particularly about short waves. It is also expected that Mr. C. Francis Jenkins will be present and demonstrate his picture-transmission apparatus for amateurs.

Fourth day, August 21st. At 10 a.m. the amateur stunts and athletic events will be held near the hotel, with many handsome prizes for the winners. Various odd times in the program will be filled in with stunt contests too. *Bring your bathing-suit*—there is splendid swimming immediately adjacent to the hotel. A big picture of the gang will be taken at 12 noon this day. At 12:30 the A.R.R.L. Publicity Department men go to luncheon together to talk over their work, and at 2:30 p.m. comes the transmission discussion under Mr. Kruse, with the speakers of the previous evening present to answer questions. At 5:30 p.m. the many prizes will be awarded their winners. And for that night prepare for action! It is Grand Finale Night, with a big party and entertainment and a free feed. It is also hoped that at midnight it can be converted into an initiation into a higher degree of the Royal Order of the Wouff-Hong, staged by the Supreme Council of the Order from Flint, Mich.

Doesn't that sound like a mighty happy and profitable four days?

Tickets

Tickets, if bot at the time of registration, will cost \$10.00. This ticket will cover

everything—the banquet, all meetings, badge, participation in all prize contests, auto trip, cabaret with lunch, etc. Now because it costs money to run a convention and that money has to be borrowed at interest, the convention management can give a discount to those who purchase their tickets in advance. If purchased on or before August 8th, the price will be \$9.00. All ticket remittances, requests for room reservations, and general correspondence about the convention should be addressed to Wm. E. Schweitzer, Chairman, 4264 Hazel Avenue, Chicago.

Railroad Certificates

Arrangements are now in process with the railroads to secure special convention fares for those attending the convention. This will take the form of a half-fare rate for the return passage. Buy only a one-way ticket to Chicago and tell the ticket agent that you are attending the A.R.R.L. Convention and want a convention *certificate* (not a receipt). If a minimum of 350 of these certificates are presented at the convention for endorsement by the railroad representative, we will all get half-fare rates back home. It takes 350, however, or we will all be left out in the cold, so no matter how close to Chicago you live, *be sure to get that certificate.*

The Michigan Attendance Cup

The amateurs of Michigan are giving a beautiful silver cup as a permanent trophy to the amateur club having the most delegates present from the greatest distance. The rules are simple—they are based on men and men-miles.

All the delegates belonging to any one local club or organization shall count their points together. Each delegate attending from a distance of over 25 miles will receive 20 points. For every mile a delegate travels he will receive 1 point. Example 1: 50 delegates travel 70 miles. $50 \times 20 = 1000$ points; $50 \times 70 = 3500$ points; total 4500 points. Example 2: 2 delegates travel 2500 miles. $2 \times 20 = 40$ points; $2 \times 2500 = 5000$ points; total 5040 points. The cup will be awarded to the club or organization having the greatest total.

Songs Wanted

The convention management wants ham songs set to popular tunes, to sing at the banquet. A prize will be given for every one printed in the banquet menu. They must reach the Convention Committee by August 12th.

Now, do you want to go? "Obey that impulse!" Make the convention your vacation. A wonderful time awaits you. CU tr, OM!

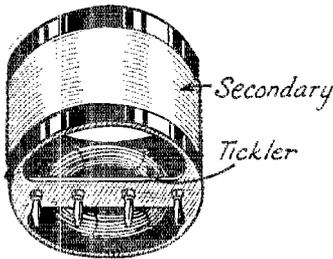
—K. B. W.

Plug-In-Coil Receivers

By John M. Clayton, Asst. Technical Editor, QST

UNTIL someone designs a short wave receiver that operates efficiently on all wavelengths between 15 and 200 meters and has only one or two main tuning controls plus an auxiliary control that has to be adjusted now and then, we are going to have to put up with inter-changeable coil receivers if we are going to get good results on all amateur wavelengths. This means that we are going to have to change coils every time we want to make any great change in wavelength. Heretofore it has been the practice to wind the coils in the Lorenz fashion and to use the coil wire itself as a support and binding posts as terminals. Unless the coils are mounted very close to the binding posts the result of this form of support is likely to be a floppy coil which means a bird-note signal. In addition to that the Lorenz coils are not as

places, and soldered to the two inside plugs. These plugs make very good contact with small terminal sockets in which they readily fit. The receiver shown in Fig. 3 (the circuit of which appears in Fig. 2) was built up around the GR coils. An antenna coil was dispensed with by virtue of a very small series condenser connecting the antenna to the grid circuit of the tube. This condenser can be a small vernier type midget variable having a capacity range between 4 and 30 μf d, or can be made of two brass angles a half inch long mount-



MODIFIED G-R COILS
FIG. 1

good as the space wound cylindrical coils, and one has to overcome a lot of inertia and lose a lot of time when six binding posts have to be unscrewed and then screwed up again whenever it is necessary to change the coils. We want a removable coil system which is efficient and almost instantaneous in its action.

In Fig. 1 is shown the General Radio type plug-in coil to which has been added a second coil which is used as a tickler. For short wave reception, the secondary, or main, coil is space wound. The secondary is connected to the two outside plugs. The tickler is scramble wound on a UV-199 receiving tube or any form having about this diameter, slipped off, tied together with strings in several

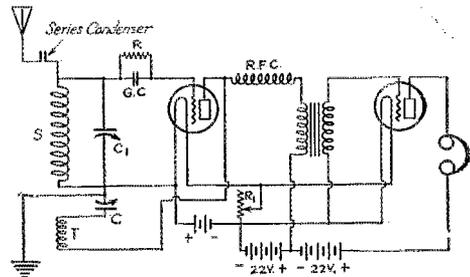


FIG. 2

ed about an eighth of an inch apart. The exact distance between these angles (to the right of Fig. 3) will have to be determined by experiment. It will vary with different antennas and with different degrees of coupling desired.

The size of the secondary tuning condenser directly affects the number of coils needed to cover all of the amateur bands. The larger the secondary tuning condenser the smaller the number of coils required, and also the more critical the tuning. The

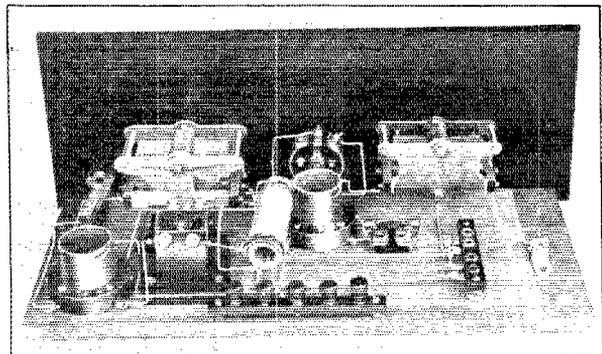


FIG. 3. REAR VIEW OF FIRST RECEIVER.
Note socket terminals on the hard rubber strip at the right.

tuning condenser capacity cannot be carried to extremes, however, for if it is made too large the tuning is entirely too sharp on the shorter wavelengths and if it is too small the secondary coil will not cover one amateur band. A secondary tuning condenser having a capacity of 250 $\mu\text{fd.}$ is entirely too large for use on the 20-, 40- and even 80-meter bands no matter what type of available vernier is used. Even a condenser having a maximum capacity of 150 $\mu\text{fd.}$ is too large unless a vernier having a ratio of at least 20 to 1 is used. From the standpoint of ease of operation alone the secondary condenser should have a maximum capacity

60 meters. The next coil is a standard G.R. space wound type having 15 turns. Its tickler consists of 8 turns of No. 12 wire. This coil tunes from 55 to 110 meters. The left hand coil at the right of the receiver is for the 20-meter band. It has six turns of No. 12 D.C.C. wound to cover $1\frac{3}{4}$ inches, with a 3-turn tickler. The right hand unit was made up for 5-meter work. It consists of two loops of $\frac{3}{8}$ th inch brass strip having a diameter of 3 inches. One loop acts as a tickler and the other as a secondary. An additional G.R. coil is provided for wavelengths between 90 and 180 meters. It consists of 30 turns of No. 24 wire space

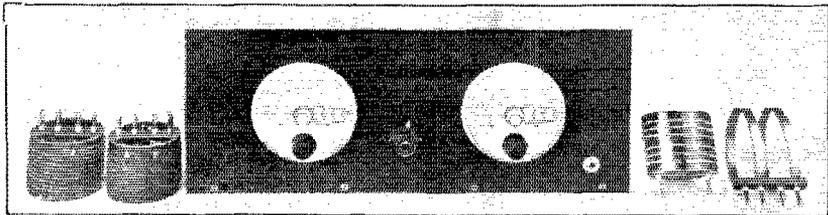


FIG. 4. FRONT OF RECEIVER WITH FOUR OF THE COILS.

not exceeding 80 or 90 $\mu\text{fd.}$ On the other hand if the maximum capacity does not exceed 20 or 30 $\mu\text{fd.}$, it will be necessary to have two coils to cover one band of ham waves. From an operating standpoint the arrangement of this latter type is entirely out of the question, of course. Also the L/C ratio is exceedingly poor when a condenser having a capacity over 100 or 150 $\mu\text{fd.}$ is used. Signal strength is improved when more inductance and less capacity is used.

The coils shown in Fig. 4 will cover wavelengths as follows when used with

wound. Its tickler should have 12 turns. The spacing between turns of all coils is greater than the diameter of the wire. It is possible to redesign this set for broadcast wavelengths by substituting a 500- $\mu\text{fd.}$ secondary condenser for the present one and a 500- $\mu\text{fd.}$ regeneration-control for the present 350- $\mu\text{fd.}$ condenser.

A G.R. coil having 59 turns will cover the broadcast bands and requires a 15-turn tickler.

The regeneration condenser shown in the set in Fig. 3 was a Cardwell 500- $\mu\text{fd.}$ type in which the plates happened to be staggered and cut away so that the capacity was 350 $\mu\text{fd.}$ A small condenser is of no particular advantage in the regeneration control while the larger condenser is of advantage in that one tickler coil can be used to cover a variety of wave bands if the secondary and tickler coils are not built into one unit.

The plugs on the coils fit in to the four "socket terminals" shown at the right of Fig. 3. These sockets are mounted on a hard rubber strip, and are so spaced that the plugs slide into them easily and with no tendency toward binding.

The radio frequency choke (R.F.C.) for all wavelengths below 200 meters consists of 150 turns of No. 30 D.C.C. wire on a cardboard form $\frac{3}{4}$ inch diameter. This choke should be mounted as far away from the main inductance as possible and should be so placed that its field and the field of the inductance are at right angles

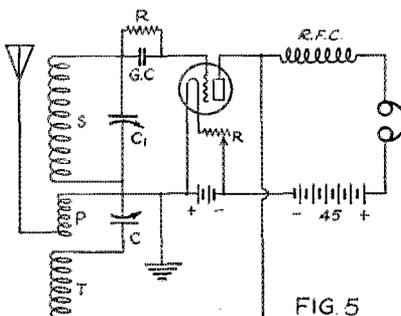


FIG. 5

a 150- $\mu\text{fd.}$ tuning condenser: the left hand coil has 10 turns of No. 12 D.C.C. wire wound to occupy a space of $1\frac{3}{4}$ inches. The tickler for this coil consists of 5 turns of the same size wire. This coil will tune from approximately 80 to

to each other. If reception above 200 meters is desired the choke should have approximately 250 turns of wire instead of 150.

Note that the tickler is mounted in the bottom and grounded end of the secondary inductance. If mounted in the grid end of the inductance the regeneration control will have a very great effect upon the tuning when the regeneration is varied. While not so very troublesome on wavelengths above 150 or 200 meters such action below 35 meters greatly impedes the ease of tuning and is an absolute nuisance. Below about 50 meters we will

cept that a primary inductance is used instead of a coupling condenser, and no audio frequency amplification is used.

The coils themselves are wound on ribbed Radion tubing (Fig 6). This tubing is 3 inches in diameter and the ribs are about 3/32 inch high. Very shallow notches were cut in the ribbing by means of a screw cutting lathe adjusted to cut 8 notches to the inch. The notches should be just deep enough to hold the wire in place. Three lengths of tubing were used in the receiver. They are one and a quarter inches, two inches and four inches. The G.R. plug terminals were mounted one

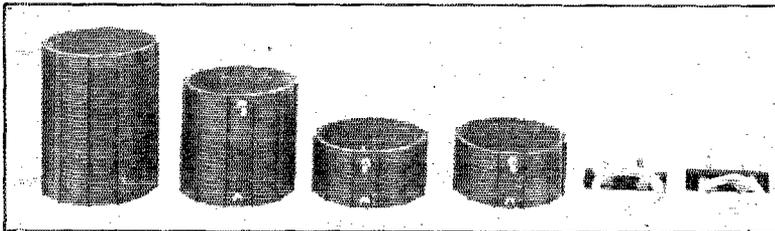


FIG. 6. FOUR OF THE COILS IN THE SECOND RECEIVER. Small coils at the right are ticklers.

have two tuning controls if the tickler is not very small and is not properly placed. The regeneration control will affect the tuning almost as much as the tuning condenser itself will. The tickler should be as small as possible, never larger than one-half the diameter of the secondary, and it should contain just enough turns to cause the tube to oscillate nicely at the upper end of the tuning condenser when the regeneration condenser is turned almost to its maximum capacity setting. If it is so designed, it is possible to tune in a station with the secondary condenser almost at its minimum capacity and vary the regeneration condenser over the whole scale without changing the note of the incoming signal to any great degree.

The front of the set is shown in Fig. 4. The dials are Ultraverniers having a ratio of 20 to 1. It is useful to have a dial and pointer on the regeneration condenser so that one can tell the approximate location of the regeneration condenser settings for different types of tickler coils.

In an effort to improve the plug-in coil the receiver shown in Figs. 7 and 8 was constructed. The circuit of this receiver appears in Fig. 7. It is substantially the same as the circuit shown in Fig. 2 ex-

cept that a primary inductance is used instead of a coupling condenser, and no audio frequency amplification is used.

cept that a primary inductance is used instead of a coupling condenser, and no audio frequency amplification is used. The arrangement of socket terminals is shown in the rear view of the receiver in Fig. 7. The two right hand sockets, parallel to the back edge of the baseboard, are terminals for the primary coils. The next two at right angles to the primary terminals are the tickler sockets and the next four to the left of the primary and tickler terminals are for the

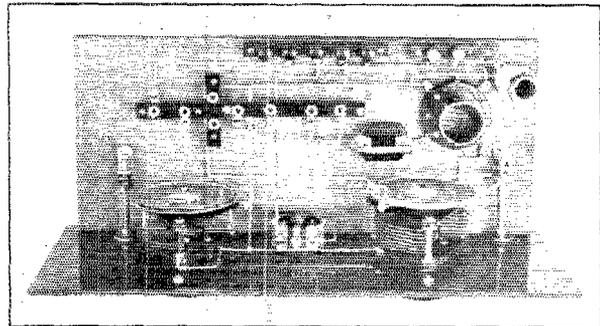


Fig. 7. "----- note particularly the arrangement of the socket terminals."

secondary coils. As the latter will vary in length it was necessary to provide a socket for each length. The first of the four is for the grounded end of the secondary and the last three are connected in parallel and to the grid condenser.

The primary is provided with interchangeable coils so that the receiver can be used with different antennas and so that the correct coupling between primary and secondary can be provided on all wavelengths. Two primaries, at least, will be necessary for effective operation on the 20-, 40- and 80-meter bands. The correct number of turns can best be determined by experiment as it will vary with different antennas. By winding a

the 150- to 200-meter band required a 42-turn coil; the 24-turn coil tuned from 59 to 90 meters; a 10-turn coil tuned from 33 to 49 meters and a 4-turn coil from 18 to 27 meters. The exact number of turns for any wave band will vary with different sets and with different wiring methods due to the capacity between wires, and also the position and size of the tickler and primary coils will have to be taken into consideration.

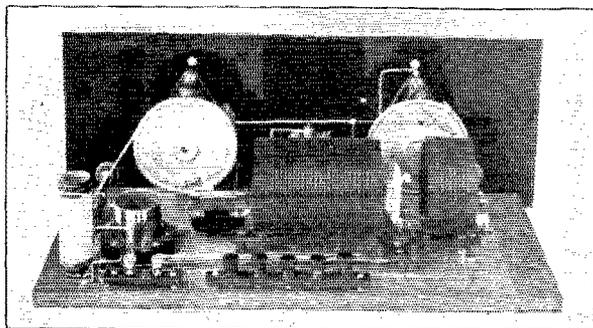


Fig. 8. Secondary at the left, tickler in the center and primary at the right.

few turns on the $1\frac{1}{2}$ inch form the coupling can be roughly varied by reversing the position of the coil in the socket. If the primary coupling is too close, or if the primary has too many turns, the operation of the receiver will be very cranky. Either the set will fail to oscillate at all when the secondary is tuned to resonance with the primary, or the regeneration control will have to be turned so far and so many turns used in the tickler that the regeneration control will have a very marked effect upon the tuning when operating the set off tune with the primary. On the other hand if the coupling is too loose, or if there are too few turns in the primary coil, there will be a loss in signal strength.

The secondary condenser (the right hand condenser of Figs. 9 and 10) is a four plate G.R. type 247. Subsequently this condenser was cut down to three plates—one stator and two rotors. The condenser will still cover the ham wave bands easily and it can probably be reduced to one stator and one rotor and still cover one amateur band with a single coil. With the 4-plate condenser shown (having a maximum capacity of about 70 μ fd.) a 24-turn secondary will cover the wavelengths between 58 and 98 meters. A 12-turn coil will tune from 39 to 61 meters and a 4-turn coil from 17.5 to 28.5 meters. For the 150- to 200-meter band a coil having 38 turns is needed. When this condenser was cut down to 3 plates, with a maximum capacity of about 55 μ fd.,

For the 150- to 200-meter band a 15-turn tickler is necessary. It should be wound with No. 12 or No. 14 wire so that it will be self-supporting. The other amateur bands, down to 15 meters, can be covered with a 4- and a 10-turn coil. These coils should have a diameter not exceeding $1\frac{1}{4}$ inches. The feedback condenser is a 250- μ fd. type 247 G.R. If a smaller condenser is used there will have to be more tickler coils with additional turns to cover the ham waves. The tickler is mounted at the grounded end of the secondary between the primary and secondary. Make the tick-

ler just as small as possible and use only enough turns in it to maintain oscillation at the upper end of the tuning condenser's range.

The verniers are pulley-and-string type as made by Zenith. A large knob 2 inches in diameter is used on the vernier shaft. The results of this combination is a set that tunes at 40 meters like the ordinary run of ham receivers tune at 200 meters.

The grid leak should be so chosen that the tube will slide into oscillation with a barely perceptible hiss or a faint "thud". If the tube "plops" in with a loud bang, reduce the number of tickler turns, move the tickler away from the secondary and try a grid leak having a much higher resistance. The correct grid leak value will be between 5 and 10 megohms with a 201-A tube.

This receiver furnishes the combination of a truly efficient set plus a set that tunes almost as easily as a 600-meter receiver, can jump from one to another of the amateur bands almost instantaneously, and at the same time can be made to operate on any but the very shortest of the ham waves.

Strays

New Intermediates
 HU — Hawaiian Islands
 PI — Philippine Islands

MacMillan Shoves Off

THE Schooner "Bowdoin" and the S. S. "Peary" of the MacMillan-Navy Arctic Expedition sailed from Wiscasset, Maine, on June 20th for Etah, Greenland, amidst tooting whistles and the cheers of a multitude of spectators. Although it expects to return in September, the expedition is most formidably outfitted with supplies and scientific equipment of many sorts, not the least of which is the short-wave radio apparatus. As we told in our last issue the "Bowdoin" is equipped for short-wave work with amateurs, the operator being our old friend, John L. Reinartz of 1XAM-1QP. As this is written the "Bowdoin" is slowly working her way up the coast and WNP is in reliable touch with many amateur stations.

This is one of the most important exploring expeditions that ever sailed, as it has for its objective the exploring of the one remaining large uncharted area on the earth's surface, where it is suspected an unknown continent may be discovered.

The affair is under the auspices of the National Geographic Society, and to that society Comdr. MacMillan will send dispatches reporting the results of the party's explorations. Amateur radio is looked to provide the contact, and all A.R.R.L. stations are requested to keep a sharp look-out for WNP. See details of schedule, wavelengths and instructions for handling dispatches, in July *QST*. Everyone is much interested in the results of this expedition and we amateurs have a wonderful opportunity to get credit for amateur radio and A.R.R.L. in maintaining the communication.

In addition to her Navy spark apparatus, the "Peary" carries a 2 K.W. C.W. and phone set, equipped with a 250-watt master oscillator and two 1 K.W. Radiotrons.

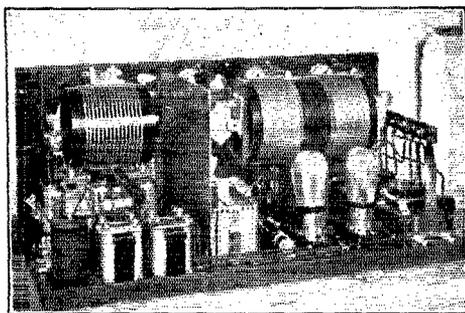
The call is WAP, and the wavelengths approximately 20, 40, 80 and 275 meters.

This set will be used chiefly for communication with the three Navy planes that will do the long-range exploring, but also for communication with the Zenith experimental station at Chicago. It is hoped that by means of a short-wave channel and rebroadcasting connections, the expedition may "go on the air" with local Eskimo talent and tell the world all about their experiences. It should prove quite a sensation if it works. The 275-meter wave is designed for reception on the Navy receivers on the planes, but the latter also carry Reinartz short-wave sets and our guess is that 275 meters won't be used very much. The operator on the "Peary" is Paul J. McGee, pre-war 9AE of Mattoon, Ill., and now a member of the Zenith staff. McGee expects to find plenty of time to ham too, and the "Peary" has lots of punch, so listen for WAP also.



REINARTZ ABOARD WNP.
(Photo © McDougall & Keefe)

McGee expects to find plenty of time to ham too, and the "Peary" has lots of punch, so listen for WAP also.



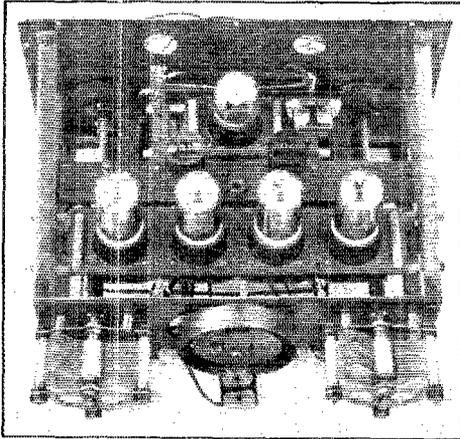
REINARTZ-ZENITH AIRPLANE SET installed on the Loening Amphibians of the expedition. The receiver is shown on the left, detector and two audio stages, using C-299 tubes. On the right is the transmitter, a 40-meter C.W. and phone set using C-301 tubes and dry battery plate supply.

Please report all communication with WNP and WAP to A.R.R.L. Headquarters.
—K. B. W.

where it is detected or changed into an audio frequency current. The audio frequency energy now passes to the primary of audio frequency transformer (11) (which is of 5:1 ratio) and is transferred

ty are shunted across the primary and secondary of the first audio frequency transformer (11) and the secondary of the second audio frequency transformer (12).

The copper shields around the tunable radio-frequency transformer (4), the cores of the two audio frequency transformers (Nos. 11 and 12), and the frame of the loud speaker (14) are all grounded to the shield of the set. The filament current of all five tubes is controlled by the 10 ohm rheostat, (16). It will be noted, however, that a fixed resistance (17) with a movable "jumper" is placed in the filament circuit of the detector tube (10). The purpose of this resistance, the value of which is 30 ohms, is to permit the use of a De Forest DV-3 dry cell tube as a detector when using De Forest DV-2 storage battery tubes as amplifiers. If the same type of tube is used in all five sock-

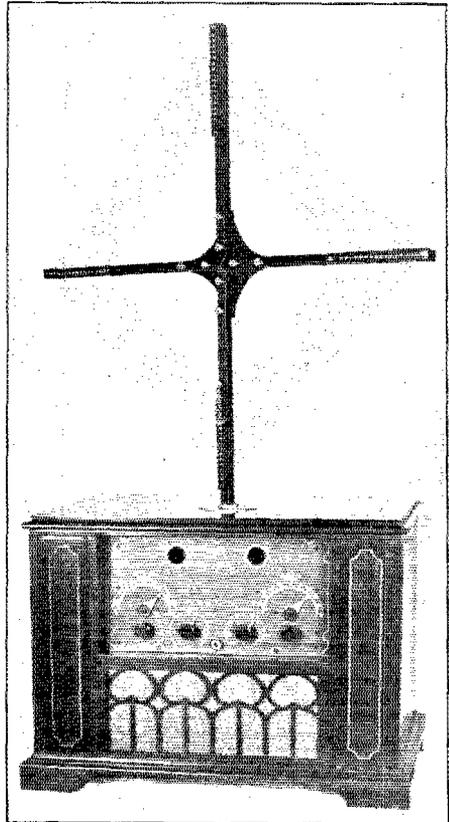


REAR VIEW OF SET WHEN REMOVED FROM CABINET.

Nearest the reader and at the left is the loop-tuning condenser, next the first interstage transformer (4 in Fig. 1) and then the condenser which tunes the secondary of this transformer. One step further back into the set is the rubber-mounted socket strip carrying the four amplifier tubes. Next after that is the strip which (left to right) carries the antenna binding post, second R.F. transformer and ground binding post. Finally, nearest the main panel, is the small rubber-mounted socket strip which carries the detector tube, the grid leak and the grid condenser. Between this tube and the main panel is the auxiliary resistance (17 in Fig. 1) and its shorting link.

by induction to the secondary whence it is applied to the grid of the third tube (8) by flowing through the secondary winding of radio frequency transformer (7). It will now be seen that this third tube (8) is the "reflexed" tube which acts as both the third radio frequency and the first audio frequency amplifier. From the plate or output of tube (8) an amplified current flows through the primary winding of transformer (9) to the primary of the second audio frequency transformer No. 12 (which is of 3.5:1 ratio) thence by induction to the secondary and on to the grid of the fifth tube (13), which is the second audio frequency amplifier. From the output of this tube the greatly amplified current passes to the built-in loud speaker (14), where it is converted into an audible signal.

It will be noted that a jack (15) is provided in this part of the circuit for the use of headphones or an external loud speaker, the built-in loud speaker being automatically cut out of the circuit on insertion of a phone plug. By-pass condensers of 1000 micro-microfarads capaci-



FRONT VIEW OF THE SET.

Note the loop-tap switch on the lower portion of the loop upright.

ets, the "jumper" is swung around to make contact with the two binding posts, thus short-circuiting the resistance. As will be

seen from the interior view of the set, this little "jumper" is located at the right of the detector tube just behind the panel.

The built-in loud speaker will be found at the rear of the cabinet, the reproducer unit being so placed that the adjustment of the diaphragm is effected by turning a small lever.³ The cast throat of the loud speaker terminates in a wooden sound chamber and projector of laminated construction, which terminates just behind the grill which is seen at the lower front of the set.

Two battery compartments are provided, the left-hand one being for the specially designed storage "A" battery⁴ or regular dry cells, and the right-hand one for the required 90 volts of "B" battery. Four heavy duty 22½-volt units, of the order of No. 2158 Burgess are recommended, as being the most economical. Three of these batteries are placed vertically in the compartment and the fourth horizontally on top of the other three. Three colored "B" battery leads are provided, the green being the common negative, the yellow being the detector 22½-volt positive and the red being the amplifier 90-volt positive.

Using An Antenna

Although the De Forest D-17 is designed for loop reception under all normal conditions, there are occasions on which an external antenna and ground, in addition to the loop, may be used with advantage. This applies principally to those cases where the receiver is located in a shielded building, or where long distance reception with loud-speaker reproduction is required. For this purpose two binding posts are provided inside the set with corresponding holes in the back of the cabinet for insertion of the leads. The

ground connection to a convenient water pipe or radiator is made in the usual manner but the antenna connection is somewhat different. To the right hand or antenna binding post the scraped end of an insulated wire about 3 ft. long should be

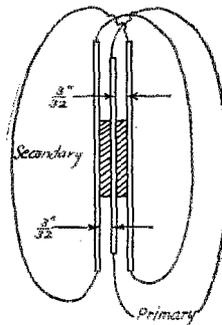


FIG. 3

Windings of the tunable R.F. transformer between the first and second tubes. This is the transformer labeled 14 in the diagram and visible at the back of the set in Fig. 2. The windings are flat single layer pancakes, not Lorenz coils. The thick discs are the spacers.

connected. The lead-in from the antenna is now twisted or wrapped around the free end of the insulated wire from the set for a distance of from 2 or 3 inches to 1 foot. Care should be taken that there is no metallic contact between these two wires. Experiment will soon show what amount of "over-lap" should be used to give the best combination of signal strength and selectivity. When this is determined the free or unused ends of the wires should be cut off.⁵

The constants of various parts used in this circuit will no doubt be of interest, and are as follows:—(The numbers refer to Fig. 1.)

Loop Antenna—Special De Forest folding spiral, 16 turns special stranded wire. Max. inductance with .0005-µfd. variable condenser in parallel. Five inside turns

- 3—The adjustment of this lever was found to be very important, both as to the quality of reproduction and as to the sensitivity of the unit. We used the set for copying ships, likewise WIM, and were able to misadjust the reproducer in such a fashion as to secure good audio resonance to WIM's note. This adjustment was of course entirely wrong for music and in no way indicated the normal quality of reproduction.—Tech. Ed.
- 4—The Technical Editor has often doubted the wisdom of introducing a storage battery into a receiving cabinet. Surely the fumes must cause corrosion of the exposed metal parts. Has this been considered in the sets now on the market? Tech. Ed.
- 5—Frankly, we are very skeptical as to the business of receiving with a loop when using a total of five tubes and attempting to work a loud speaker. It was an agreeable surprise to find that the set (with the antenna entirely taken down) did very nice work. The directional property of the loop was not useful to us because of a peculiar location. The only station we were anxious to get rid of was directly opposite the other stations we wished to hear. However, even WBZ's inordinately broad wave could almost be *tuned out*. The loop minimum was found to be quite good. There is a slight antenna effect as shown by the fact that one maximum is somewhat larger than the other.—Tech. Ed.

- 6—This amounts to putting another (very small) condenser in series with the 100-micromicrofarad antenna-series condenser (19) inside the set. This is necessary to prevent the antenna capacity from loading up the input circuit across which it is connected. Instead of the wire-scheme suggested by the article we used a Gardner & Hepburn "Continental Junior" vernier condenser. If this was set at too large a value the natural period of the antenna (or its harmonics) introduced points at which the set did not regenerate enuf. If the setting was too small the signals were weak. A more satisfactory scheme all around seemed to be to shorten the antenna until the external series condenser was not needed. The final antenna was a 20 foot piece of wire in the room. This gave a "pickup" greatly above that of the loop, altho with a loss of selectivity. A wire 5 feet long seemed to double the pickup as compared to reception with the loop alone.—Tech. Ed.

can be cut out by a switch for efficient reception of wavelengths below 400 meters. Upright member of frame is fitted to a plug which provides revolving electrical contact in loop jack.

Rheostat—(16)—10 ohms.

Potentiometer—(18)—500 ohms.

By-pass Condensers—See diagram.

Variable Condensers—(2 and 5)—Low Loss—hard rubber ends. 16 stationary and 15 rotating aluminum plates. Capacity 550 μ fd.

Grid Condenser—250 μ fd.

Grid Leak—2 megohms.

Tunable R.F. Transformer—(14)—Primary 30 turns No. 24 S.S.C. copper wire. Split secondary 38 turns No. 24 S.S.C. copper wire in each coil. See Fig. 3 for construction.

Fixed R.F. Transformers—(7 and 9)—Wound with No. 34 (.006) S.S.C. copper wire. Secondary is wound in six slots, 50 turns per slot. Primary, 200 turns wound over secondary winding which is first covered with a layer of oiled paper. Core:—Iron wire. Both transformers have the same characteristics.

First A.F. Transformer—(11)—Ratio; 5:1. DeForest type A-50. Turns: Primary 2800 of No. 38 wire. Secondary 14,000 of No. 40 wire. D.C. Resistance: Primary 540 ohms; secondary 7370 ohms. Impedance: Primary 60,00 ohms; secondary 1,500,000 ohms. Inductance at 1000 cycles: Primary 9 henries; secondary 250 henries.

Second A.F. Transformer—(12)—Ratio: 3.5:1. De Forest type A-35. Turns: Primary 2800 of No. 38 wire. Secondary 9800 No. 40 wire. D.C. Resistance: Primary 540 ohms; secondary 5160 ohms. Impedance: Primary 55,000 ohms; secondary 680,000 ohms. Inductance at 1000 cycles: Primary $8\frac{1}{2}$ henries; secondary 102 henries. In both cases the closed core is of laminated silicon transformer steel $\frac{5}{8}$ inch square and is sufficiently large to permit maximum amplification without distortion over all frequencies.

The circuit is extremely simple to operate. All tuning is accomplished by the three knobs which respectively control the loop condenser, the tuned R.F. transformer condenser and the potentiometer. The latter controls oscillation of the circuit, and, when turned over to "Max", permits easy "picking up" of the carrier wave, which can then of course be developed in the usual manner.

Strays

6BUR reports reception of signals from "ANE" the Laboratory of the Government Radio Services at Bandoeng, Java, Dutch East Indies. QRH 83 meters. Also some station signing "zero RZ" using a "u" intermediate and on 40 meters.

New England Division Convention

GET STARTED! For the second convention sponsored by the Poultney Executive Radio Council.

Ham's for a real time, the best eats you ever had, the liveliest bunch you ever met, **BY HECK!** Dust off the ole hay wagon take the OW or persuade the YL to board the ole buss and mosey over to see us.

The convention will be called to order at 3 p.m., Friday, September 4th, at Odd Fellows Hall. The first affair will be a trip to beautiful Lake St. Catherine for a swim, dance or fish. At 5 p.m. we get together again for a little hamfesting till supper time. At 8 p.m. we are to have movies and visits to the local stations, which will be open all night for the convenience of the gang.

SATURDAY: The big day, of course, fellows. Starts at 10 a.m. with a traffic meeting, and the day follows along with technical meetings, **STUNTS, CONTESTS,** for real prizes, too, OM's,—think them up.

The banquet is at 7 p.m., with music, etc. The following speakers expect to be with us: A.R.R.L. representative, probably our dear Mr. Hebert; Dr. Elliot White, N. E. Division Director, and W. M. Hall, A.D.M. of Vermont. Also numerous other celebrities of the ham radio world.

The tickets will be \$2.50. For reservations or any other information write to George Wood, 1AEY, Poultney, Vermont, Chairman of the convention committee.

Remember, OM, WE expect YOU!

—The Poultney Executive Radio Council.

Vancouver Division Convention

(2nd Fifth Canadian District)

AUGUST 29th and 30th, 1925, is expected to bring together at this the first Vancouver Division-2nd Annual 5th Canadian District Convention to be held in the City of Vancouver, British Columbia, under the auspices of the British Columbia amateur Radio Association, all the amateurs in British Columbia, neighboring Provinces and States.

The Committee is planning a wonderful program and cordially invites all amateurs to write Ed S. Brooks, Secretary of the Association, Court House, Vancouver, B. C. if you are coming.

—A. A. H.

Strays

Holland is to have a broadcasting company run under the same system as the one in England.

The Mysterious WJS

FOR its startling contrast with anything that has ever been done before, the radio work of the Hamilton Rice Expedition is unique. As far as we can tell the amateur radio world had not even suspected that there was such a thing as a Hamilton Rice Expedition. Much less did it suspect that his expedition had carried a radio transmitter along in its explorations of the Upper Amazon River.

Our notice was a strong signal signing WJS which on December 9 worked with u2CVS, handled messages, and arranged a schedule. By this time the station was being heard in the United States, in Canada, Mexico, England, and Hawaii. Still very few of us knew where it was nor what it was all about.

The Hamilton Rice Expedition has for its purpose research on tropical diseases and an authentic serial survey of the territory on the Upper Amazon River. Its base of operations is at Boa Vista on the Rio (River) Branco in Brazil. The territory to be explored extends to the head waters of the Parima River.

As nearly as we can make out the expedition has a base station WJS at Boa Vista and a number of field stations, all apparently in charge of T. S. McCaleb (MC) and Second District Radio Inspector Swanson (SWN). Our information on the calls of the field stations is decidedly defective. We understand that there are only three of them, yet there have been reported to us the calls UR, UJ, GD and LR. Possibly the calls were changed at times.

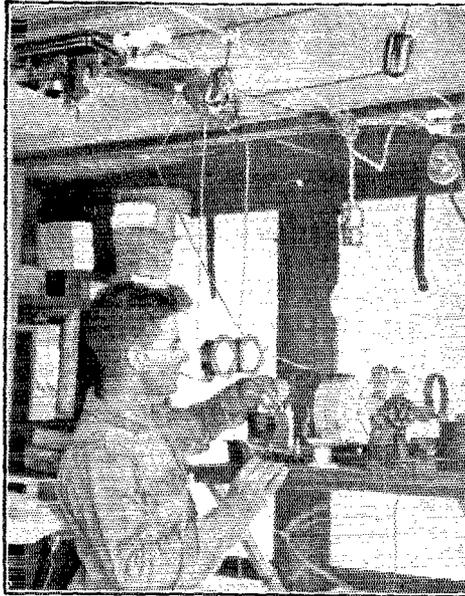
Very well, now that we have some idea of what we are talking about we will hear the story from the men who made it possible.

"WJS"

By T. S. McCaleb*

AT this writing the latest QST on hand dates back to February, 1924, so I have not the slightest idea what is going on in new developments excepting as I know of the results by listening to amateur Signals here at Boa Vista (Brazil).

With this as an excuse the following station description is submitted.



STATION WJS, BOA VISTA, BRAZIL. A splendid demonstration of what can be done with limited facilities. The connection board on the ceiling is made of cardboard soaked in wax.

Receiver

The receiver, shown in the photograph, is built to get away from losses. I assume that this is still the thing to do. The set has no panels, the coils are wound with wire sufficiently large but not too large. The coils are made interchangeable so that a variety of wavelengths can be received. The support for the socket is a General Radio type 300D amplifier unit. As this carries a transformer and the rheostat for the filament it makes an excellent mounting when turned upside down and fastened to a small bakelite panel 6" x 2½" on top of which are crowded the three

sockets of the set.

The center tube is a radio frequency amplifier with leads made as short as possible, behind it is the detector, in front of it is the one-step audio amplifier. With this arrangement all leads run directly to the next unit in the series.

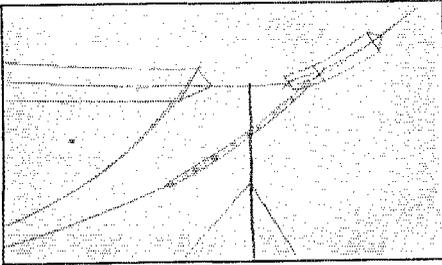
The four connections on the radio frequency sockets are made to support the entire unit by using copper strip ¼" x 1-16" to connect the condensers on each side to this socket as may be seen in the photograph.

* Operator WJS, Boa Vista, Rio Branco, Brazil.

Projecting up from each condenser binding post is a copper strip. The short wave coils are connected to these copper strips when they are in use. The copper strips also carry honeycomb coil plugs so that long waves may be received by disconnecting the small coils and plugging in large honeycomb coils.

A Static Dodge

By connecting an antenna to the plate of the detector tube the energy is coupled



The antennas, long wave at the left and short wave at the right.

to the input of the radio frequency tube by means of the tickler coil. This peculiar connection reduces the intensity of static and leaves the signals unchanged. Don't laugh at this, try it. Unless your static is very much different from ours down here you will be pleased at the results. To improve matters further we use a low antenna as may be seen from Fig. 1.

L1 moves inside of L2 or may be coupled to it as shown in the photograph. As a rule the coupling can be made fixed to cover wavelengths from 60-110 meters but with our particular antenna it is necessary to reduce the coupling near 90 meters because that is the natural wavelength of the antenna. We keep the coupling between L1 and L2 just large enough to keep the radio frequency tube oscillating easily when the adjustment of C2 is correct. The tube should go in and out of oscillation easily without a sharp click. The tickler coupling should be just enough so that a slight hissing is heard when approaching resonance.

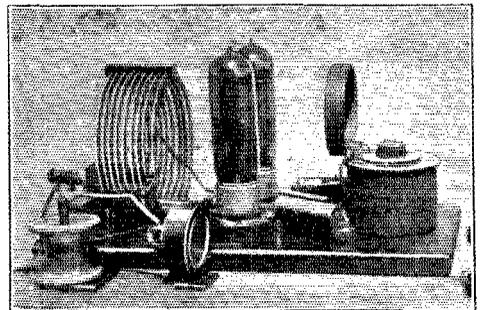
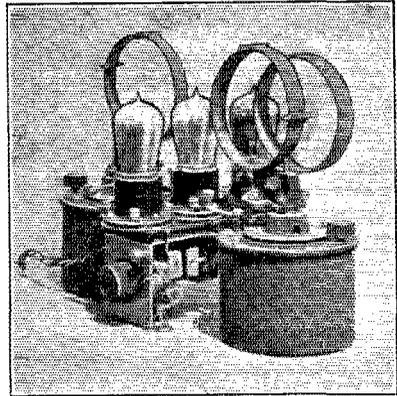
The Transmitter

The transmitter unit is mounted on a piece of wax impregnated wood measuring 9 1/2" x 17" x 1". The big inductance L1 (Fig. 2) is part of a Radio Corporation helix (UL-1008) which has 25 turns of copper strip 3/8 of an inch by .06 inch. This inductance was removed from its base and 9 turns cut off. The wooden strip at the top of the original helix was impregnated with wax and used to mount the inductance on the wooden base of the set by two brass

screws. A new and smaller strip was provided at the top. Partly inside of this helix (see photograph) is mounted a 500 micromicrofarad "Faradon" fixed condenser C1. The current carrying capacity of this condenser is given as four amperes at 200 meters. This was later replaced by a General Radio variable condenser with a capacity of 1000 micromicrofarads. This was found to heat much less when carrying the heavy current flowing in the closed circuit L1, C1.

L2, C2 (the grid circuit) is used in the transmitter because no other variable condenser was available. This part of the set was really intended to be a wavemeter. It will be seen that the transmitter operates with the Armstrong tuned plate circuit.

Each tube has a separate grid leak and condenser. The socket terminals are joined together by short bus bars and the con-



The transmitting and receiving sets at WJS. A beautiful example of the simplicity that can be achieved by doing away with panels.

nection for grid, plate, and so on are made to the centers of these bars.

The value of the condenser C4 is purposely made very small so that the antenna capacity cannot change the tuning of the

local circuit. Therefore the wavelength is determined entirely by the local plate and grid circuit and we are able to work a large antenna at a low wavelength (92 meters).

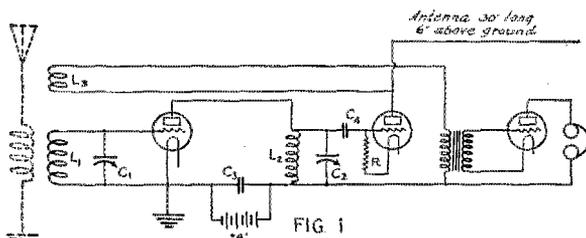
The inductance and capacity values given

1924. The first station worked was u2CVS (New York City) although at that time we were using a small high T antenna about 45 feet high and approximately 30 feet long.

This same antenna was in use when we exchanged signals with New Zealand 2AP, (Dec. 24, 1924) and English 2NM, (Jan. 19, 1925) and also several West Coast stations. The wavelengths used at WJS were all near 90 meters.

The enclosed photograph, taken by Captain A. W. Stevens, should be self-explanatory as to constructional arrangement. Should the apparatus herein described be not too far behind the times, the photograph might be given space in the magazine.

At this writing¹ our field station LR is closed down for a few days. This station was taken up the river (that is the Rio Branco) by Mr. Swanson who has now left for the United States to resume duty with the Department of Commerce. The writer will attempt to communicate with the United States from portable station LR.



THE RECEIVING CIRCUIT with the filament battery omitted for the sake of simplicity.

The antenna was originally coupled as suggested by the dotted line, but this arrangement was abandoned in favor of the low antenna connected to the detector plate as shown.

C1 and C2—General Radio type 247 condensers, capacity 500 micromicrofarads.

C3—Fixed condenser capacity 2000 micromicrofarads.

C4—Grid condenser capacity 250 micromicrofarads.

L1—7 x 3 3/4" in diameter.

L2—6 x 3 3/4" in diameter.

L3—7 x 3 3/4" in diameter.

R—Grid leak with resistance of 2 megohms.

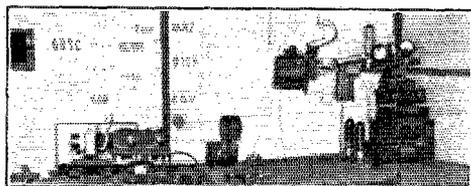
are not necessarily the best ones. They are just the ones that we used in a set hurriedly thrown together in December,

with the Department of Commerce. The writer will attempt to communicate with the United States from portable station LR.

Chalk Up Another Credit for the Amateur

By A. C. Lopez and J. W. Baldwin.*

AMATEUR radio has again stepped in and established communication where commercial means were not satisfactory. This story proposes to tell about that portion of the communication with the Hamilton Rice Expedition which



STATION 2BR, NEW YORK CITY. From left to right we have the receiving set, wavemeter, key and transmitter. The two tubes on the table are not oscillators but Kenotrons. Back of the transformer can be seen the choke and condensers of the filter system and above that the single 50-watt oscillator.

has taken place with the stations in and around New York City.

Some very fine work was done by 2CVS in the Bronx. Later communication was

established by 2MC owned by John Grinnan and with 2AG owned by A. G. Runyon of Yonkers. Finally a schedule was established by this station (2BR) and maintained nightly for four months although 2BR is located in the heart of the apartment house jungle of New York City.

Much credit must also be given to the United Fruit Company station at Costa Rica. This station (SJ) worked hard and gave invaluable assistance. Communication between WJS and SJ was not good but fortunately 2BR was able to work both stations and this three-cornered arrangement was finally adopted as standard.

Receiving conditions at WJS were better imagined than described. Many nights the operator drew sparks from his antenna but the traffic was handled just the same. 150 to 300 words of traffic were cleared nightly. There were only two exceptions. One night they had a very bad windstorm and on another night a blizzard was raging here and the counterpoise was carried away. Temporary repairs were made, however, and communication resumed. The messages received here were to Isaiah Bowman, President of the American Geo-

* Operators of station 2BR, 485 Central Park West, New York City, New York County, N. Y.

graphical Society; Mrs. Hamilton Rice; General Mitchel of the U.S. Air Service; The Naval Radio Research Laboratories (NKF); The Associated Press; The United News Service; The Radio Inspector of the 2nd Radio District and the families of the men in the party. Many of these messages were telephoned to their destinations

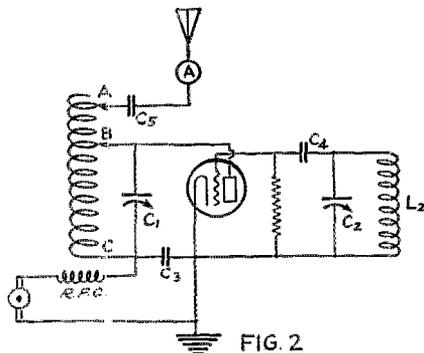


FIG. 2

THE ARMSTRONG TUNED PLATE TRANSMITTING CIRCUIT AT WJS

L1—Plate inductance made of 9 turns taken from studio Corporation helix as mentioned in text. There are four turns between the clips B and C. Clip A must be adjusted to suit the antenna used. L2 grid inductance. CA 5 turn wavemeter coil 3/4" in diameter was used.

C1—1000 micromicrofarad variable condenser, General Radiotype 247. (This replaced a Faradon condenser.)

C2—500 micromicrofarad variable condenser, General Radio type 247.

C3—Plate by-pass condenser capacity 2000 micromicrofarads.

C4—Grid condenser 24 micromicrofarads.

C5—Antenna series condenser 25 micromicrofarads.

C6—Antenna series condenser 25 micromicrofarads.

R.F.C.—Radio frequency choke coil, necessary because this is a series feed system. If used with a counterpoise this system would need a radio frequency choke in the negative lead also; unless it was used inductively-coupled as would be necessary in the United States.

R—Grid leak. This transmitter was used with two 50-watt tubes in parallel, but a single one is shown in the diagram for the sake of simplicity. The set was used with the small antenna operating near its fundamental or else by operating the long wave at one of its low harmonics which came at 92 meters.

G—1000-volt direct current generator.

immediately upon reception and in some cases an answer was received in Brazil ten minutes after the message was sent.

When it is realized that without the aid of Amateur Radio, these messages had to be sent by cable to Manaos, then carried by runner or canoe through the jungle, a very good brief for the amateur is presented. It meant a saving of months in the delivery and reception of important communications. These communications did not only cover news and friendly greetings but also supplies entirely necessary for the Expedition.

The equipment of 2BR consists of the conventional loose coupled Hartley circuit

using a single 50-watt tube. The plate supply is taken from Kenotrons and well filtered. The receiving set is a short wave Lopez tuner with a detector and one stage of audio amplification. It was noticed that low clouds and thick weather invariably caused our signals to be weak without affecting those of WJS as received here. On good nights the signals from WJS were consistently loud enough so that they could be copied on the mill. It is needless to say that with harmonics from broadcast stations, vibrating battery charges at broadcast listeners' sets and other such interference incidental to this congested radio district, copying was difficult at other times. The location of 2BR is anything but ideal. The station itself is in a shack built on an apartment house at 485 Central Park West in New York City. Anybody familiar with the region will realize some of the difficulties. The antenna is 50 feet high at one end and 35 at the other where the lead-in is taken off. Only a single wire is used but it is expanded into a cage at the high end. The four wire counterpoise is supported by the same masts.

On March 15th Operator McCaleb left WJS to join the field force and Swanson came back to WJS. Communication was finished and the following day the station was dismantled and packed down the Amazon to Manaos, where it will be set up again.

Practically every district has been heard at WJS and we are all eager to get some more information on receiving conditions there. Swanson is due back here around the middle of May. Amongst the records established by WJS is the working of British 2OD and 2NM. They were worked with perfect ease after u2MC had put them into contact. u2AG, besides handling a great amount of traffic with WJS, was reported one night as being heard thirty feet from the fones and being copied almost nightly on the mill. Great credit is due the operators at WJS and the field force for their ability as operators, also for their excellent performance in keeping their set working regardless of adverse conditions. Perhaps it is needless to say that they were both ex-Amateurs.

Strays

hPB3 is the second of the licensed Holland stations to come into operation since their new regulations went into effect. Address communications to Mr. H. D. Oly, Willemsparkweg 4, Amsterdam, Holland. 500 watts are used on 80 meters. The apparatus and operator of hOLL are used.

Bolivian A9 is on the air with a wavelength of 130 meters.

Measurement of the Voltage Ratio of Audio and R. F. Transformers

By R. R. Ramsey*

THE following gives a very simple and exact method of measuring the amplification ratio of an audio transformer. At the same time a careful study of the principles involved will show why many neutrodyne receivers failed to "neut" after they were built. The apparatus needed is two variable condensers, a telephone, a buzzer, a dry cell, and a telephone induction coil.

Connect up the apparatus as in Fig. 1. The buzzer, battery and induction coil Tr are simply a convenient source of alternating current. The transformer Tr is a

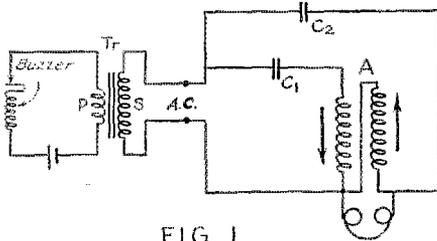


FIG. 1

telephone induction coil which is found in all telephones, connecting the microphone to the other parts of the system. A, is the transformer to be measured. The diagram indicates that the secondary of the transformer is connected reversed. This means that if the secondary coil is wound in the same manner as the primary coil the inside end of the secondary coil is connected to the outside end of the primary coil.

The principle of the experiment can be seen from the diagram. Suppose that at some instant the current is increasing through the condensers in the direction indicated by the arrow. I_1 , the current through the condenser C_1 , is running down through the primary coil of the transformer. This induces a current up through the secondary coil of the transformer. If this induced current is just equal to I_2 , the current which passes through the condenser, C_2 , then there is no current left to go through the telephone and there is no sound in the telephone. Mathematically, this can be somewhat better expressed in the form—

$$M \frac{dI_1}{dt} = L \frac{dI_2}{dt}$$

$$\text{or } MI_1 = L I_2$$

where M is the mutual inductance of the

transformer and L is the self inductance of the secondary of the transformer.

Since M is proportional to $n_1 n_2$, and L_2 is proportional to n_2^2 , where n_1 and n_2 are the number of turns of wire in the primary coil and secondary coils respectively, then

$$n_2/n_1 = L/M = I_1/I_2 = C_1/C_2 = A$$

where A is the amplification constant of the transformer.

The currents can be shown to be proportional to the capacities of the condensers by considering the equation for alternating current when we have resistance capacity and inductance in the circuit.

$$I = \frac{E}{R_2 + (1/C^w - L^w)}$$

When the capacity C is small, as in this case, practically all the impedance is due to the term $1/C^w$. Thus considering R and L to be zero we have

$$I = E C^w \quad \text{and} \quad I_1/I_2 = C_1/C_2$$

No sound or a minimum sound in the telephone tells us when this condition is obtained and the ratio of the condensers gives us the amplification constant of the transformer.

It will be seen that we are making the capacity of one condenser neutralize the effect of the other condenser. In the case of the tube the condenser neutralizes the capacity of the tube.

If our coil is a neutrodyne coil and our condenser is a neutrodyne condenser, and if we connect a second tube in place of the telephone, so as to act as an amplifier, we have

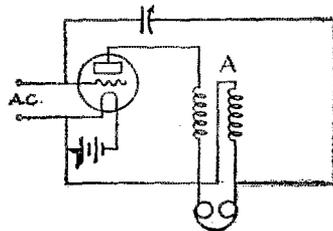


FIG. 2

the last two tubes of the neutrodyne hookup. By placing another tube, neutrodyne condenser and coil in front of the second tube and by replacing our buzzer outfit by a third neutrodyne coil connected to an aerial

* Department of Physics, Indiana University, Bloomington, Indiana. Author of "Experimental Radio".

we have the regular neutrodyne hook-up, Fig. 3. Since we are using radio frequency alternating current instead of ordinary alternating current the last tube must be a detector and a grid condenser with leak must be inserted.

The amplification ratio of neutrodyne coils is about five. This means that the capacity of the neutrodyne condenser must be one-fifth of that of the tube. It is hard to make a variable condenser of such small capacity. It is customary to connect the neutrodyne condenser to a tap on the secondary instead of to the grid end of the coil. Between this tap and the filament end there are as many turns as there are in the primary coil. Connected in this manner the neutralizing condenser has about the same capacity as the tube.

If the condensers are ordinary variable condensers which are exactly alike, and if the capacity is proportional to the scale readings, then the scale readings can be

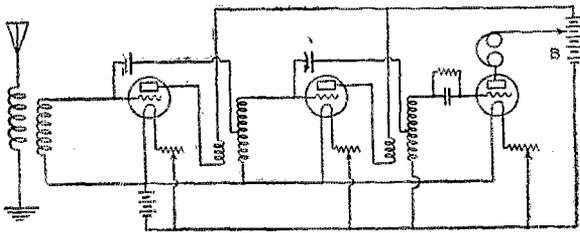


FIG. 3

substituted for the capacities and the amplification is the ratio of the readings of the dial. (For methods of measuring capacity see "Experimental Radio", page 14.)

Instead of ordinary audio coils any transformer, such as those used with 60-cycle current, can be measured in this manner also. If the ratio of the transformer is determined the method can be used to compare the capacity of a condenser with a known capacity. There is no fixed rule for using the markings on the terminals of the coils when connecting the transformer. All manufacturers do not mark their coils in the same manner. Connect the coil up and if the telephone does not show a minimum sound, reverse the connections on one coil.

Instead of the condenser C_1 the capacity of a tube can be used as in Figure 2. In this case the capacity of C_2 must be very small. However, the transformer connections can be made such that C_2 is larger than C_1 . It will be an interesting variation to measure the capacity of the tube with the filament cold and then again when the filament is hot. It will be found that there is not much change of capacity.

2nd Annual Western New York Convention of the Atlantic Division.

THERE is an old story that all roads lead to Rome. It was proven on Sunday, June 28th, in the City of Rome, N. Y., when at the call of J. Alton Fitch, Superintendent of District No. 10, the Clan began to gather at Uvanni's Inn, "Hams" from Cortland, Watertown, Utica, Boonville, Ilion, Herkimer, Edwards, Otter Lake, Gouvernor and Syracuse were present to the number of 55.

Whoever passed the word that ladies would be welcomed did not make a mistake, as some 12 Y.L's and O.W's added dignity to the affair and enabled a number of the fellows to "trip the light fantastic" to their heart's content.

Different from other conventions was the fact that no definite program had been prepared, but the committee saw to it that everybody became acquainted, and group discussions on the latest amateur performances, circuits and traffic problems was noticed everywhere.

At 3 p.m. those assembled sat down to one of the best dinners we have had the pleasure of eating. After coffee was served, E. S. White, 8AOZ, as Toastmaster, introduced the A.R.R.L. Headquarters representative,

Mr. A. A. Hebert, Treasurer and Field Secretary, who talked to us for forty-five minutes and made us all feel that we were glad to be members of this wonderful organization of ours.

The success of this "Hamfest" was due to the efforts of the committee, and thanks are extended to J. Alton Fitch, 8BCW; T. M. Dickinson, 8BRI; and E. S. White 8AOZ.

The day closed with the members voting to have another convention next year, and a committee was appointed to take charge, with Charlie Schrader, 8ADG, as the Chairman, and from what we heard there will be surprises next year. Just pass the word around, fellows, and tell those who did not come this year what they missed.

Au revoir till next year.

—A. A. H.

Strays

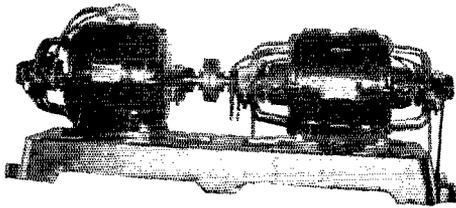
Miss Madilene Carter of Lawrence, Kansas, and Robert S. Kruse, Technical Editor of *QST*, were married at Lawrence, Kansas on July 15th. We expect them back in Hartford about the first of August.

The Bowdoin's Generators

By Edward W. Berry*

THE short wave transmitter of Commander MacMillan's ship, the Bowdoin, which returns to the Arctic in June, will have for its power supply two motor-generator sets of rather unique design. These will of course be used singly, one of them being used as a spare for an emergency.

Each set is of the two-unit type, comprising a 2-horse power 32-volt motor and a 2,000-volt, 500-milliamperere, 1,000-watt



THE BOWDOIN'S M. G. SET

generator. The motor and generator are connected by a flexible coupling and mounted on a cast iron sub-base. Both units are ring oiled. The design of the high voltage generator differs radically from the usual cast iron or steel frame type in that the windings instead of being

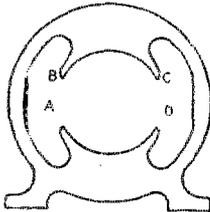


FIG 1

in one concentrated coil around the solid pole piece consist of a number of smaller coils distributed around the frame.

Figure 1 shows a cross section view of the usual cast iron frame used for direct current generators. If in a generator of this type one were to measure the flux density or strength of the field from point A to point D and plot this distance against the angle subtended by this distance, that is against the distance covered, he would have a curve very weak at A, theoretically zero. As B is approached it slowly strengthens. As it nears the pole tip B it rapidly rises to its maximum value, where it remains fairly constant under the pole surface.

After passing the pole tip at C the field strength rapidly decreases to its minimum at D. This means that each armature coil as it passes around in the frame has a sudden surge of voltage induced in it as it

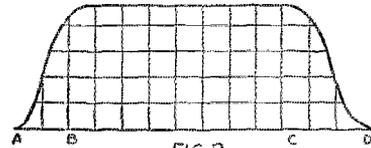


FIG 2

passes from A to B. While travelling from B to C the voltage remains fairly constant, and from C to D it receives a second surge as the voltage is rapidly decreased. Also, as each slot leaves a pole tip it momentarily interrupts the flux at the highly saturated tip, causing a surge at this point in the flux. Each surge in the flux causes a corresponding surge in the voltage induced in

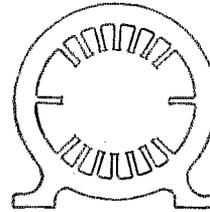
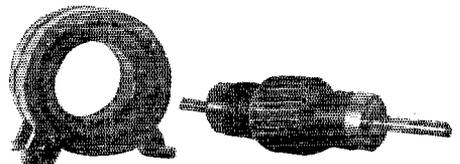


FIG 3

the armature. It is these surges which cause the slot ripple, and sometimes in the very high voltage machines also cause serious flash overs.

Figure 3 shows a cross section of the frame of this new type of generator. The poles instead of being solid consist of a



THE STATOR AND ROTOR

number of teeth and slots similar to those on the armature. The windings are not one large coil around the pole piece, but are divided into a number of smaller diamond-shaped coils that fit into the slots.

The flux curve for this type of pole and

* Engineering Department, Electric Specialty Co., Stamford, Conn.

winding is similar to Figure 4, that is, nearly a sine wave. The field strength gradually rises to a peak and just as gradually decreases. There are no sudden rises or falls. Consequently the ripples are greatly reduced. The wide commutating zone from A to B and from C to D should also be noted.

Another very important feature is the very excellent commutation derived from this machine. This is due to two important features in its design. A commutating tooth is placed between the two poles and is excited by a compensating winding placed in the slots at right angles to the main field windings as shown in Fig. 5. This compensating winding is also of the distributed type. Most of the slots then contain one field winding and one compensating winding. The field of this compensating winding neutralizes the armature reaction. The compensating winding is of course in series with the armature and load. This means that as the armature reaction tends to shift the neutral or commutating zone with the increase of load, the compensating field strength builds up correspondingly, and neutralizes the armature reaction. That is, the neutral or commutating zone "stays put". It does not shift with a change in load as in the types without this interpole or commutating pole. The slots in the poles also help this action of the commutating poles in that the teeth tend to become highly saturated at their tips and on the edges in the direction that the field tends to shift. The slots tend to stop the movement of the field at each individual tooth. In the case of the solid pole type such as is shown in Figure 1 there is nothing to stop the shifting of the flux along the pole until it reaches the pole tip. Here of course the high saturation and the tremendous air gap beyond halt the shifting. But it is too late, for the field has been distorted so that the brushes tend to spark.

The fact that the winding is distributed greatly reduces its thickness. Consequently the poles do not need to be so long. That is, a larger armature diameter may be used. This means more winding space. More

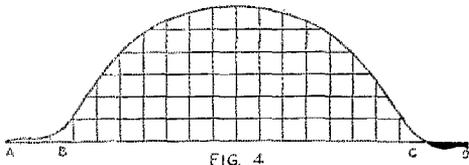


FIG. 4

winding space means more copper and consequently a larger output for a given outside frame diameter. The larger armature diameter also allows a greater number of slots to be used and likewise a larger number of commutator segments. These latter of course mean a machine remarkably free

from ripple. The Bowdoin's generators have 31 slots and 93 bars per commutator. In this particular size of machine the older type was limited to 24 slots and 72 bars per commutator. This is the second way in

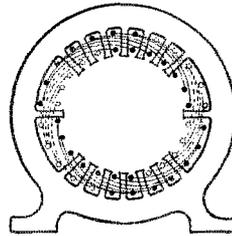


FIG 5

which the new design improves commutation. The distribution of the field over considerable area materially decreases the heating of the machine under intermittent service such as it will receive. This means a very large overload capacity.

The ability of the machines to stand up under a rigid test far more severe than they will probably have to undergo in service (especially as regards overload and continuous heat runs) have proven the merit of this type.

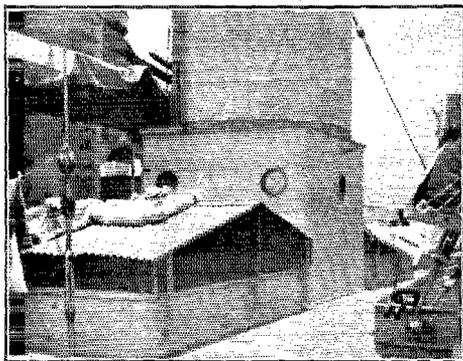
A.R.R.L. Information Service Rules

1. Before writing, search your files of QST. The answer is probably there.
2. Do not ask for comparisons between advertised products.
3. Be reasonable in the number of questions you ask.
4. Put the questions in the following form:
 - A. Inclose a stamped self-addressed envelope. Envelope without stamp from foreign countries.
 - B. Make diagrams on separate sheets and fasten sheets together.
 - C. Number the questions and make paragraphs of each.
 - D. Print the name and address (NOT merely call letters).
5. Address all questions to Information Service, American Radio Relay League, 1711 Park Street, Hartford, Conn.
6. Keep a copy of your question and diagrams and mention that you did.
7. State whether or not you subscribe to QST.
8. Make references to previous correspondence as complete as possible, as otherwise time is used in going into letter files. Better yet, send letters referred to with new queries.

NRRL Homeward Bound

By A. L. Budlong, Asst. Traffic Manager, ARRL

WHEN this story gets into print, NRRL will be at Melbourne, Australia, the most distant point of the trip, and will be getting ready to start for New Zealand and Samoa, homeward bound. Therefore, the first thing which we want to impress upon every reader of *QST* is that now



"DANTE'S INFERNO."

The compass shack of the U.S.S. Seattle which houses NRRL.

above all times is the period when every effort should be made to log and work the SEATTLE. The opportunity to do your best DX on Schnell's signals is right now. After August 6, the SEATTLE will daily draw nearer to this country.

The rest of this article concerns itself with the activities of NRRL from May 15 to July 1, during which time the SEATTLE was either at Honolulu, or cruising in the near neighborhood of the Hawaiian Islands.

The most notable feature of the short-wave work while the ship was at this location was the wonderfully consistent performance of the 40-meter set. While occasional reports of the 54-meter signals were received here at Headquarters, most of them concerned reception of the 40-meter transmissions. Apparently, this wave was used for handling the bulk of amateur and official traffic, and the signal strength and steadiness were amazing. Reports of reception were received from all over the United States, Canada, Mexico, England, South America, France, New Zealand, Australia and the Philippine Islands. The best record, and one that approaches the "ultimate", was the reception of NRRL on May 16 by Mr. S. C. Pleass, of Johannesburg, South Africa. This is a distance of ap-

proximately 12,500 miles! Stations in the eastern part of the United States frequently reported NRRL's signals louder than the Sixth District stations with whom Schnell was communicating.

This 40-meter wave, at least, has proved itself most satisfactory up to the present; the situation at the beginning of July being that every time NRRL came on the air with this set, the signals were heard everywhere with a 5000-mile radius.

So much for the 40-meter side of the cruise.

The 20-meter transmissions are another story. Signals on this wavelength have been heard but a few times, if the number of reports reaching up here at League headquarters is an indication of the true state of affairs. How much of this is due to failure of the 20-meter signals to reach out, we do not know. Schnell complains that local QRM from generators, motors, fans and other electrical devices on the ship makes 20-meter reception impossible most of the time, and this fact has had something to do with the infrequent transmissions on the low wave. In spite of QRM disadvantages, however, NRRL succeeded in hooking up with 1HN, Hartford, Conn., on 20 meters on May 25, at 11:40 P.M.,



WAIKIKI BEACH

where many "observations" have been taken on short waves, especially on marcel and permanent.

E.S.T., and handled some traffic. Previous to this date, signals were heard by various stations in Massachusetts, Minnesota, Kansas and California, and by Simmons, g20D, who reported reception of the 20-meter transmissions at 0615 G.M.T., May 21 and May 26. In addition to the work with 1HN, two-way communication during May and June was carried on with 6AGK, 6BUR,

6CLP, 6CGW, 6TS and 6XAP. Some of this work was during full daylight, but most of it appears to have been done when one, or both of the working stations were in the dark belt. Whether daylight work gets better as the distance increases, we have yet to learn.

The performance of this wave as the SEATTLE reaches the furthest point in its cruise schedule is going to be carefully ob-



See page 28, June QST, cartoon by IASN. After very careful searching with a new type direction finder, we found this "mahogany colored siren" calling "CQ" on her ukulele.

served. We urge everyone who has a receiver to spend part of his time listening for the 20-meter signals. We are fairly sure of the results on 40 meters, but there is a fearful lack of data on the 20-meter transmissions. Please arrange to listen on this latter wavelength part of the time, sending copies of your log both to A.R.R.L. Headquarters, at 1711 Park St., Hartford, Conn., and to Director, Naval Research Laboratory, Bellevue, D. C.

LOG OF NRRI, MAY 15 to June 15
Ship at Hawaii the Entire Time
40 Meters

WORKED—U. S.—1aac, 1li, 1pm, 1te, 1uw, 1xav, 1yb, 2brb, 2bur, 2ev, 2cxw, 2qn, 2wb, 2wc, 4au, 4jr, 4rm, 4sa, 4tv, 5aac, 5agl, 5alu, 5ce, 5ov, 5oz, 5zm, 6aak, 6ac, 6acb, 6afg, 6age, 6agr, 6ahp, 6alj, 6akz, 6alf, 6asr, 6awt, 6bep, 6bgo, 6bhz, 6bjj, 6bjx, 6bkx, 6bmw, 6bsn, 6buc, 6bur, 6bwy, 6cal, 6caq, 6cc, 6cej, 6ego, 6egw, 6eh, 6chl, 6chs, 6chz, 6clp, 6cms, 6cmu, 6enc, 6eqz, 6est, 6esw, 6eto, 6evm, 6ewp, 6dah, 6ea, 6eb, 6ex, 6fa, 6fz, 6hu, 6ji, 6jp, 6km, 6li, 6ao, 6of, 6oi, 6qd, 6rw, 6tc, 6ts, 6uf, 6vc, 6xap, 6xz, 6xh, 6zac, 6zbe, 6zd, 7adm, 7aek, 7akk, 7ao, 7ay, 7gb, 7kj, 7lo, 7ly, 7mf, 7nk, 7nl, 7nx, 7pz, 7tw, 7ya, 8aa, 8axy, 8bau, 8lgn, 8caz, 8cwp, 8do, 8er, 8gz, 8nx, 8pl, 9adg, 9ado, 9akf, 9amb, 9aoj, 9ayp, 9azp, 9bdu, 9bdw, 9bkr, 9bni, 9bof, 9bvh, 9bvo, 9ces, 9eld, 9elp, 9em, 9exx, 9dat, 9det, 9ddp, 9ded, 9dpx, 9eht, 9eli, 9oo, 9rz, 9xi, 9ze, 9zt, New Zealand: 1ao, 2ac, 2xa, 4aa, 4ar, 5ag, Australia: 2ayi, 2bk, 2cm, 2ds, 2ij, 2yi, 3bd, Canadian: 4uj, 4gt, 5ba, 5ef, Japan: 1aa, Argentina: ss. Miscellaneous: kfu, vis.

HEARD—U. S.—1aff, 1anz, 1awe, 1axa, 1axn, 1bs, 1cmp, 1cmx, 1ha, 1pl, 1pr, 1zu, 2agw, 2bzj, 2cty, 2cyu, 2rm, 2sz, 2xab, 2xaf, 3age, 3apu, 3apy, 3ay, 3wb, 4ak, 4kl, 4sc, 4xe, 5aa, 5aac, 5ag, 5alj, 5ajh, 5amb, 5apu, 5ew, 5hi, 5nj, 5ot, 5ph, 5uk, 5wl.

6agk, 6ahq, 6ajm, 6alw, 6amm, 6aoi, 6aql, 6asp, 6asv, 6ave, 6avj, 6bad, 6bcw, 6bdi, 6bez, 6bfn, 6bgv, 6bh, 6bil, 6bip, 6bjd, 6bjt, 6bni, 6bsh, 6bub, 6buk, 6buc, 6bve, 6cax, 6ccy, 6cef, 6efz, 6eho, 6eic, 6els, 6ema, 6emu, 6end, 6evv, 6crw, 6eso, 6ess, 6etd, 6eub, 6ev, 6evm, 6cwg, 6dao, 6def, 6dvg, 6ew, 6hd, 6kn, 6kp, 6kr, 6li, 6ml, 6mp, 6nx, 6gi, 6rw, 6uc, 6up, 6ur, 6ut, 6vr, 6vw, 6gaf, 6gk, 6zbn, 6zo, 6zi, 7aji, 7aji, 7au, 7bsn, 7cw, 7dc, 7dj, 7fb, 7fr, 7ef, 7ga, 7ls, 7pl, 7rl, 7yz, 8afm, 8aom, 8aun, 8avy, 8bas, 8bo, 8bx, 8cbp, 8chk, 8chl, 8cuz, 8cvi, 8dgp, 8don, 8doz, 8drs, 8eq, 8ij, 8og, 8to, 8agc, 8agl, 8akf, 8aot, 8apm, 8anz, 8arc, 8avg, 8bet, 8bdw, 8bdc, 8bec, 8bff, 8bjp, 8bml, 8bnd, 8bpb, 8caa, 8ebh, 8ecx, 8ecz, 8efi, 8eul, 8dac, 8dbw, 8dez, 8dfh, 8dga, 8dnc, 8do, 8dph, 8dqu, 8dtf, 8duc, 8dum, 8eak, 8ect, 8efy, 8ff, 8hm, 8ig, 8mm, 8sr, Canadian: 3br, 5gf, Mexican: 1ah, 1b, 3a, Argentine: cbs, New Zealand: 2cm, 2ae, 1af, Australian: 2ay, 2me, 2xa, 2yg, Belgian: 1af, French: 8qq, Miscellaneous: kdvm, gbe.

20 Meters

WORKED—1hn, 6ark, 6bur, 6clp, 6cgw, 6ts, 6xap. **HEARD**—NRRL's set at shack of 6asr, Honolulu, June 14, between noon and 3.15 P. M., Honolulu time): 1cmx, 1ka, 1asc, 7ij, 6bjx, 6chs, 6ir.

STATIONS REPORTING NRRL TO HEADQUARTERS

May 1 to June 15

U. S.: 1aac, 1axa, 1ayk, 1bni, 1cea, 1id, 1po, 1py, 1uw, 1yb, 1zl, 2adu, 2bgl, 2bo, 2brb, 2ctg, 2wc, 3apv, 3bwj, 3efx, 3eg, 3cy, 3il, 4au, 4dm, 4fm, 4sa, 4tv, 5aah, 5ael, 5ags, 5amb, 5apq, 5gj, 5ng, 5ov, 5oz, 6aji, 6ajz, 6akz, 6bez, 6bgo, 6bjx, 6bqr, 6bur, 6cax, 6cc, 6ego, 6egw, 6ekf, 6elp, 6elz, 6emq, 6esw, 6etp, 6ewo, 6ea, 7akk, 7ao, 7bj, 7gb, 7ku, 7lu, 7pz, 8aa, 8ayo, 8bdg, 8bgn, 8brb, 8do, 8drc, 8gz, 8ks, 8nx, 9adg, 9agl, 9aoj, 9ayp, 9bhd, 9bcn, 9bdw, 9bj, 9bky, 9brq, 9bvh, 9bvo, 9ces, 9eck, 9eld, 9em, 9ep, 9evv, 9exe, 9exx, 9ddp, 9del, 9dng, 9dzf, 9egu, 9eld, 9eli, 9rg, 9rz, 9zt, C. A. Brockert, Platteville, Wis.; W. A. Cooper, Los Angeles, Calif.; J. C. Harper, St. Michael's, Md.; D. H. Gustafsen, Denver, Colo.; M. S. Brainerd, Toledo, O.; R. Nixon, Huntington, W. Va.; R. C. Berry, Louisville, Ky.; W. L. Nye, Burlingame, Calif.; J. R. Hall, Pittsburgh, Pa.; Eric Roberts, Tottenville, N. Y. Canadian: 3tv, 3ni, 3aaz, 4ac, 4gt, J. F. Seace, Brantford, Ont.; A. F. Price, Duncan, R. C. Mexican: 1b, British: J. F. Taylor, Birmingham, New Zealand: 2ae, D. Cuthbert On-chunga, Australian: W. J. M. McAuly, Melbourne, South Africa: 4fm, Johannsburg.

20 Meters

U. S.: 1aac, 1bko, 1hn, 6ark, 6bur, 6cgw, 6ctp, 6cwp, 9rz; P. C. Shockley, Topeka, Kansas, British: 2od.

Future QRA NRRL

Arrive Melbourne	July 23
Leave " "	Aug. 6
Arrive Wellington	Aug. 11
Leave " "	Aug. 24
Arrive Pago Pago	Aug. 30
Leave " "	Sept. 3
Arrive Tahiti	Sept. 8
Leave " "	Sept. 14
Arrive San Diego, Calif.	Sept. 29

Strays

Mr. William L. Sayre, an old time Commercial and Naval radio operator and engineer, has joined the H. H. Eby forces. Mr. Sayre's radio experiences date back to the Mexican border trouble at which time he left the ham ranks to become a Naval radio op on a ship in Mexican waters.

The Interference Muddle

By W. J. Williams*

MOST people wonder why radio should be so noisy. They forget that most of the applications that engineers have recently made of the findings of science to the solution of our everyday problems have produced considerable noise. For instance, most of us can remember in the early days of the automobile industry how noisy the automobiles were.

Similarly with radio, a number of noises we encounter are perfectly natural and show a healthy development.

The "Noise Level"

After we have eliminated the *unnecessary* noises we cannot expect to have a "zero noise level", or in other words, no noise at all. We must always bear in mind

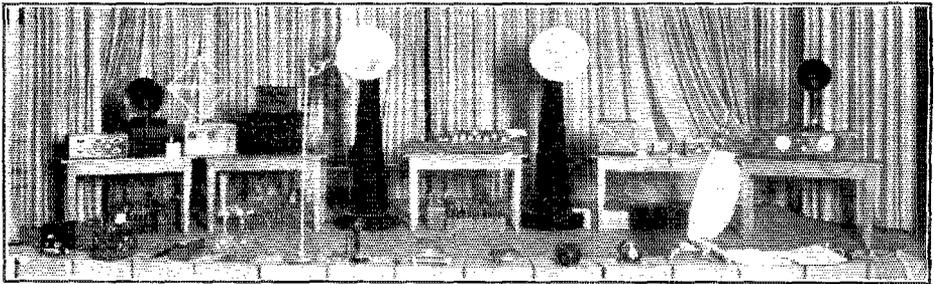
action of the individual radio listener. The principal social groups affected are the radio broadcasters, the radio manufacturers and retailers, the radio audience and those government departments which have supervision of radio broadcasting.

The Listener

Before taking up the individual radio listener's reaction to interference we will have to consider some of the characteristics of this interesting person.

Those of us who were interested in opening broadcasting station WHAZ found that we did not know the psychology of the radio audience. I am going to tell you some of the things we found out.

A large proportion of the working time of most persons is devoted to mere routine



RADIO INTERFERENCE DEMONSTRATION.

Apparatus set up in the Broad Street High School auditorium, Hartford, during a lecture by the author. The tables at the back of the stage carry various well-known receivers, also the control switches for the entire demonstration. A special program was broadcast by station WTIC, the Travelers Insurance Company, received with the Grebe Synchrophase at the left and fed to the large Western Electric loud speakers at the center of the stage. The various electrical devices near the footlight were then turned on to show what made some of the familiar rackets. The audience was absolutely amazed to find that much of the clamor starts right in the home. Even greater was the amazement when it was shown that violent receiver squeals could be set up by the super-heterodyne and by a set with fixed tune R.F. transformers.

that wherever we have electrical energy there is a possibility of producing an electromagnetic disturbance which will produce noise in a receiving set.

The interference problem is thus seen to be theoretically simple, whereas practically, it is a very difficult one, owing principally to its size.

Our Problem Explained

A complete solution of the interference problem requires consideration of the social aspect and also the psychological re-

and sometimes even to drudgery. This means that in order to be reasonably happy most people have to find outside of their work some means of satisfying those desires which they cannot fully satisfy through their work. The instincts of wonder, admiration and even reverence can be and are satisfied by radio.

The artistic instincts find satisfaction in many different ways in radio, from the construction of a radio set to the artistic enjoyment of the programs received.

The Self-Made Expert

It must be known to all of you that the amateur scientist finds himself in clover when he enters the radio field. This type of radio listener is hard to handle when a

* Director radio Broadcast station WHAZ, Rensselaer Polytechnic Institute, Troy, New York. Abstracted from a lecture given before the Hartford, Conn., section, A.I.E.E., May 20, 1925, under the title "Causes of Interference In Radio Reception."

case of interference arises. He is usually successful in making a satisfactory receiving set but should he have a set which is noisy, it is almost impossible to convince him that the noise originates in his set and does *not* originate in some external source.

This type of radio listener always makes me think of the country doctor. This doctor was driving home one evening when he was stopped by a farmer who asked him if the young boy up the road had small-pox. The doctor pulled up his horse and said that he had not yet decided. The farmer replied, "My mother-in-law says he has small-pox."

"Well," said the doctor, "has your mother-in-law ever had smallpox?"

"No," said the farmer.

"Has she ever nursed a case of small-pox?" inquired the doctor.

"No," said the farmer.

"Well, has she ever *seen* a case of small-pox?"

"No," said the farmer, "but that don't make no difference to *my* mother-in-law."

We found that if a speaker criticised anything feminine, even in a joking manner, our telephones would soon begin ringing.

Unless we recognize the strength of these personal appeals we cannot understand why the listener is so utterly unable to understand the relative importance of broadcasting and the other electrical utilities.

Public Utilities Deserve Fair Play

I wish you would picture in your imagination what civilization would be without *any one* of these public utilities. Would you be willing to go without the advantages you now have through the facilities placed at your disposal by the electric light and power company, the telephone and telegraph company, the railways and the electric railways which serve the community in which you live? No sane person would be willing to make this sacrifice.

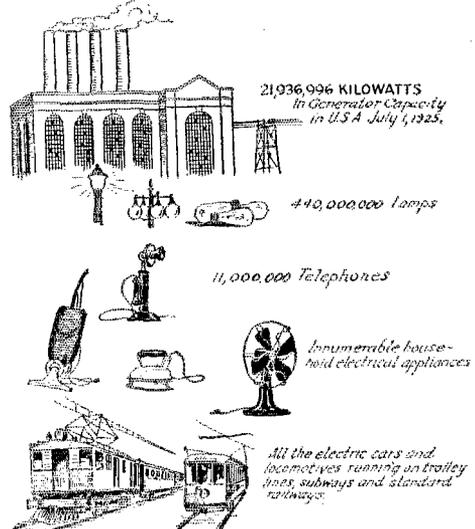
I want you to take, in your imagination, a large map of the United States and draw upon that map all the important transmission lines used by the electric light and power companies, telephone and telegraph companies, railways, and electric railways. Then take a map of your county and put on this map all the electric lines in the county. Next take a map of your city and put on this map all the electric lines threading the city streets and buildings and try to add to this last map all the apparatus in your city which uses electrical energy. Add to this picture you have of these three maps the fact that a disturbance at any one point can affect receiving sets at great distances from the source and you will begin to realize the

enormous number of possibilities there are for producing radio interference.

The Cure

We come now to a general outline of the method which must be followed by the interference engineer. Do we find that nature has evolved a human ear which is infinitely sensitive and which can be affected by waves of all frequencies? *Most certainly not.*

We hear sound waves between the frequency limits of approximately 100 and

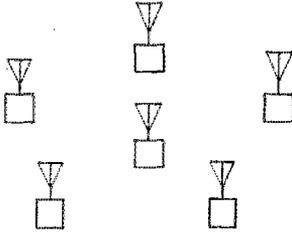


WOULD YOU GIVE ALL THESE UP TO GET RID OF INTERFERENCE ?

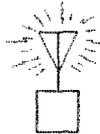
15,000. No sound waves outside these limits produce the sensation of sound. If a sound wave is too intense the ear does not recognize it as sound, but as pain. If the sound wave has an intensity below the threshold value it will not be heard. The lower limitation prevents us from being disturbed by all those small noises which are of no practical importance to us. For instance, if our ears were infinitely sensitive how could we sleep, if we had to listen to the footsteps of all the flies within a hundred miles? I think you will agree with me that nature has been very kind as well as wise and that we cannot do better than apply nature's method to our radio problem.

Radio broadcasting must function under this *same kind of limitations*. The lower frequencies are already used by our power and transportation systems. The *intermediate* or audio frequencies are now used by our telephone systems. Many of the frequencies which might be available for radio broadcasting are already used by our commercial radio telegraph companies, the government and radio amateurs.

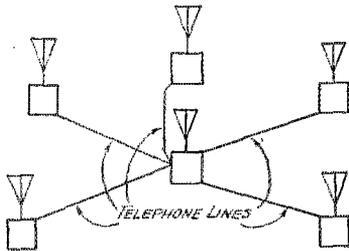
These radio services are at present considered social necessities. All this means that radio broadcasting must be carried on between perfectly definite frequency limitations.



Normal 500 watt stations serving nearby listeners



The "Super power" station attempts to cover the country. Succeeds only in creating a mess locally



System of 500 watt stations and telephone lines that really covers large territories and does not increase interference

The other limitation, which is the more important, is that of the power which broadcasting stations shall use. If we allow a large variation in power we make it extremely difficult to design and construct receiving equipment which can be operated by the average radio listener. We, in Troy, have experienced more trouble from this source than from any other in the whole field of radio broadcasting.

Radio listeners have constructed for themselves or bought, so-called supersensitive sets with which they hope to hear the Pacific coast and European stations. It has been our experience that it is impossible for the majority of these people to receive either the distant or the nearby stations satisfactorily.

If the radio listeners require the public service corporations operating in their territory to reduce the noise level produced by them they would require these corporations to spend vast sums of money in changing equipment, improving insulation,

etc. Eventually the public, which includes the broadcast listeners, would have to pay for these improvements. It is, therefore necessary to establish a reasonable lower power level. Then if any particular broadcast listener wishes to construct or buy a sensitive receiver, which will receive programs below this power level he should do it with the knowledge that he is placing a symphony orchestra in a boiler shop.

The High Power Nuisance

With regard to the upper power limit for broadcasting stations, there is room for considerable difference of opinion. Our experience in Troy has convinced us that there is no necessity for these so-called "superpower" broadcasting stations. When something of national importance is being broadcast, it can be done very satisfactorily by linking several 500-watt broadcasting stations (chosen on account of their location) together by line wires.

Nothing can do more toward solving the interference difficulty than an educational campaign for the purpose of getting these facts honestly and fairly before the public.

What Is Being Done

The National Electric Light Association, ever since its attention was called to this matter, has been collecting information on the subject from all over the country. Almost all light and power companies are turning over to this association complete data regarding their experience in the matter. This information is being very thoroughly studied by a committee created expressly for this purpose. Any information which this committee is able to get out of the data they receive, which will help in any way to prevent trouble or locate trouble which already exists, is sent out by it to all the operating companies. I believe at the present time they have the matter well in hand and that we have every reason to expect that unnecessary noises from this source will rapidly disappear.

The American Telephone & Telegraph Company is doing practically the same thing. They are gathering information through the telephone operating companies and when this information is thoroughly digested at headquarters, they are sending out information to the associated companies, which will enable them to forestall troubles or locate and eliminate the cause of troubles which may already exist.

I think that you will agree with me that these other interests who have to use the same medium as you do when you are receiving broadcasting programs, are doing everything they reasonably can be expected to do to give you the undisturbed use, for broadcast reception, of this common medium.

Smoothing Circuits for Half-Wave Rectification

By F. S. Dellenbaugh, Jr.*

FREQUENTLY the question arises of smoothing rectified A.C. by means of a choke when only one-half of the wave is used. The circuits are shown in Figures 1 and 2. The load is assumed to be a pure resistance. For simplicity, the rectifier is considered perfect. When current is flowing through the rectifier, it opposes no resistance; and when no current is flowing it is a complete open circuit.

Suppose that the power is turned on and, with the first favorable A.C. wave, the current begins to rise in the circuit. This current will store energy in the magnetic field of the choke. After the A.C. voltage has gone through zero to a negative value, the energy from the choke tends to maintain current through the circuit. It thus seems possible to use a very large choke and store enough energy to keep the cur-

What really happens is that when the A.C. voltage wave is favorable the rectifier passes current. The current then rises in the load circuit, according to the usual laws. This can be expressed mathematically; but the mathematics will be left out. As the inductance becomes greater

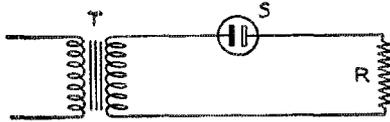


FIG. 1

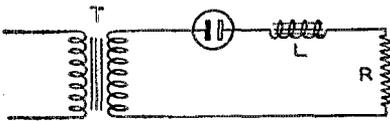


FIG. 2

rent flowing until the A.C. voltage again becomes positive, when more power would be supplied through the transformer and rectifier. Smoothing of half-wave rectified A.C. by inductance alone appears possible from this reasoning. If we investigate the circuit correctly, we see that the rectifier must be a conductor when the current is flowing. If the current flows all the time between the favorable half-waves that are being rectified, the rectifier must act as a conductor all the time. Therefore, the rectifier can be replaced by a conductor. Evidently if this is done no rectification can result, as A.C. voltage will be impressed upon the choke and load in series. The results of this argument, then, are absurd and the conditions impossible. We cannot do our smoothing with inductance alone when working with a half-wave rectifier.

and greater, the current rise is slower and slower. Since the time during which the voltage is impressed remains constant, it is evident that with a large inductance the current will never rise to as high a value as with a small inductance. It is true that after the voltage has passed to the other half-wave, the energy in the magnetic field of the choke maintains the current through the rectifier for a while; but it must always drop to zero before the next cycle.

Figure 3 shows the A.C. voltage with

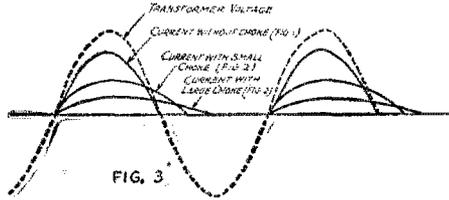


FIG. 3

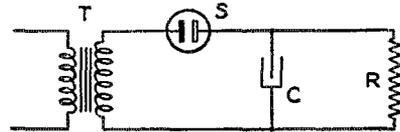


FIG. 4

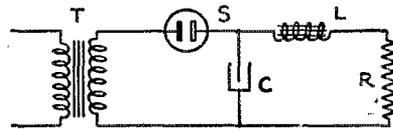


FIG. 5

curves of current for various values of inductance. It will be seen that with low inductance the current rises to a higher value; but the energy in the magnetic field of the choke is too low to maintain the current very long. With large inductance, the current does not rise to so high a value, and so dies away in about the same time. This means that the energy stored in the

*Massachusetts Institute of Technology, Cambridge, Mass.

inductance during the rectified half cycle is about the same regardless of the number of Henries used.

The only way that it is possible to smooth half-wave rectification so that the current will not drop to zero between cycles is to store energy in a condenser connected as shown in Figure 4.

The condenser then charges up when the rectifier is conducting and, after the rectifier has opened the circuit on the reversed voltage wave, the energy in the

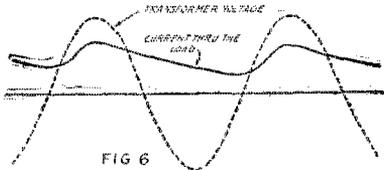


FIG 6

capacity discharges and maintains current through the load circuit. Still better results can be obtained by using both choke and a condenser as in Figure 5. The choke and condenser give better smoothing than the condenser alone. The rapidity with which the condenser can discharge is limited and the choke tends to average the fluctuation of voltage. The results obtained under these conditions are indicated by the curves shown in Figure 6. The current rises with the first favorable voltage wave after turning on the power and then hangs on, due to the energy stored in the condenser, until the next favorable voltage wave occurs. Thus, the current continues to flow, always in the same direction, and pulsating between limits controlled by the storage capacity of the choke and condenser.

It is evident that for half-wave rectification it is much more important to have

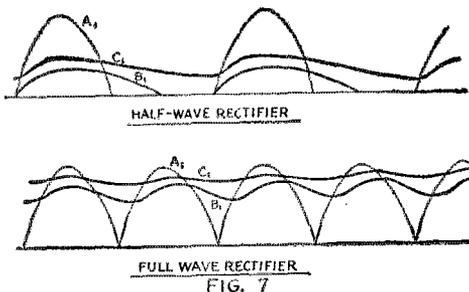


FIG. 7

large capacity than large inductance in smoothing circuits. The tendency of smoothing circuits can be summarized as shown in the table below, and illustrated in Figure 7.

Half-Wave Rectification

1. *Inductance only*—gives less than the

average current obtained with resistance only; and current always falls to zero between rectified waves. See Figures 2, 3 and 7.

2. *Capacity only*—tends to give a current resistance only; and must be large compared with resistance to be useful.

3. *Inductance and Capacity*—in combination give the best results.

Full-Wave Rectification

1. *Inductance only*—tends to give the average value of current obtained with resistance only. It usually will not reduce the current below the average, except by adding its own resistance to the circuit.

2. *Capacity only*—tends to bring the current to the maximum value obtained with resistance only.

3. *Inductance and Capacity*—in combination give the best results.

In general, for half-wave rectification a lower reading upon a D.C. output ammeter will be obtained when a smoothing circuit is used than when the rectifier is connected directly to the load. This can only be overcome by using a large-sized condenser.

With full-wave rectification, the addition of inductance will produce little change upon a D.C. ammeter; and addition of capacity will increase the D.C. ammeter reading. The amount of energy storage required or the size of the chokes and condensers needed to smooth the current by any desired amount, will always be much smaller for full-wave than for half-wave rectification.

Strays

The Burgess laboratories at Madison, Wisconsin are installing a 20-meter beam transmission system with a large rotary reflector. This new 9EK will be in operation some time this summer. Don Mix is back at Madison for the summer and will return to Burgess Isle, Florida, next fall.

Large glass or porcelain beads placed over the bare leads of a "debased" transmitting tube make excellent insulation and at the same time keep the leads fairly flexible.

A receiving grid leak of good manufacture which has become noisy probably can be made OK by taking off the paper label. These labels usually extend from one end of the glass tube to the other, and the glue on the label usually causes the noise.

If you want to keep your call book up-to-date follow the suggestion of 7BU and cut out the new QRA's in the QRA Section ads in QST and paste them in your call book.

Experimenters' Section Report

Short Wave Transmission Tests

We are constantly besieged with requests like this: "I have a transmitter going on 5 meters. Please tell everybody to listen for me the next few weeks." Now it takes something like seven weeks between the time such a letter arrives and the time when we can possibly get notice into *QST*. It follows that one should plan the schedule seven or eight weeks ahead. It is simply wasted effort to send us letters about tests that are going to be made during months before we can tell anybody about them.

Those that are carrying on tests which may be looked for at the time this number of *QST* is received (I am speaking of the 5 meter band) are 2ADM, 9ZT, 6AJF, and 2EB. It is probable also that the transmission from 4XE and 9EK will have been resumed by this time. Anyone hearing any one of these stations on the short waves should notify the Experimenters' Section at once giving full details.

Extreme Short Wave Generators

A letter from Mr. Ray Schlorf of Chicago suggests that frequency multipliers can be used to produce the 77-centimeter wavelength. The saturation curve of a vacuum tube has the same properties which make it possible to use an iron core transformer for frequency doubling. This principle can be made use of by building an ordinary push-pull amplifier and then reversing one of the primaries. In its usual connection one of these amplifiers cancels the double frequency and adds the main frequency of the tubes. When one primary is reversed the reverse action should take place and a fair double frequency output be obtained. The idea should be useful at short waves.

Counterpoise or Ground?

From tests made at 8AQO and 1XAQ, the Technical Editor is inclined to be of the opinion that a counterpoise is not as good as a first class ground connection when one is working at or below the fundamental wavelength. Experience at 9ZT seems to confirm this.

The evidence is not at all complete and one should by no means take this statement as having any authority but rather as the request for investigation of the subject at other stations.

The argument for the superiority of the ground is that when one is working at or below the fundamental one encounters a very high radiation resistance, therefore the additional 5 ohms or so of the ground connection does very little harm but at the same time the extra ten feet of effective

height may do a great deal of good. If this argument is correct then one should usually find that when working above the fundamental where the currents are large and the radiation resistance is small a counterpoise will be superior to a very good ground connection.

It is a fascinating problem and this is the time of year to investigate. The Technical Editor will be very pleased to outline the problem for those that wish to undertake it.

Oscillating Crystals

From correspondence with Dr. W. G. Cady of Wesleyan University, Middletown, Conn., and Mr. Richmond, Treasurer General Radio Company, we at last have some information on oscillating quartz crystals.

It seems that these crystals can be ground by anyone able to do accurate cutting of precious stones and having an understanding of crystal construction. However, many of the crystals, even though cut just as they should be apparently, will absolutely refuse to oscillate. One then has to cut away one inch on another and if it happens to be the correct one the crystal will begin to oscillate. If too much is cut away it will stop again. The General Radio Company is prepared to furnish working crystals ground to known frequencies (above 140 meters) for \$50 each. Those adjusted to an approximate frequency only are worth \$35. One inch



square crystals may be obtained from A. Esposito, 33 West 46th Street, New York City. The price for a one inch crystal is \$4, and that for larger sizes in proportion. As we understand it these crystals have not had any radio frequency test made on them and are not guaranteed to oscillate. This accounts for the rather large difference in price.

Antennas

As nearly as we have been able to find out it is correct to speak of the "natural wave" of the antenna as being its funda-

mental wavelength when no loading coil or series condenser is used. As soon as any of these things are connected it is our understanding that we still have a fundamental but no longer have a natural wavelength. Do all hands agree? It will be a convenience to have this understanding in the section if there is no objection.

The Tyzzer Signal

The entire file of correspondence on the double modulation experiments which have been carried on under the direction of Mr. Horace Tyzzer is now at the Technical Editor's desk. In the October issue of *QST* it is hoped to make a progress report as there will in the meantime be an opportunity to write all men engaged in the experiment which have been compelled to suffer much delay on account of an unusually busy time for Mr. Tyzzer.

Pipe Antennas

The Technical Editor has lately received a large number of letters and articles concerning the use of the vertical metal antenna in the shape of a metal mast insulated at both the guy wires and the lower end of the mast itself. Unfortunately, only one of the men in question made any test whatever to see if the thing was better or worse than other antennas. It seems probable that the vertical antenna of this type will be very steady as to wavelength but not particularly effective as to radiation. Merely having the set work does not mean anything; there must be a test showing just how much better or worse this antenna was than another antenna at the same place used during the same evenings or during the same days.

Will not some members of this Section undertake to run tests of the same? The Technical Editor will be more than glad to outline the problem in such a fashion as to avoid duplicating the work that others have already done.

Wave Meter Calibration

Mr. James P. Barton of 2640 Herriot Ave., South, Minneapolis, Minnesota, is able to calibrate a limited number of wave meters between 12 and 250 meters. The range can be extended to 600 meters if desired. The calibration is done against standards which are dependable to a tenth of one percent and should be charged 58c for each point obtained. The owner of the wave meter which is to be calibrated must pay the transportation charges both ways, of course. It is suggested that particular care be taken to avoid the commonest mistake of amateur wave meter builders, making the thing too flimsy to retain the calibration when one has been obtained. First make a good substantial wave meter, then worry about the calibration.

The Jenkins Experimenters

As of June 26th, the list of those who have obtained Jenkins picture transmission machines for radio experimentation is as follows:

L. C. Porter, Wildacres, Cedar Grove, N. J.

S. Kruse, Hartford, Connecticut.

Harold E. Smith, 802 South St., Peekskill, N. Y.

James L. Hubbard, Norwich, Connecticut.

Alfred C. Turner, 62 Windsor Road, Waban, Mass.

H. P. Haresty, 396 Monterey Avenue, High Park, Michigan.

W. W. Grant Co., Calgary, Alberta, Canada.

C. F. Burgess Laboratories, Madison, Wisconsin.

Charles J. Camp, Palo Alto, California.

C. H. Hofmeister, 16007 Grovewood Ave., Cleveland, Ohio.

Henry B. Joy, 1830 Penobscot Bldg., Detroit, Mich.

Motors for Jenkins Device

The Industrial Division of Steger & Sons Piano Mfg. Co. at Chicago has a number of electric phonograph motors in stock. These are equipped with a friction governor and can be run at a very constant speed. They can be purchased quite reasonably and should be excellently adapted to running such devices as the Jenkins Picture Machine.

Strays

If you want to leave the base on your 5-watt tubes but do not want to use it in a socket, large Fahnstock clips can be attached to the base pins and connections made to these clips.

This cut and caption appeared on page 52 of the July issue of *Radio News*:—

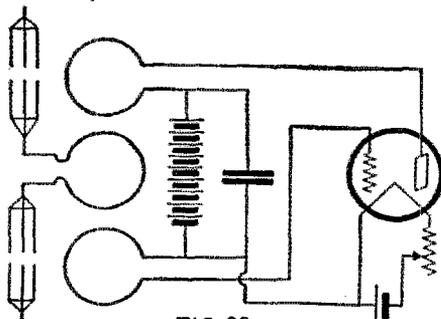


FIG. 28

Short-wave circuit as conceived by Hertz in 1888.

Hi! The vacuum tubes were in use during George Washington's day too, weren't they?

Loss Comparisons

W. L. Seibert*

THIS ARTICLE is intended primarily to describe a convenient method of comparing the losses in variable air condensers and other parts of radio frequency receiving circuits. The circuit should be of value to manufacturers for comparing their production with competing equipment. The circuit also enables the experimenter to compare various equipment offered for sale, so that the most efficient may be selected.

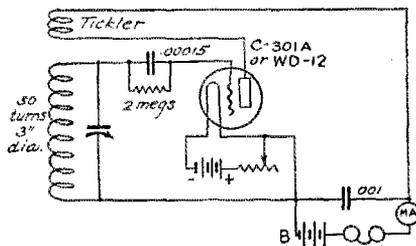
The fundamental circuit is shown in the accompanying figure. The circuit consists simply of a regenerative detector circuit in which the tickler coil coupling is increased until weak oscillations are obtained. The plate circuit includes a milliammeter so that the comparative amplitude of the oscillation can be judged by the comparative decrease in the value of plate current. As the tickler coupling is increased, oscillations start abruptly in the circuit. Then accumulative grid rectification causes the grid voltage to decrease which produces a corresponding decrease in the plate current.

With the plate coupling value remaining constant, the amplitude of the oscillation will increase if the resistance, or losses, of the oscillating grid circuit is decreased. That is, a circuit having lower losses will cause the plate current to be a smaller value than a circuit having higher losses.

The circuit is particularly adapted to the comparing of variable air condensers so that the one having lowest loss can easily be selected. A variable condenser is connected across the grid inductance as shown, the tickler coil coupling increased until oscillations are obtained as indicated by decrease in reading of the plate current milliammeter, and then the variable condenser is tuned until the beat note due to a broadcast station of convenient wave frequency, or from a local oscillator, is obtained. The tickler coupling is then adjusted until the detector circuit oscillations are rather weak. The variable air condenser is then replaced by another, which is also adjusted until the beat note from the same station is received. If the plate current value is higher than before, the second condenser has higher resistance and losses than the first; but if the plate current is lower, the second condenser is better than the first. The first condenser should then again be placed in the circuit and adjusted, and should duplicate the reading first obtained. It is best to have the circuit just oscillating weakly using the poorer condenser, as the circuit

is most sensitive to small changes in resistance when it is oscillating weakly. If several stations are broadcasting and a certain beat note cannot easily be selected, an antenna circuit, tuned to a certain station, may be placed within about one foot of the testing circuit.

The subject of losses in variable air condensers has been much discussed during the past year, and the present general thought is that the subject has been given a rather exaggerated importance. This is because the losses in most of the condensers on the market are considerably smaller than those in the inductance coil included in the same tuned circuit, and further improvement of the condensers will increase the general efficiency but slightly. Most of the data that has been published gave the resistance of the condensers at maximum capacity setting. At a given frequency the resistance or losses of a certain variable air condenser will vary inversely as the square of the capacity. That is the losses are very much greater at low condenser settings than at maximum condenser setting. It is therefore well to compare condensers at low scale readings as the difference in losses will then be much more apparent. In actual practice the condenser operates at higher frequencies as the scale setting is decreased. This is accompanied by a de-



THE MEASUREMENT CIRCUIT

NOTE - For best results no part of the tickler may come within $\frac{1}{2}$ " of any part of the tuned circuit. It is best to use a tickler of not over $1\frac{3}{8}$ " in diameter

crease in the effective resistance, so that the effect of the difference in settings is partially neutralized. Even then the resistance at low scale settings is much greater than at maximum capacity setting.

The dielectric losses in tube sockets, tubes, insulating materials, etc., can also be shown very quickly by the method described. Two of the terminals of an empty socket are connected across the grid inductance, the circuit tuned to receive the beat note of a certain station and the

* Radio Laboratory, Signal Corps U.S. Army, Camp Alfred Vail, New Jersey.

value of plate current noted. The empty socket is then replaced by another and the station beat note again tuned in. The improvement of hard rubber or pyrex glass sockets over moulded bakelite sockets is easily apparent. The connections to the grid and filament of a tube, unlighted, having a porcelain base can be replaced in the same way by a tube having a moulded bakelite base and the greater loss obtained with the grid leak connected from the grid to the filament then obtained by connection across the grid fixed condenser is easily seen.

As stated before, the loss due to a variable condenser that has been carefully designed is usually smaller than the loss due to the inductance forming part of the same radio receiver circuit. The use of carefully designed and constructed coils is therefore of great importance. Unfortunately the testing circuit described does not lend itself easily to the comparison of inductances. The following procedure is required. A tuned plate circuit having negligible coupling with the grid coil is substituted for the tickler coil. The test circuit is tuned to the signal beat note by means of the variable condenser and the condenser then left at that setting. A coil having exactly the same inductance can then be substituted for the first coil and the difference in loss observed from the comparative plate current values. The lower loss coil will have the lower plate current. If the inductance coils are not of exactly the same inductance value, a loading inductance provided by a small carefully designed variometer may be added in series with the smaller coil to enable the same signal to be tuned in. This small series inductance may be a single layer winding movable with respect to the other coil so that the total inductance value required will be obtained. The method is particularly suitable for the inspection of production coils at point of manufacture so that faulty coils can be eliminated.

The milliammeter used in the circuit should have a range of 0-1 or 0-2 milliamperes. A very sensitive voltmeter may be used by connecting across the coil of the voltmeter. The value of plate voltage should be such that the non-oscillating value of plate current is near full scale reading of the meter.

The test circuit described may be applied to radio transmitter circuit parts, and will indicate comparative losses except the additional dielectric loss occurring in insulating materials when the temperature of the insulation is increased due to the loss taking place. The test circuit enables more positive comparisons to be made than can be obtained by listening to a certain signal using successively various circuit parts.

R. C. C.

THE Rag Chewers' Club is growing by leaps and bounds. Membership has spread out all over the country and at this writing there are somewhat over a hundred members.

A few Super-Rag-Chewers have made their appearance and in order to give them the credit they deserve The Old Sock has decided to list each month in *QST* the stations which have done particularly well in initiating new members into the outfit. This will be similar to the "Brass Pounders' Club" of the Traffic Department. The ones which stand out this month are as follows:—

2CPD, Richard A. Donnelly,
Brielle, N. J.
11 Members

2AGQ, C. Kenneth Taber,
Milton, N. Y.
9 Members

4JR, Robert S. Morris,
413 S. Broad St., Gastonia, N. C.
8 Members

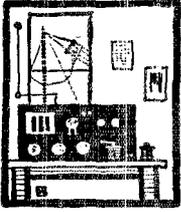
2CRP, R. B. Wehrly,
23 E. 34th St., Bayonne, N. J.
6 Members

Now fall to it, R.C.C. Members, and let's see who gets listed next month.

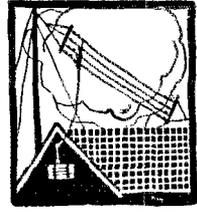
A great many stations have applied for membership but have not fulfilled the requirements outlined in the R.C.C. "Constitution" as printed on page 29 of the June *QST*. Read that again, gang, and note particularly that it is necessary to be "initiated" by a *member-station* in order to get into the outfit. Here is the list of members as this issue of *QST* goes to press—work one of them and then send a card in here and your membership certificate will be mailed to you.

THE MEMBERSHIP ROLL

1AM, 1ACI, 1ADW, 1AID, 1AJK, 1AMU, 1AOS, 1AOX, 1APL, 1ASN, 1AWQ, 1AYE, 1AYG, 1BAO, 1BEW, 1BIP, 1BNL, 1BVL, 1BVR, 1CAK, 1CBG, 1CLZ, 1DQ, 1HB, 1ES, 1GC, 1GR, 1ID, 1IL, 1KP, 1KY, 1MK, 1OA, 1OX, 1PY, 1QR, 1RF, 1SL, 1TC, 1VC, 1XAQ, 1XAX, 1ZD, 2ADC, 2AEC, 2AEY, 2AFC, 2APG, 2AGQ, 2AHK, 2AKH, 2AKK, 2AOX, 2APT, 2BOX, 2BZP, 2CDH, 2CGH, 2CPD, 2CRB, 2CRP, 2CTY, 2CYH, 2EG, 2HU, 2HV, 2IY, 2KA, 2KS, 2MT, 2APT, 2APV, 2AVK, 2BNU, 2BVZ, 2BWJ, 2KQ, 2LL, 2QP, 2UT, 2VT, 2KAN, 2ZI, 2CU, 2FJ, 2JR, 2NJ, 2OA, 2SC, 2TX, 2UX, 2VN, 2VQ, 2WN, 2DI, 2AHQ, 2AMM, 2CTO, 2BJ, 2AKS, 2AVH, 2AWS, 2BEN, 2BRT, 2BLP, 2BYN, 2CEO, 2CPE, 2DHX, 2DPL, 2DRJ, 2DRX, 2OQ, 2ZU, 2ADO, 2AEK, 2AYK, 2BAA, 2BHT, 2CSL, 2DNG, 2DPJ, 2DWH, 2EJY, 2KW.



Amateur Radio Stations



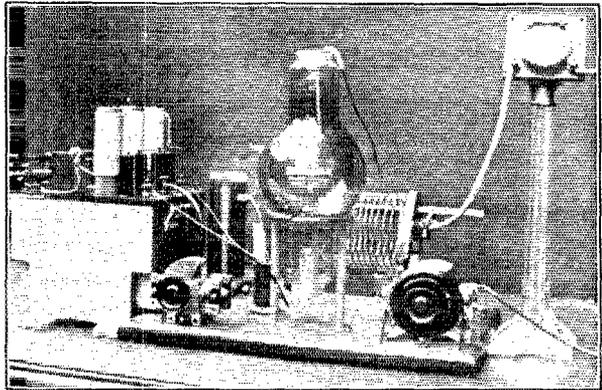
g2OD, Bucks, England



A beautiful and famous 20-meter transmitter is used at g2OD, the station of Mr. F. J. Simmonds, president of the British section of the I. A. R. U., located at Meadowlea, Bucks, England. The station is famous for its pioneer daylight work with a 2CM on 20 meters.

Refer to the photograph of the transmitter and to the circuit shown. The filament heating transformer appears at the left of the photo. The primary rheostat for this transformer is mounted on top of the transformer as are also the radio frequency chokes (RFC) in the secondary circuit of the filament transformer and in the positive high tension lead. The latter choke is space wound on a glass tube 2 inches in diameter and contains 200 turns. The tube is a T250 Mullard transmitting tube having a normal output of 250 watts. For 22-meter work Mr. Simmonds operates the tube with an input of 120 watts. Directly behind the tube is the transmitting inductance. The main inductance contains two coils, one (coil B) is the plate coil consisting of 9 turns of No. 8 wire 5 inches in diameter and the other is the grid coil (C) containing 4 turns of the same wire. The grid coil is shunted by a small well spaced variable condenser having a maximum capacity of 300 μf (C2). The inductance

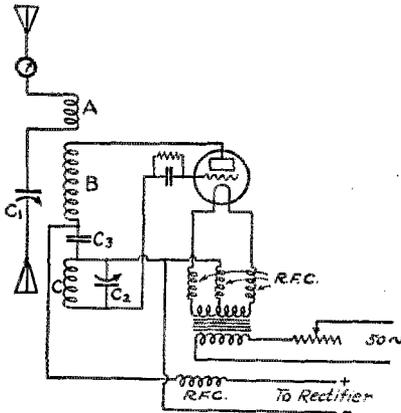
comprising coils B and C is split in the center and the two ends of the coils are connected by the by-pass condenser (C3) having a fixed capacity of 300 μf . The grid condenser and by-pass condenser are home-made and are constructed from foil and mica. The grid condenser has a capacity of 200 μf and is shunted by a 15,000 ohm grid leak.



THE 20-METER TRANSMITTER AT g2OD.

The antenna inductance (A) is a spiral of three eighths inch copper ribbon having a mean diameter of 5½ inches and containing 4 turns. In series with the counterpoise end of the antenna inductance is the series condenser C1 which has a

capacity variable to 500 μ f. This condenser is shown at the right of the photograph. The antenna ammeter is mounted



20 METER CIRCUIT AT ϕ 20D

on the tall glass supporting column which we suspect is Mrs. 20D'S pet flower vase.

Power for the transmitter is obtained from the 50-cycle lighting mains. The plate potential is secured by means of a high tension transformer which supplies approximately 2200 volts to a synchronous rectifier. Passing thru the rectifier the

current goes thru a simple brute force filter from which the plate is supplied with 2,000 volts of good D.C.

The antenna is 40 feet high at the station end and 42 feet high at the other end. The flat top portion consists of a single wire 35 feet long and a slanting lead-in 25 feet long. The counterpoise is a six wire fan 48 feet long and 25 feet wide at the far end. It is 7 feet above the ground. Antenna and counterpoise are both insulated with plate glass and porcelain rod insulators. The wavelength of the antenna-series condenser-counterpoise combination is 66 meters. The transmitter is operated at the 3rd harmonic of this fundamental, 22 meters.

A standard superheterodyne is used for 20-meter reception. It is the same receiver as used on 90 meters with only a slight modification of the oscillator coil. It is also adopted for use as a simple 2 tube set (detector and one stage of audio frequency amplification) and this arrangement is used for quick tuning. The tuning coils are space wound on three very narrow strips of insulating material. The coils are wound with No. 16 S.W. gauge wire.

In the photograph of the complete station the 20-meter transmitter does not appear. At the left is the master oscillator and in the center the power amplifier used on 90 meters. To the right is the super which operates satisfactorily on all wavelengths from below 20 meters to 900 meters.

6LJ-6CFT-6XP, Los Angeles, Calif.



THIS station is jointly owned and operated by H. W. Leighton and M. E. McCreery, both old-timers. The antenna consists of a single vertical wire 35 feet long with a 12-inch seamless copper

ball at the top. The ball is suspended by hemp rope from a 12-inch Pyrex insulator. The counterpoise is suspended directly below the antenna and is also a single wire 24 feet long with a T lead to the exact

center. This radiating system is used on 40 and 80 meters and a single vertical wire 16 feet long, with 6-inch copper ball at the end, is used as a 20-meter antenna. The same counterpoise is used on all three wave bands.

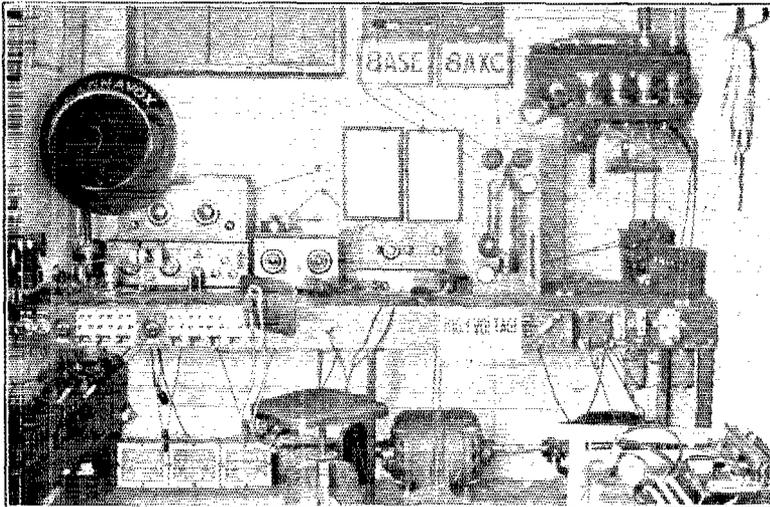
The transmitter consists of one or two 203-A tubes in the conventional loosely coupled Hartley circuit. Usually only one tube is used as it has been found that every station that is worked with 2 tubes can also be worked just as easily with only one tube. Plate supply is from a $2\frac{1}{2}$ -K.W. 110-volt to 3, 300-volt pole transformer with a center tap giving 1650 volts on either side. This is run through two of the old type Amrad "S" tubes which have been in constant use for two and a half years and which are still going strong. The filter is a 11- μ f condenser across the line with a 3-henry choke in series and the usual R.F. choke. The transmitter is mounted behind the neat panel shown at the right of the photo. All indicating meters are mounted on this panel. The keying is done in the primary of the plate transformer by means of the Leach relay shown on the table shelf. The small "box transmitter" over which the changeover switch

is mounted is a G.E. naval flying boat transmitter which was formerly used at GLJ for 150 to 200-meter work. This transmitter has not been in operation for a long time.

Four receivers are used to cover the wavelength bands from 15 to 24,000 meters. The lower right hand receiver shown tunes from 15 to 45 meters. The set just above operates on wavelengths between 60 and 120 meters and the Navy type SE 1012 shown on the left lower side is good on wavelengths between 150 and 1300 meters. The set just above is a 3-coil honeycomb set operating between 800 and 24,000 meters. This receiver is made from an old Grebe RORN unit. All receivers have self-contained two stage amplifiers. The RCA loud speaker can be plugged into any receiver, giving great volume from DX stations.

All the apparatus except the Navy transmitter and receiver was assembled by Mr. Leighton to whom much credit is due for the excellent results which have been obtained at this station. While the station is not on the air very regularly, New Zealand, Australia, Chile, Mexico, Canada, Brazil, NRRL, KFUH and all U. S. districts have been worked and the signals have been copied from points all over the world.

8ASE, Oak Park, Elm Grove, W. Va.



THIS station was designed and constructed by Edward Pence and has been in operation for some time. The antenna is a three wire fan with a counterpoise of four wires directly underneath it. The fundamental of the antenna to counterpoise is one hundred and fifty-five meters. Two transmitters are in operation now, a third being under construction. The

set using four 202 tubes, shown in the upper right hand corner of the photograph, operates on 155 meters. The antenna current is six and a half amperes. This transmitter has been copied on a loud speaker by a ship operator just off the coast of Japan. The main transmitter uses a 500 watt Telefunken tube on 79 meters. Altho

(Concluded on page 63)



NOTICE

TO MEMBERS OF THE I.A.R.U. RESIDING IN GERMANY, SPAIN AND THE NETHERLANDS

Nomination Solicited for National Presidents

The members of the International Amateur Radio Union residing in Germany, Spain and Holland are hereby advised that the minimum required number of members has been received from the countries, and that national sections of the Union in each of these countries are hereby declared existent.

In accordance with Article III, Section 3, of the Constitution, a National President is now to be elected in each of these countries, to serve for a term of two years. His powers and duties are outlined in the Constitution. You are invited to nominate a member of the Union from your country to become your National President. Article V, Section 10, specifies that in order to be eligible the nominee must not be commercially identified with the radio industry and that he must be a member of the Union. All nominations must be received by Sept. 15, 1925, immediately after which ballots will be prepared, listing all the eligible names placed in nomination, and mailed to you for the actual voting. Address your nominations to International Amateur Radio Union, 1711 Park St., Hartford, Conn., U. S. A.

K. B. WARNER,

International Secretary-Treas.

July 2, 1925.

The Congress and the Union

There seems to be much confusion in magazine stories reporting the proceedings of the First International Amateur Radio Congress as to the distinction between the affairs of the Congress and those of the International Amateur Radio Union which was formed at the Congress.

The Congress was organized by a committee of French amateurs at the sugges-

tion of Mr. H. P. Maxim, president of the A.R.R.L. The Congress adopted rules of order for its government, under the chairmanship of M. Edouard Belin, who served as president of the Congress. These rules provided that the pieces of business would be handled by sub-committees. Five items were proposed by the organizing committee and approved by the Congress, resulting in five sub-committees:

1. Organization of an I.A.R.U.
2. International Amateur Tests.
3. Wavelength Allocation.
4. International Auxiliary Language.
5. Station calls, intermediates, etc.

The work of the first sub-committee resulted in the formation of the I.A.R.U., its report and suggested constitution being unanimously adopted. The I.A.R.U. thus being brought into existence, a meeting was held of the amateur delegates present, as provided in the constitution, at which the officers of the Union were elected. This meeting was not part of the Congress. The remaining sub-committees reported to the Congress, not to the Union. Their findings are in no sense binding upon the Union. Thus, for example, although the Congress adopted Esperanto as its (the Congress) auxiliary language, it is not correct to say that the I.A.R.U. has endorsed or adopted Esperanto—the Union simply has not considered the subject. Similarly the fifth sub-committee recommended many changes in international intermediates and this report was adopted by the Congress. It has not been adopted by the Union, and the same old intermediates are still in effect.

Doubtless it would have been better if the Congress could have devoted itself first to the formation of the Union and then, the Union being formed, converted itself into a Congress of the Union under the direction of the officials of the Union. Unfortunately this was not possible, because of the limited time. As it was, the Union has nothing to do with the actions of any of the other sub-committees. Some of these reports contain a careful study by representative amateurs, and the Executive

Committee of the Union is making a study of the reports with the idea of officially adopting many of the recommendations. It is only fair, however, to say that this has not yet been done. —K. B. W.

On June 10th u1 CMX established communication with OK1 who gave his QRA as Prague Czechoslovak. OK1 was on 43 meters at the time. Greetings from The Czechoslovak Radio Club were sent to the A.R.R.L. and Mr. Maxim. This is the first communication between the U. S. and Czechoslovak. The Czechoslovakian Government has granted permission to operate amateur transmitters for scientific purposes under certain conditions. It is anticipated that in a very short while there will be a large number of ham transmitters in operation in Czechoslovak.

On March 28, 1899, the first two-way communication across the English channel was established between stations at Saint Margaret, near Dover, England and Wimereux, near Boulogne, France. Marconi transmitted a message of congratulations to Professor Branly, then in Paris. Commemorating this first "DX", the amateurs of the whole world have been asked to cooperate in the collection of a fund for the erection of a suitable monument of recognition to the real pioneers of radio. This monument will not only stand as an everlasting tribute to the efforts of Hertz, Popoff, Lodge, Marconi, Branly and others but will also commemorate the date upon which Marconi himself announced to the world that wireless telegraphy existed as a practical means of communication between distant points. The monument is to be erected at Wimereux, and the movement should have the support of all the amateurs of the world. All subscriptions should be sent to The Committee of the Monument of Radio at Wimereux, Pas de Calais, France.

With the formation early in April of the Reseau Belge, the amateurs of Belgium now have their traffic organization similar to the A.R.R.L. The Reseau Belge is the national "ham" society, having its Traffic Manager, M. Rudolph C. A. Coupez of Brussels, its Technical Manager, District Manager, City Manager and Official Relay Stations. Belgium is the first European country to organize such a League—the energetic hams of Belgium are to be congratulated upon their excellent work. At a combined meeting, in Brussels, of representatives from all of the Belgian societies plans for the unification of radio effort were worked out and the Belgian amateurs went before their Government and stated their case. The Government has recognized the amateurs and Government regulations

for the amateurs are now in the process of formation. In the meantime the amateurs are allowed to operate with the Government's sanction, hence it is no longer necessary to send QSL cards in to Belgian under "blind" cover. Any official communications to the Reseau Belge should be addressed to Mr. R. Deloor, General Manager, 26, Ave du Mont-Kemmel, Saint-Gilles, Bruxelles, Belgium.

The following wavelength list is a fairly complete tabulation of all high power commercial, naval and ship transmitters operating on short wavelengths. This list is accurate to date.

Wave length	Call letters	Location
20.0	POX	Nauen, Germany
25.0	2YT	Poldhu, England
25.0	POY	Nauen, Germany
26.0	POX	Nauen, Germany
30.0	2XI	Schenectady, N. Y.
32.0	2YT	Poldhu, England
35.0	2XI	Schenectady, N. Y.
36.0	LPZ	Buenos Aires, Argentine
38.0	2XI	Schenectady, N. Y.
40.0	1XAO	Belfast, Ireland
43.0	WIX	New Brunswick, N. J.
47.0	POZ	Nauen, Germany
50.0	NKF	Anascotia, D. C.
56.0	KFKX	Hastings, Nebraska
58.79	KDKA	East Pittsburgh, Penna.
60.0	1XAO	Belfast, Ireland
60.0	2YT	Poldhu, England
62.0	KDKA	East Pittsburgh, Penna.
67.0	SXS	East Pittsburgh, Penna.
70.0	POX	Nauen, Germany
71.5	NKF	Anascotia, D. C.
74.0	WIR	New Brunswick, N. J.
75.0	SFR	Paris, France
75.0	WGN	Rocky Point, L. I.
76.0	POX	Nauen, Germany
83.0	RDW	Moscow, Russia
84.0	NKF	Anascotia, D. C.
85.0	SFR	Paris, France
85.0	8GB	Kahuku, T. H.
86.0	NQC	Belfast, Ireland
90.0	6XO	Poldhu, England
90.0	1XAO	Paris, France
92.0	2YT	San Diego, Calif.
94.0	2YT	Poldhu, England
95.0	SFR	Paris, France
96.0	SXS	East Pittsburgh, Penna.
99.0	6XI	Bolinas, Calif.
100.0	—	New Orleans, La.
100.0	POX	Nauen, Germany
100.0	2XI	Schenectady, N. Y.
100.0	NAM	Norfolk, Va.
103.0	WGH	Tuckerton, N. J.
105.0	WHU	as "Big Bill"
107.0	2XI	Schenectady, N. Y.
112.0	IXAO	Belfast, Ireland
115.0	FL	Paris, France
120.0	IXAO	Belfast, Ireland
146.0	6XO	Kahuku, T. H.

The Lorenz firm at Eberswalde, Germany announce the following short wave schedules of their station "AS": Wavelengths 24 and 48 meters for telegraphy, daily 1200 to 1230; Monday 2230 to 2330; Wednesday 2230 to 2330; Sunday 2000 to 2100. Telephony in German and English, talks and music on 53 meters on following days: Monday 2000 to 2045; Tuesday 1100 to 1145; Wednesday 2100 to 2145; Thursday 2100 to 2145 and Friday 1100 to 1145. All time is G. M. T. Reports of reception of either telegraph or telephone signals from AS will be highly valued and should be addressed to Mr. H. Kraus, Secretary, Funktechnischer Verein, Dorotheenstr. 43, Berlin N. W. 7, Germany.

French stations usually work on Saturday and Sunday on wavelengths in the vicinity of 90 meters from 2000 to 2400 G.M.T. and also on wavelengths around 45 meters. A number of French hams, notably 8AB, 8BF, 8CT, 8GO and 8SM, transmit on 20 meters from 1600 to 1900 G.M.T. on Saturday and Sunday nights. For QSO with France it is suggested that we look for them on 20 meters in daytime, 40 meters in the evening and 90 meters at night. French 8SM tests on 43 meters at 0800 to 0900 G.M.T. and 2000 to 2100 G.M.T. On Thursday, Saturday and Sunday, 20 meters at 1600 and 43 or 100 meters at 2359 G.M.T.

Cliff Dow, the pioneer amateur of the Hawaiian Islands where he operated the famous 6ZAC is now located at Pago Pago, Tutuila, Samoa. He is back on the air with 6ZAC as his call, and also signs NPU when working the set for Naval Communication. The transmitter consists on one 50-watt tube with 500 cycles on the plate. He has been in communication with 1CMX, 8GZ, 8ALY, 9CSS, 9ADO, several 7's and a flock of 6's. He expects to have a 250-watt tube in operation soon and will be QSO with many other stations.

The operator on the schooner Kaimiloa KFUH is Fred Roebuck, an old timer who used to operate 6FD at Phoenix, Arizona. The set was installed by Heintz and Kohlmoos of San Francisco. It will be remembered that it was this concern that designed ex6ZAC.

The Italian magazine "Il Radiornale", the official organ of the national Italian radio Club, is organizing, under the auspices of this club, a large radio transmission contest among Italian amateurs. The contest runs from June 1st of this year to March 31, 1926. The prizes will be handsome gold, silver and bronze medals and radio apparatus donated by the leading ra-

dio manufacturers. The classification of the contest will be according to the following three points:

- (1) Greatest distance achieved, which is confirmed by a QSL. Power input less than 200 watts. The minimum distance to be 10,000 kilometers (approximately 7,500 miles).
- (2) The greatest number of two-way communications, confirmed by QSL. Minimum distance 5,000 kilometers.
- (3) The most interesting experience on various wavelengths in accordance with the time, season, etc.

Inasmuch as the classification and results of the contest will be greatly dependent upon the QSLs received, the National Radio Club of Italy earnestly requests the amateurs of the whole world, and particularly the American, the Australian, the South African and the Asiatic operators, to be kind enough to promptly send QSLs to their Italian ham friends.

g2OD has been in communication with z4AG quite regularly, on 20 meters from 0500 to 0600 GMT. Communication was first established on May 16th.

On April 29th at Stockholm the union of Swedish radio clubs was created. Twenty-six radio clubs have joined the Swedish Union and many more are expected to enter.

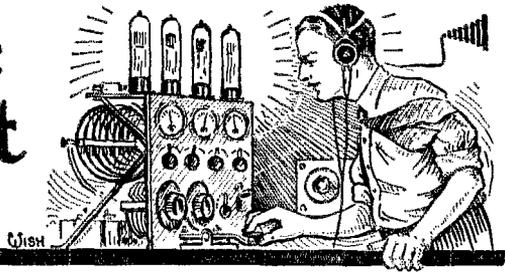
A short wave station is reported to be in operation at Iwatsuki, Japan. The call letters are JSDA and also AKPKI. The last two letters "KI" of the call are run together. This station has been heard on 73 meters calling JAA and CQ. Ani dope, gang?

The amateurs of the southern hemisphere are invited by the Radio Club of Argentina to be on the job from July 16th to August 9th for a round-the-world-relay entirely within the southern hemisphere—South America, South Africa, Australia and New Zealand. There are no schedules and no points of origin for messages—just everyone get on the job and see if messages can't be put all the way around via the southern route.

H. Kidder on the *uss Pope* at Manila, Philippine Islands, has a five watt tube operating and signing pilHK. He has been QSO 6VC and 6AKW, and wants to get into communication with other amateur stations. His mail address is U.S.S. *Pope* (225) Asiatic Fleet, care Postmaster, Seattle, Washington.

The Traffic Department

F. E. Handy, Acting Traffic Manager
1711 Park St., Hartford, Conn.



THE Traffic Department is that department of the League's activities concerned with the practical operation of the stations of its members. The several purposes of the Traffic Department include:

- Arranging amateur operating activities.
- Establishing standard operating procedure.
- Encouraging good operating.
- Improving message relaying.
- Conducting tests.

The work of the Traffic Department has definite objectives. The aim of the Traffic Department is to bring into existence:

- A large and efficient communication network made entirely of privately owned radio stations.
- A body of skilled operators whose services and abilities we may use to further the general knowledge of the art of radio communication, to relay friendly messages to different parts of the country without charge, and to help our country in time of any sort of an emergency.

These objects of our organization must be borne in mind at the same time we, as individuals, are getting the most enjoyment from the pursuit of our chosen hobby. Only by operating our stations with some useful end in view can we improve the service which we give others and increase the pleasure we get from amateur radio communication.

The policies of the Traffic Department are those which urge members to use system in the operation of their stations. Compliance with government regulations, adoption of orderly and efficient operating procedure, and cooperation between members and between the League and outside interests for the advancement of the art, are all embodied in the policies of the Traffic Department.

The activities of the Traffic Department are arranged and recorded through the official organ of the League, *QST*, and by special correspondence. Tests and relays are arranged from time to time to develop new routes for traffic handling and to increase the general knowledge of short wave radio communication. In this way the whole membership can learn the possibilities of communication on different wavelengths and all members can benefit from the experience of certain members of the League.

It is obviously impossible to distribute up to the minute information in a monthly periodical. Therefore, circular letters are used to keep the active stations informed of the latest developments in such a rapidly progressing system. Official Broadcasting stations have been appointed to better even this arrangement. Official Wavelength stations have been selected to aid in maintaining the orderly and law-abiding operation which is in accordance with the policies of the League and of the Traffic Department.

Improving Our Traffic Handling

By E. G. Watts, Jr., 4FM

A MESSAGE is filed at a station in a very large city where "umteen" stations are in regular operation. Station A, as we may call this station, assigns this message a number. He sends the message to B who keeps it a week and crosses out the date. Finally B gets the message off to C who makes a guess at the address thru bad interference and garbles it. After the message has made a generous visit at his station it is sent to D. He garbles the text a little. The next station to receive the message is station E who has "no use for

this A.R.R.L. system of numbering." When he sends it he dubs it number one after his own inclination. Our message now arrives at the town of its destination (some of them don't get that far) with a new address and a vague text little like the original one. F can't find the party in the telephone book so he mails the message. After a week it comes back covered with red stamps and such remarks as, "Unclaimed," "no such number," or "return to sender." F, being a conscientious amateur, decides to send a "service" message back to the station of

origin asking for a better address. He reaches for a message blank, but lo! Where is the station of origin? And here endeth the first lesson and so dieth a good message.

This life history of a message may be a bit exaggerated, and I dare say that all these things never happened to a single message, but we know that they do happen. The point of this article is *not* to mention all the "rotten" things but to suggest some means of making them better than they are.

Let us list the troubles which beset our message traffic and suggest an appropriate remedy for each:

Incomplete preambles seem to be the most common fault in our message-handling today. The city of origin, the station of origin, the number, the date, and the check are all part of the preamble which goes at the beginning of every message. The *city* and *station of origin* are most essential. Without them it is impossible to notify the sender that his message could not be delivered and it is not possible to route the reply speedily without this information. All stations have been instructed to refuse to accept messages without this essential information. Every station should demand an office of origin and "QSK" on failure to include it. Thus messages without a starting place will never get on the air.

Many messages carry an *insufficient address* and cannot be delivered. Originating stations should refuse to accept messages with a meager address.

Improper calling is a hindrance to the rapid dispatch of traffic. In Florida our regulations are strict. When I am operating and hear a station "CQ" more than three times, I change my receiver to another wavelength the instant he starts his fourth "CQ." Perhaps some say that we can't afford to do this for traffic will never move. The A.R.R.L. has "diddle-daddled" long enough over these "CQ hounds" and now is the time to start cutting them dead. We have action on poor operating in Florida. Long calls after communication has been established are unnecessary and inexcusable. Many stations are slow to reply. If you have a dozen switches to throw, get rid of them. The up-to-date amateur station uses a break-in system and there is but ONE switch, controlling the power to the transmitter.

Poor sending takes the joy out of operating. There are those who are unable to send better and those who can send better but don't. The latter class believe that their "swing" is pretty or they use a key with which they are not familiar. Beginners deserve our help and sympathetic understanding. Practise will develop them into good operators. The best sending speed is a *medium* speed with the letters quickly formed and sent evenly with proper spacing. The standard type telegram key is best for all around use. Before you use

a freak key spend a few months of practise on a buzzer.

There is no excuse for a "garbled" text. Operators should copy what is sent. Never "guess" at any word. If not sure of it ask for a "QTA." The "lid" operator can be told very quickly when he makes a mistake. He does not use a definite "error" signal but usually betrays himself by sending a string of dots. The good operator sends "I ?" after his mistakes and starts sending again with the last word sent correctly. Unusual words should be repeated twice. After the first transmission the "error" signal is used and the word is repeated. The A.R.R.L. system for "fills" is a good one. Send the last word correctly received followed by the interrogation and the first word received after the communication was again good. Everyone knows the fellow who sends the whole message over to fill in one word. Nothing is so exasperating. A reference to the check reveals missing or superfluous words. Words should be sent twice *only* when necessary and at the request of the receiving operator.

The law concerning *superfluous signals* is totally disregarded by many amateurs. Some operators hold the key down for long times when they are testing or thinking of something to send. Every time you sit on the key during working hours you ruin someone's else copy or prevent someone from getting someone else. If you must test pick a time when nobody will be bothered. Let folks know who you are occasionally by sending your call. It may be to your advantage. If you must have code practise use an omnigraph and a buzzer.

Some stations write their messages on scratch pads along with the miscellaneous signals that have been copied. Messages are actually forgotten in this way. The remedy is to write messages on message blanks when they arrive at the station. Uniform blanks should be used and a good filing system is useful to keep things straight. The messages which are to be sent are kept together, and at my station the abbreviation for the state of destination is marked in the upper left hand corner of each message. The messages are arranged in a clip so that each one projects from under the one on top exposing to view the name of the state for which the message is bound. The station log should be complete. The simpler it is, the easier it is to keep and simplicity does not detract from its value. Too many stations overlook the value of an accurate clock. Both a wavemeter and a clock are necessary to keep schedules. A clock is necessary in keeping an accurate log.

Our stations are afflicted with a thousand and one faults. I have heard fellows so ignorant that they think they can get a "DC" note out of unfiltered rectifiers by merely turning dials and changing clips. Many stations do not get the right view of the

routing business. What difference does it make if a message does go out of its straight-line path if it arrives just as quickly? Operators must learn to never send a single acknowledgment to a message until it has been correctly received.

Mr. Watts has covered the ground well. He believes that we need better "regulations." We need more than that! Questionnaires have shown the need of certain things which we will try to supply through "Procedure Bulletins" for Official Relay Stations and a "Traffic Department Handbook" in the near future. Any relay system must be checked and supervised continually to make it wholly successful. Every operator who reads these columns can help in improving conditions by making sure that he is never guilty of the improper operating practices mentioned. A.D.M. Clarke of Florida is making his state a state of good operators. The questionnaires contained several complaints of insufficient supervision by certain Traffic Department Officials. If you are dissatisfied with the way things are run, the proper action to take is to write the person you have in mind. Give him your criticisms and suggestions. If he fails to respond it is then your privilege to go to the next person higher in authority and demand action.—[F. E. H.]

Official Relay Station Operating Rules

MANY requests have come to Headquarters for copies of the "Rules and Regulations" of the Traffic Department. From time to time someone has called our attention to the general nature of the requirements laid down for Official Relay Stations on the Appointment Certificates. The regulations are not as specific or complete as they should be we must confess. Before the next winter season they will be brought up-to-date and we hope to include more specific information and to cover more territory in the revision.

The following specific rules are to be followed by all Official Relay Stations:

1. Use "CQ" as adopted by the A.R.R.L., calling three times, signing three times and repeating three times. "CQ" is not to be used in testing or when the sender is not expecting or looking for an answer. After a "CQ" cover the dial thoroughly looking for replies.

2. When you have traffic, send a directional "CQ" (call followed by direction, district, or state for which you have traffic) or send a "QST" listing the states for which you have traffic. A plain "CQ" always indicates that you have no traffic to send but are open for traffic.

3. Answering a call: Call three times (or less); sign three times (or less); and after "QSO" is established decrease this to once or twice.

4. Signing off: Call once or twice, sign once or twice, and send "SK". "SK" indicates to others that you are through with the station which you have been working and will now listen for whoever wishes to call. Never "CQ" after "SK" until you have covered the dial thoroughly

The Traffic Department Trophy

Back numbers of *QST* contain complete information about the Traffic Department Trophy. When you handle over 100 messages in a month be sure to send them to your local Traffic Officials who will forward them to the Division Manager. Division Managers will send bundles of messages to Headquarters each month and one man at Headquarters will count the messages and make up a "Brass Pounders' League" each month after which the messages will be returned direct to you. Only messages containing the CITY and STATION of origin, the complete ADDRESS, the TEXT, and the SIGNATURE shall be counted. The date and the number are important as the inclusion of a date speeds up the message and the number makes it possible to trace the message. However, the fundamental parts of a message shall determine whether or not it is counted. All messages must be handled in 48 hours or less.

looking for stations calling you.

5. The proper use of "AR", "K", and "SK" signals is required of all Official Relay Stations. Use "AR" at the end of a call; use "K" at the end of each transmission when answering or working someone, and use "SK" when signing off.

6. Do not "QSZ" unless it is requested.

7. The transmitter should give a steady signal that is easy to copy.

8. Omission of the fundamental parts of a message will subject the O.R.S. appointment to cancellation. Do not accept incomplete messages.

9. A file of messages handled should be kept. Only messages which can be produced shall count in the monthly reports. The message file is subject to call by the A.D.M. at any time.

10. Each Official Relay Station is required to keep a record of stations he hears violating these rules and to forward his record to his A.D.M. each month with the regular traffic report, with the violations of each station.

(All stations will be notified from time to time of complaints lodged against them. Cooperation is expected of every Official Relay Station. More than one report of poor operating practice is necessary to get action. It is no disgrace to receive notification of your poor operating. Disgrace comes from failure to improve.—T. M.)

One hour after the earthquake an emergency transmitter was working at Santa Barbara, California. 6OI and 6AIV got together a twelve volt battery, a three inch spark coil, a rotary gap and key, and after an hour's frantic calling, the tanker, KDVV picked up the signals. Thru his aid the emergency transmitter worked KDKY, the tug Peacock, 18 miles away. Protection for the stricken city was obtained and the first direct news of the quake was transmitted on 250 meters by amateur radio.

Traffic Briefs

From June 14 to June 26, 6NX maintained communication with the "Idalia," one of the yachts of the San Francisco to Tahiti sailing race. Many messages and Associated Press reports were handled daily. At 2600 miles swinging and broken signals interrupted the contact despite the efforts of operator Newby of the Idalia. 6HC, 6CKV, 6BDT, 6BON and 6GY formed a relay route for handling traffic to Mr. Parker, owner of the Idalia. The good work of 6NX and the cooperation of the stations mentioned is just one more record of the worthwhile-ness of amateur radio. KFVM is returning and a daily watch is kept by 6NX.

9BDW handled several emergency messages for the Chicago, Milwaukee and St. Paul Railroad.

8BWT handled 68 messages with 3ABW in four hours during the recent visit of the Haddonfield High School to Washington.

"Don" Mix is now with the Burgess Battery Co. at Madison, Wis. When operating 4DM at Burgess Island, Florida, he handled lots of traffic daily by keeping a noon-schedule with Madison on twenty meters. Official Relay Station owners can learn a lesson by studying this performance carefully and arranging schedules of their own.

The Merchants and Manufacturers Association recently chartered the Steamship "Southland" for a three day trip down Chesapeake Bay to Norfolk. Mr. Baker of the M. A. Leese Co. engineered the communications of the expedition. One of 3ZW's portable transmitters was used and the necessary short wave receiver was procured. A license for a portable station was obtained and the set operated under the call 3BE. "Waddy," 3JJ, was operator, and he handled 61 messages and 2500 words of press between the ship and 3APV at Chevy Chase, Md. Both 40 and 75 meter wavelengths were used.

The Massachusetts fellows demonstrated the usefulness of amateur radio on Defence Day. IBOM,

1ADU, 1AKZ and 1WL sent mobilization reports from five cities where soldiers assembled to 1AWW of Springfield. The complete report was then sent from 1AWW to 1AJK in Worcester. He promptly delivered the message in person to General Foley. The messages made good time and the relay was a success.

WNP and WAP are in touch with civilization daily through amateur radio. Many personal and official messages have been handled besides the reports for the National Geographic Society. 1MY, 1CKP, 2BGG, 3DW, NKF, 1ANQ, 1XU, 1MK and 3BKR have handled some of the traffic. A bunch of other stations also worked the MacMillan expedition.

One good way to work stations consistently and handle messages with them frequently is to find what wavelength in one band seems best for your transmitter and to be THERE all the time.

The telephone and U.S. mail are efficient means of delivering messages. Messages are going from Coast to Coast every night and being delivered the next day by U.S. Mail. Many stations have made, and are keeping regular schedules for traffic handling, and the reports show lots of enthusiasm.

CALLING PRACTICE

We have a new suggestion to reduce the use of the much-abused "CQ." When you have traffic for some foreign land use the proper intermediate repeated five times and followed by your own intermediate and call sent three times. A call for a French station goes like this: fffff u 9CXX 9CXX 9CXX. The whole call may be repeated three times before listening for a reply.

DIVISIONAL REPORTS

ATLANTIC DIVISION E. B. Duvall, Mgr.

THE Atlantic Division is in better condition than ever before. This is encouraging and somewhat surprising, as there generally has been a decided slump during the summer months.

The D.M. thanks the many fellows who were prompt in answering his circular letter and monthly bulletin.

While there is an improvement in the reporting situation, it is evident that many Assistant Division Managers are delayed, as several were compelled to send reports in by special delivery this month to insure their reaching the D.M. on time.

DISTRICT OF COLUMBIA—Interest was keenly shown at the meeting of the Washington Radio Club. Besides entertaining individually many amateurs who visit the city at this time of the year, the club has several interesting meetings. Many stunts have been arranged to stimulate summer interest. 3BWT is the most active station in the District. He delivered local messages for stations who are not O.R.S. 3BPP used both twenty and forty meter wavelengths this month. 3JO is going to Camp Roosevelt this summer. He will use a spark coil set operating on 80 meters. 3AB has been keeping company with a second-hand fiver. 3HS touches the key when fancy strikes him. 3ZW is spasmodically active. 3CEJ bought a motor boat. The active stations are: 3AB, 3BWT, 3BSE, 3JO, 3BPP, 3ZW-3BE and 3PZ. Cancellations are in order for the remaining O.R.S. in the District who have shown no interest. 3KM will probably be active through the summer.

Traffic: 3BWT, 113; 3AR, 8; 3BPP, 8.

MARYLAND—The A.D.M. turns in a good report. Interest is shown by a few real consistent stations. 3OU has turned in his final report for the season. The school is closed, but Bailey operates from IDE at Worcester, Mass., during the summer. 3OU will open in the fall with a 250 watter. Forty meter stations are increasing in number, due to the greater daylight range that can be obtained. 3LL, using a 38 meter wavelength, worked several "Aussies" and "Zedders." 3CGC has a new antenna. 3BVD, using twenty and forty meters, will be glad to arrange tests with anyone this summer. 3RF and 3AJD are doing consistent forty meter work. 3HU has forsaken the higher wavelengths. 3OP is one of the strongest Baltimore stations. 3ACW is on "80" occasionally. 3TE-3XAQ is moving to New York for the summer. 3HG is on 38 meters. 3PA reports that his "fiver" cashed in. 3KU is working for the National Geographic Society. He will visit Arizona and California stations. 3APV does good traffic work through 1BCC and 4JR. He intends to take a portable set to the National Convention, using 8CXK as the new call.

Traffic: 3PA, 7; 3HU, 23; 3CGC, 9; 3OP, 6; 3RF, 4; 3LG, 5; 3HG, 18; 3APV, 24; 3DW, 16.

DELAWARE—Three stations at Wilmington are active. 3WJ is now an O.R.S., operating on 7500 kc. 3BSS is now putting in a fifty watter. 3AIS is active and looking for more traffic. 3AUN will be im-operative until fall. 3JQ has not been heard lately. 3SI has moved to his new country address. The A.D.M. complains that most of the traffic passes over Delaware. There is an opportunity for originating

some traffic at Wilmington. Delaware stations should hunt some of it. Wilmington is an excellent relay point between Baltimore and Philadelphia. Why not write some amateurs there and arrange some "sure-fire" routes. Keep 'em alive by feeding 'em messages on schedule.

SOUTHERN NEW JERSEY—Most of the fellows are doing business as usual on forty and twenty meters.

Dist. No. 6 made an effort to hold first place this month, but had to bow to district No. 8, which handled most messages. 3ALX took first honors. 3ZI and 3XAN are handling day and night traffic on forty meters. 3CBX takes everything that comes his way. He is proud of his new appointment certificate. 3BRM has improved his note. 3CBX, 3BRM and 3OH operate on eighty meters. 3ZI worked Porto Rico in daylight. He has a new seven and one-half pound junior "op." (Congratulations, OM! No new tubes for a while now!—A.D.M.) 3DH will be off until fall. New officers of the Princeton University Radio Club are President Lawrence, Secretary Mayers, Treasurer McPlatner, and Chief Operator McGreagor. 3ARF and 3SK are handling traffic again. The new Trenton Vigilance Committee work well. 3ZI, 3HLZ, 3HW and 3CBX have eliminated interference in their territory. 3RO is a new traffic handler. He works at five o'clock each morning. 3WJ still "knocks 'em cold" with a fifty watt. 3EAY has a portable set. 3ALX is the high man in traffic handling this month. 3DE operates daily from 2 a.m. until daylight. He is after real traffic.

Traffic: 3ZL, 8; 3XAN, 15; 3DH, 21; 3BTQ, 6; 3CBX, 6; 3BRM, 14; 3RO, 4; 3BWJ, 12; 3EAY, 5; 3HEL, 1; 3ALX, 35; 3WB, 20; 3BA, 4; 3CB, 6; 3AS, 15; 3CO, 22.

EASTERN PENNSYLVANIA—3ZS has come to life. He is arranging his transmitter for twenty, forty and eighty meter work. 3ZL has been experimenting. 3CTZ is sailing on the U.S.S. "Topeka" cruise to Berranda. 3BNU has been working on forty and eighty-four meters. 3AVL worked 8SM at noon May 30. 3CHG has accepted an important position. 3BYA burned, but is now rebuilt and working New Zealand and two Australian stations. 3LW logged several of these. 3BVZ does consistent 78 meter work.

Hiskey wants to form an O.R.S. Club. Details are lacking, but 3BNU wants to hold some "hamfests" to bring the men closer together. Full information may be obtained by writing Supt. Hiskey at Bethlehem, Pa. Eastern Penna. is in excellent shape, as shown by the traffic totals. The work is steady and consistent for this time of year and indications are that it will continue so throughout the summer.

Traffic: 3ZS, 6; 3ZM, 16; 3ZF, 3; 3BTA, 46; 3BNU, 40; 3AVL, 14; 3AYM, 3; 3PLC, 23; 3TS, 4; 3EPN, 10; 3BML, 5; 3BFN, 20; 3BAG, 2; 3CJN, 7; 3FN, 1; 3MQ, 4; 3UE, 22; 3AUV, 49; 3ZO, 133; 3HYA, 4; 3LW, 3; 3BVZ, 27; 3BCT, 8; 3AHR, 2; 3HD, 6; 3FS, 5.

WESTERN PENNSYLVANIA—The A.D.M. is on the job with renewed vigor. He promises to make up for lost time and is digging into complaints and whipping his district into shape. A chance will be given to all who show interest and pep, but fellows who do not care to continue the work will be dropped.

District No. 9 is coming back to form again. 3CEO is an able traffic official. We need more like him. The appeal for letters through June QST brought results. If any more stations are not in touch with traffic officials, write 3CEO. 3BJT lost his M.G. set and nearly forgot to report. He is operating with a "B" battery plate supply. 3CKM is rebuilding and operating at the same time. 3DLI runs a store. 3GD is closed. 3JW always reports. 3ARC is using the short waves. 3DNF is on 40 meters. 3CES has trouble getting below 47 meters. 3DOQ has been to Washington. He says 3BWT has SOME station. 3CEO keeps schedules with 4JR on forty meters regardless of time and weather. 3AGO and 3CEO will start July first for a trip of six weeks over the mountains near State College, Pa. They have a portable ten watt set, 3DHU. Eighty, forty and twenty meters will be used and many experiments will be made. 3CUK has improved his antenna. He says it is hard to get stations to "QSR." Why not try the "Five Point System?"

3AYH uses a "fivever." 3DNO is on eighty-two me-

ters nightly after quiet hours. 3BRL handles his share of traffic. 3DGL reported difficulty getting traffic into Pittsburgh. Who will make a schedule with him? 3DVQ is operating on forty and twenty meters. 3CRK has a new "fivever," operating on the "A" band.

Pittsburgh: 3JQ worked 34AR. He is our star message handler. 3AIG worked several west coast stations. 3BHJ handled quite a bit of traffic. 3BIT corresponds with 6AVP and 7SL. He gets some interesting picture postals from them. 3AGO has been operating a bit. In four nights 3CLV worked every U.S. inspection district on thirty-eight meters, using a 250 watt.

3AJU is rebuilding. 3BUY is working nightly and is doing good "DX" with a "fivever." 3AEY has a new "50." 3CTF is having B battery trouble. He wants to hear from old and new amateurs living on the north side of the Allegheny. Phone him or drop him a postal.

3AUD is building a short wave transmitter. 3CBH operates his phone occasionally. 3ADS, 3DSV, 3ATB and 3BYI will soon be working regularly on the shorter wavelengths. 3BYI and 3AUD have just finished building a new set for WHBP. They would appreciate reports on this station. 3DQ is on the job. His tube burned out. Reports are coming direct to the A.D.M. Please get these reports hereafter, District Superintendents.

3CON has just returned from State College, where he operated 3XE. He intends to operate a portable set this summer with 3DKI. We want every report, even if there is but little activity.

Harmon, 3ABM, of Grove City, is on seventy-six meters with a "50" and promises a traffic report. 3BRC operates every evening from 6 to 8 p.m. on 178 meters and from 8 to 10.30 p.m., E.S.T. on forty meters with a "50" and promises a traffic report. 3BRC is an O.R.S., Fellow, and a good clearing point for west bound traffic! 3GU-3XC is doing some good work for the experimenters' section.

Any stations operating in Mercer, Lawrence or Butler counties will please report to A.D.M. Wiggin. Reports will be temporarily handled by A. W. McNulty for Dist. No. 14 at Oakmont. Get in touch with 3CEO over the air. We hope "Scotty" will show some interest and continue his duties now that all hands are set to do some real business. Why not originate some traffic at your station?

Traffic: 3CEO, 10; 3CKM, 7; 3CES, 6; 3DNF, 5; 3DOQ, 3; 3DGL, 5; 3GUK, 32; 3BBL, 15; 3JQ, 30; 3BHJ, 14; 3AIG, 1; 3AGO, 3; 3CLV, 6; 3BIT-3PX and 3AYW all report NIL. 3DQ, 2; 3DKI, 16; 3BRC, 16; 3ABM, 10.

WESTERN NEW YORK—3APU is off for the summer. 3DRJ is doing good "DX" work. 3BDP handled his share of traffic. 3CFV, 3UF and 3BXV are handling traffic in good shape. Forty meters is now the most popular wavelength band. 3BZU was heard in England and France. 3CCR hears NRRL often, but has not connected yet. 3ADG is rebuilding. 3DSM is on forty meters and 3ADG says July first will see two new stations in the district. 3BCW and 3BZU are doing good "DX." 3BCW lost his 250 watt on Memorial Day. He will remember this in years to come. 3VW is rebuilding his set. 3HJ is ready for traffic at all times. 3CT is married. 3BGN worked Australia and N.Z. on forty meters. 3NB is on again after being off for a month. 3ATR has his station completed and will be operating again August 1st. He is taking a portable set, 3ALB, into the mountains in July. 3BHM is operating on forty meters. He keeps schedules with 1st, 2nd, 3rd, 4th and 9th inspection district stations. 3ARG will be off until August. He is changing over to eighty meters.

3ADE and 3DHI, also 3NT, handled a bunch of traffic. 3NT works on twenty and forty meters. 3OR is a new O.R.S. with one "fivever." 3ADE has a new antenna. 3BIC will be on the job all summer. 3CTK has perfected his new set and is now using DC from generators. 3BSF is handling traffic with a 250 watt, keeping a 50 watt as spare.

3DGA and 3BOE handled their share of traffic. 3BQA and 3BQB are touring the country in a Ford, visiting western stations. 3SR is located at Springfield, Mass., in the New England Div.

Traffic: 3DGA, 8; 3BOE, 2; 3DRJ, 29; 3PHI, 14; 3ADE, 4; 3NT, 23; 3OR, 1; 3RV, 3.

CENTRAL DIVISION
R. H. G. Mathews, Mgr.

ILLINOIS—9NQ lost part of his mast in a storm. 9AVH operates every day. 9BHT is experimenting. 9BIZ is on the two-weeks U.S.N.R.F. Cruise. 9DZR changed to a Hartley circuit on eighty meters. 9CTF has a new car and is leaving for Madison next week. He will be at the Burgess station while there. 9DXL handled very few messages. 9ALR is looking forward to fall. 9ARM has been sick but is on the air again on 77 meters.

9ATT, the new D.S., finds few stations reporting. 9CLZ took a portable transmitter and receiver to Sawyer, Michigan. 9CSW sent in a good report. 9ATT is working on twenty and forty meters.

9DHZ and 9DQU are on forty meters regularly. 9BLO just returned from St. Louis after joining the U.S.N.R.F. He expects to cruise on the Great Lakes for two weeks. 9AQY is leaving for San Francisco, California. 9AYB is using a forty meter wavelength. 9EBQ handled little traffic.

9DVV is now on the air on forty meters, using one 0V208-A. Both coasts and Mexico were worked the first night. 9ALW is through school. He is working on a short wave receiver. 9EHQ reports several cases of inactivity. 9CEC is building a new taper cage antenna.

All Chicago O.R.S. appointments, with the exception of 9DWH, 9IX, 9AIO and 9RE, have been cancelled for failure to report.

Traffic: 9DWH, 62; 9IX, 62; 9DQU, 34; 9BE, 31; 9AIO, 26; 9AAW, 17; 9BNH, 15; 9APY, 10; 9BDA, 9; 9DVV, 8; 9ATT, 7; 9DHZ, 6; 9BBR, 4; 9DZR, 5; 9ALF, 4; 9BIZ, 4; 9DXL, 2; 9AYB, 2.

KENTUCKY—Louisville activity has been greatly reduced. The Indianapolis "gang" gave us the "once-over." 9MN has joined the army. West Point is his objective. 9ELL is moving. 9DTT and 9HP are doing some good forty meter work. 9DTT has a "250." 9WU handled a good bit of traffic.

Traffic: 9ELL, 22; 9WU, 27; 9DTT, 3; 9OX, 12; 9CVR, 1.

INDIANA—9AUC has added Mexico and England to his "DX." Traffic-handling work progressed well. 9AEB wants an O.R.S. certificate. 9BYI says that the last two weeks of hot weather put a crimp in the activities of all second-story stations. 9EJU was active for a week. 9EJT and all Muncie stations now operate on eighty meters. 9EG has ordered some new tubes. Last month he handled traffic with a W.E. 216-A. 9DRS has a short wave transmitter.

9DHJ leads in traffic handling. 9DXI handled the next greatest number. 9CBS is rebuilding. 9BYG is on again with the call 9DZA. 9DXI worked 3MV and 4RY, using a "five" with 110 volts on the plate. 9BK is rebuilding for the short waves. 9MM and 9BPT failed to originate any traffic. 9BPT loaned his plate transformer for use at a portable broadcasting station. 9BYL is just recovering since graduating from high school. 9CP has been operating on forty meters and hopes to try twenty meter work soon. 9BO has gone to Cleveland to buy some big "bottles" for WGAZ. Paul is experimenting with five meter receivers. 9CUB has a new wooden mast and is building a new radio shack. 9AKD expects to re-enter the game in the fall. He advocates a one-wire antenna. 9AOL pounds 'em out with a 201A and goes to parties and dances every night, also. 9AMI says he has a poor antenna system, but his signals don't show it. 9DKT is operating on twenty meters, but with little success. 9RE is hunting a better location. 9AQK was a great "brass pounder" in the days of spark sets. He is going to keep up his reputation by putting in a "fifty." 9DNC is operator and engineer at 9BBJ. 9LG came to a club meeting a while ago and said that he had been in town for ten years. He will be operating actively again very soon. 9DIZ and 9BBJ operate on forty meters. 9BBJ has two transmitters, some big tubes, a new antenna and a bunch of new ideas. 9CCL is second operator with 9BHH and 9DMC as assistants. The station seems to be a community station. A crowd is always on hand. A big "garbage" can rectifier was built to save the cost of so many "S" tubes.

9BRK is operating on forty meters and going lower soon. He wants to arrange some five meter test schedules. 9CKH is installing a 250 watter.

Traffic: 9EG, 44; 9BRK, 27; 9EJU, 24; 9ES, 20; 9DVC, 20; 9BVZ, 19; 9DVE, 15; 9DHJ, 15; 9ADK, 15; 9AUC, 15; 9BJL, 10; 9CKH, 10; 9EJT, 10; 9AUC, 10; 9AEB, 9; 9DXL, 8; 9EJI, 6; 9BP, 4; 9CUR, 4; 9ASJ, 2; 9DSL, 2; 9UJ, 2; 9BJ, 1.

WISCONSIN—9DTK is busy getting a tourist service established at various places. 9HW has a portable transmitter, but golf now occupies a lot of his time. 9BBY worked NRRL and Australia. 9BKR is looking for messages. 9DWG is a newcomer who handled his bit of traffic. 9EHM has a new tower and a new 20 and 50 meter transmitter. 9DB was heard in N. Z. 9AFZ is still having trouble with the radiating system. 9UH is another new station on reporting. 9BMV has established a five point system for the country and a separate system for state traffic. (FB—T.M.) 9ATO is hunting a new location. 9BEK gets out nicely. 9CJV is trying to get his set to work on forty meters. 9ABZ is employed by the Electric Company. 9CII says that the masts absorb what little energy gets as far as the antenna. 9BY changed the antenna every time he went home. He hopes to operate 9CCB some next month.

9DUJ and 9CHE are rebuilding. 9DUJ will have a new "fifty" soon. 9CWZ wants a short wave station of his own. 9OM wants to arrange schedules with reliable hams. 9BMV expects to operate on forty meters soon. 9DVB is leaving for the west coast and will take a 9AKR receiver with him. 9AKR is experimenting at the University Laboratory. 9CUO handled a lot of messages, many of which originated at a Tourist Camp. Other amateurs who are located near a camp should take advantage of this opportunity. (Why not send those messages to the T.M. or D.M. for counting and get in the starred rectangle?—T.M.) 9AZA has purchased a new fifty watter for experimentation on the short waves. 9SR dismantled his outfit. We are sorry to lose him as he was one of our best traffic men. Good luck, OM!

9DKA has been using a five and a one-wire antenna. Signals are reported steadier and clearer with the single wire. 9EMD operates from 12.30 to 1.00 p.m. on 179 meters and from 5.00 to 6.00 p.m. on 83 meters. 9AEU is having a hard time getting a tube that will work. 9BVA's antenna is down and his "B" battery is dead. 9BYJ is "pounding brass" for the Soo Line. He says that 9CFU has heart trouble, a reaction from the "YL" complex. 9DCT worked N.Z. and Australia.

9ELL and 9RFI handled lots of traffic the first half of the reporting period, but they did little traffic work the last half of that period. 9DCX handled less traffic this month. 9RKC has built a new 60 foot lattice work mast. 9AKY was on but little. 9BSO went to the farm for the summer. 9AQD is moving farther away.

9DPR has a new aerial. He is spending his vacation with the Madison gang. 9ELI worked NRRL several times. He is not 9ELJ as reported in the last "Badger News." 9BKU deplores the lack of time to operate on twenty and forty meters. 9BTH has completed a new forty meter receiver. He also contemplates putting in a new transmitter.

Traffic: 9CUO, 184; 9SR, 103; 9BFT, 78; 9EK, 72; 9DTK, 42; 9HW, 37; 9DKA, 27; 9ELL, 27; 9ALN, 18; 9BBY, 16; 9BIB, 11; 9BKR, 11; 9EIL, 10; 9DWG, 9; 9EHM, 7; 9DB, 7; 9DCT, 7; 9AFZ, 6; 9OM, 6; 9VD, 5; 9UH, 5; 9DCX, 5; 9DPO, 5; 9BMV, 3; 9AEE, 3; 9ATO, 2; 9BEK, 2; 9CJV, 2; 9AKR, 2; 9EMD, 2; 9BCC, 2; 9AKT, 2; 9AEU, 1.

DAKOTA DIVISION
D. C. Wallace, Mgr.

REPORTS are gratifying and show signs of great summer activity. The men report better "DX" this summer than during any previous radio season.

The recent tornado, which blew across central Minnesota, blew a number of masts and antennas down. This was a blessing in disguise. Practically all the stations fortunate enough to lose an antenna erected small antennas temporarily. They are now getting better results using a 40 meter wavelength.

A number of the Division personnel are joining the Naval Reserve. 9EGU, 9DKL, 9DX and 9ZT have

joined. Those in the Division who can qualify are urged to join the U.S.N.R.F. A great deal of good is to be gained from it; many fellows have already taken interesting cruises this summer.

A large number of Division men are planning to attend the Chicago Convention, August 18-21. The Director and the D.M. are planning unusual stunts for the Dakota Division fellows.

Cy L. Barker, 9EGU, has been unanimously elected Assistant Division Manager of Minnesota. Barker is a "Wiz" at organization work and we congratulate him upon his election. We know the right man for the job has been secured. We are sorry to lose Berkner, 9AWM, who is leaving the Division temporarily. When he comes back we expect to have another job for him.

Emergency work proved its usefulness following summer storms. Many telephone and telegraph lines were out of commission. More concerning this will appear later.

MINNESOTA—Reports this month are small, but perhaps that is to be expected. Daylight routes and better reports are what we need. Rubber-stamp messages and operating is improving by leaps and bounds.

9CWN leads in traffic-handling. 9BAV has rebuilt his whole station. 9EFP is operating on a 42 meter wavelength. 9EGF has been on only a few times with little success. 9CMS uses a 201 tube with an indoor counterpulse and he gets out fine. 9DKR has closed his station. He operates on 40, 80 and 150 meters. 9CDV has a new transformer and he is working hard to get started again. 9AND and 9ADF have been granted permission not to report until fall. 9AKI signs 9DFD under his new license. 9KV and 9CKI are doing excellent work. 9EGN is making good. 9BMR started rebuilding, but he was forced to see a specialist about his heart. (Are the YL's getting the best of you? ADM.) 9ZC is getting ready for regular work again. 9EGU is a new ADM for the State. He is also CG for Henning and Fergus Falls. He worked M-1AA June 10th.

Traffic: 9CWN, 17; 9DKR, 3; 9EFP, 10; 9AOG, 4.

9CAJ is the traffic-handler this month. 9JI reported by "Long distance" phone. 9EFD uses a 20 meter wavelength. 9ACT replaced his "fiver" with a fifty watter. 9AIR has been trying to produce 3/4 meter oscillations. 9BBY did some 40 meter work. 9DDB has a new "all-wave" tuner. 9DMA reports working like "60" to get on "40." 9AXS is CC. 9DDP worked NRRL with one "Fiver." 9CPO lost his mast. 9MF worked G2LZ.

Traffic: 9CAJ, 40; 9CPO, 1; 9DDP, 30; 9EFD, 2; 9BBV, 8; 9DDB, 5.

The windstorm which struck the Twin Cities keeps everyone busy raising masts. 9ZT worked NRRL every night. He worked Australia and New Zealand, too. 9DPX worked Porto Rico and Mexico regularly. 9BVH worked NRRL and ZAAR.

Traffic: 9ABK, 13; 9APE, 5; 9BMX, 6; 9BPY, 19; 9DAW, 4; 9DGE, 35; 9DPX, 15; 9IG, 38; 9SE, 14; 9XI, 37; 9ZT, 71; 9GH, 2; 9BIS, 1.

Let's keep up our good work, fellows. In making monthly reports please include live news for publication in the state bulletin.

The Sioux Falls Radio Club will resume its regular meetings in September. "Nick" Jensen says that there are prospects for several new stations this fall. Ex-9AIG and ex-9BCG are spending the summer at Chicago.

9BOW is operating regularly on forty and eighty meters. 9EH and 9AEO will soon receive their appointments. 9BDW worked NRRL, A2BK and A2DS. He had a nice message total. 9BKB detuned his house lighting circuit from its forty meter wavelength. 9AGL is getting a transmitter ready for regular 20 meter operation. 9TI got an additional 200 volts of "B-bat" for plate supply. 9DAJ is a Milbank station. 9DBZ reports a scarcity of traffic. 9DZI burned out the tubes in his receiver. 9DXR has moved to a more favorable location. 9NM says that messages are as scarce as pre-historic three-toed Badland horses. 9DID finds it difficult to run a station at Webster and to live at Wauvay. 9CKD is in his new quarters.

Traffic: 9DXR, 5; 9NM, 6; 9DBZ, 9; 9AEO, 4; 9TL, 8; 9AGL, 2; 9BKB, 5; 9BDW, 17; 9BOW, 11; 9CJS, 18.

DELTA DIVISION Benj. F. Painter, Mgr.

THE hot weather isn't bad for traffic on the short wavelengths, but it is bad on Division morale. The Division is improving, in spite of the smallness of the report. In Louisiana, New Orleans is awakening. Things will soon be happening there.

ARKANSAS—5ANN, 5AQN, 5CK and 5UE reported little activity.

MISSISSIPPI—Meridian is active. 5AQU and 5AEV have caught the traffic habit. 5QZ has returned from an auto tour of the far West. 5ARB, 5AJP, 5AQU and 5AGS are operating a portable "spark-coil CW" set, using the call 5AGM at Boy Scouts of America camp. This set is the only means of communication between camp and town.

LOUISIANA—5AFH has a new five watt station. 5ML is rebuilding his station.

TENNESSEE—4GL, ex-5WO, is handling heavy traffic. 5FX, ex-5AOT, and 4UV, ex-5UV, are operating every night. 4AJ is a new station also operating nightly. 4MM, ex-5MB, is the DM's station, which has been on the air since the first of July. 4KM, ex-5CN, is on the air with a 250 watter. He is driving to the National Convention at Chicago and has room for others. If you are interested write L. K. Rush, Bemis, Tennessee.

4EO, ex-5ER, has one of those "fivers" working on 40 meters. He is nightly rarin' for traffic. 4CU, ex-5AUR, is the steadiest ham in Memphis. 4FR has a "fiver" working on a 150 meter. 4KB burned much midnight oil. 4IV laid to eternal rest his "ether-busting fiver." He now uses a UV-201 with 8 watts plate input. The world listens! 4FL, ex-5EK, is all that is left of Botto until cooler weather. 4GY, ex-5AQU, is the proud possessor of a new 7.5 watt tube. He handles traffic and raises everything. His new plate glass insulator made the sun shine in the eyes of the BCL's and they raised him. Ex-5AAZ is giving 40 meters the "lo-loss" test. Ex-5JV, our CM, is doing the work of six men while others take a vacation.

Traffic: 4EO, 15; 4IV, 4; 4KB, 19; 4GY, 10; 4GL, 152; 4KM, 16; 5AAZ, 5; 5AEV, 2; 5AGM (Portable) 56; 5AGS, 7; 5AKP, 27; 5ANN, 12; 5AQN, 10; 5AQU, 9; 5ARB, 6.

HUDSON DIVISION E. M. Glaser, Manager

NEXT month the stations doing the best work will be mentioned at the beginning of this report. A dozen forty meter stations in the division are working Australia despite the hot weather. Several stations worked WNP and NRRL and hope to keep in contact. More stations are needed on 20 and 150 meters. Please send in the number of messages ORIGINATED, RELAYED and DELIVERED on the new Form No. 1 cards and on time. Short wave antennas don't pick up so much "QRN." Everyone can work "DX" and handle traffic the same as in cold weather.

O.R.S. who change their address should notify the D.M. or their appointments may be cancelled. The D.M. has some job keeping the Division's records straight. Be sure to keep him posted. Act IMMEDIATELY!

Something will be announced by the Director and D.M. next month.

New York City: 2PF, 2CLA, 2CYX; 2UD, 2BNL and 2BEE are certain of going to the National Convention at Chicago. Everyone going is requested to get in touch with Dave Talley, 2PF, 2222 Avenue O, Brooklyn. 2BEE handled the most messages. He says he worked 19 foreign stations in an evening. 2CYX worked Europe. 2BBX is rebuilding.

2CLA is now an O.R.S. "Doc" has been operating on 40 meters with good results. Now he wants to try "20." 2WC handled most Brooklyn traffic. 2PF has a good 40 meter station. 2UD has been recommended for appointment as an O.R.S. Ross is well-known and well-liked. 2BRB is at Island Park, Long Beach, L. I. He gets home once a week to operate. 2CTY worked two "Aussies." 2ADC has moved. 2BO did well this month. 2ABR did well in traffic handling work. 2CRB joined the "RCC."

2CHK is going to Europe. He wants his men to report direct to the A.D.M., Fred Mardon, 1309 West Farms Road, Bronx. 2LD and 2CZR are away for the summer. 2KR is operating again. 2TF now operates on 80 meters.

2BRL is a "DX hound." 2AEP is the best Queens station. Others will lose their appointments unless they get busy soon. 2ACZ handled his share of traffic. He will operate on 20 meters soon. 2AKK will soon be an O.R.S. 2BQU expects to make up for lost time due to "Exams." 2CEP is going to get back to his old schedules. 2CIS is off with an empty socket. Use a 201A, O.M.

Traffic: 2BEE, 93, d30; 2BBX, 41, d6; 2CYX, 59; 2WC, 42, d26; 2CRB, 25, d3; 2ABR, 25, d2; 2BO, 22, d8; 2ADC, 34, d12; 2BRB, 11, d2; 2CTY, 20, d5; 2WZ, 6; 2CLA, 20; 2CHK, 1; 2CZR, 11; 2KR, 39; 2LD, 14; 2CHU, 20; 2BRL, 2; 2AEP, 16; 2ACZ, 49; 2AKK, d6; 2CEP, 5; 2ND, 5.

Eastern New York: 2CLG and 2KX sent in good reports. More O.R.S. are needed, but as material is lacking, D. S. Fincher is doing the best he can with what is at hand.

2AG has taken out the big "bottles" and is now using a "fifty." 2AAN overloaded his Singer tube and it went up in smoke. 2AJQ bought 2CVS's "fifty." 2CUL is away on a sea trip. 2DD gets out well with a "fiver" on twenty meters. 2CTF has three reports from the Antipodes. Phil and Herman have a new car to drag the "gang" to club meetings. 2CGB has a lot of trouble with defective tubes. 2DN is roaming with his saxophone. 2ADD will return from school soon and start collecting his apparatus from the Yonkers stations that borrowed it. The D.S. is collecting "junk" again and will soon operate with a new call. 2CNS has a string of eight houses on two streets connected in series to his broadcast receiver. He "pumps" music into their loudspeakers about nine hours a day. When he "opens up" he switches 'em off and they report "QRN" nil. He is organizing a Vigilance Committee. 2BQB is using two "fifties" with S tubes and a brute force filter. 2AJP is making space wound coils. He has a "fiver" on 40 meters. 2AKH has a "fifty." He lives with the "cans" on, handling traffic and working "DX."

2SZ at R.P.I. has closed for the summer. All the "ops" have left for home. 2AGM will be operating all summer. 2BM, our old timer, uses forty meters days and 75 meters nights. 2CTH and 2CUL had fair results from 20 meter work. 2CDH is getting into his old stride. 2ANM is doing well on 20 and 40 meter wavelengths.

2CXG is having difficulty with his 40 meter set. He expects to stay on 80 meters. 2AQR graduated from school. 2AOX and 2CYM are doing well on 80 meters. 2AKH is doing good low power work. 2AII is ill. We wish him a speedy recovery. 2AMD is in England. He has visited a number of British "hams." He says most foreign amateurs abandon the key during the summer. 2ESE hasn't much time for the old set. 2APO is using a "fiver" and doing good work. 2AGQ worked Australia and New Zealand with a new 40 meter antenna. The R.I. visited 2ESE and 2ACQ. Everything was all right "and a good time was had by all."

Among newcomers at Schenectady are 1CMP and 3ADT. 2CGH, 2ACS, 2CGJ, 2ADM and 2GK are among the key addicts. They are all on the short waves. 2ACP is doing nice 40 meter work. 2GK worked Br-IAB and 2SP, using a 40 meter wavelength. "WG" of NRRL is an old Schenectady "op." 2ACS's cousin. He will join 2ACS when he leaves the Navy. 2AWF keeps Albany on the map. He worked KFUH and 2BK.

Traffic: 2CLG, 45; 2KX, 14; 2BQR, 35; 2AAN, 15; 2CTF, 10; 2AHK, 10; 2HM, 12; 2CTH, 10; 2SZ, 2; 2AGM, 1; 2ANM, 7; 2CDH, 24; 2CXQ, 4; 2AKH, 5; 2AGQ, 46; 2AOX, 1; 2AUO, 15; 2CGH, 4; 2ACS, 4; 2CGJ, 2; 2ADM, 2; 2GK, 12.

Northern New Jersey: If your station is to be closed, due to rebuilding or going away, drop your D.S. a card, so that your certificate is not cancelled for failure to report. The N.J. "gang" are using 180 meters for RCC work and local traffic handling. 40 meters is used for the "DX" traffic handling. The chairmen of all Vigilance Committees are requested to report progress to the ADM with a list of members for our records.

2CTQ handled the greatest number of messages.

2CGB is making room for a larger transmitter. 2ADU operates on 40 meters all the time now that college is over. 2BIM and 2AFC are new O.R.S. 2CGS is busy at Patterson's broadcasting station. 2ARB has something "up his sleeve."

2WR boasts a new 250 watt transmitter. 2CRP is on regularly. 2CDR, 2BAW and 2CRP are all on 180 meters, where they claim traffic originates. 2EB is lacking a mast. 2CDR is using an S tube rectifier. 2BKR wants to be an O.R.S.

2QS moved to North Plainfield. 2CEE operates on 20 meters with fine results. 2CQZ still works on a 180 meter wavelength. A few stations in District No. 3 are on the black list for non-reporting. They had better watch their step. 2BQA has taken unto himself a wife, but he continues to operate.

2BJJ's mast was struck by lightning. 2CGK now works on 20 and 40 meters. 2BUY and 2CXY are off until fall. 2FC is rebuilding his rectifier. 2CFD handled the most Jersey traffic. 2API is in operation and ready for traffic.

Traffic: 2AT, 7; 2CTQ, 28; 2CYV, 4; 2AJA, 6; 2ADU, 3; 2BIM, 6; 2ATE, 1; 2BW, 15; 2BAW, 22; 2CRP, 9; 2CDR, 5; 2ACO, 4; 2CQZ, 11; 2AEK, 8; 2CYW, 4; 2CYQ, 14; 2CPD, 32; 2BUY, 24.

MIDWEST DIVISION P. H. Quinby, Mgr.

NEBRASKA is noted for its storms and certainly lived up to its reputation this month. High winds crippled the antenna systems of most of the active stations in Omaha. 9DUO and 9NL lost towers and 9DUH was damaged. Few aeriels went through without some damage. Temporary antennas serve the purpose in most cases. 9NL is handling a lot of Omaha traffic.

9BNU is busy getting his 40 meter set on the air again. 9DPS was in Omaha recently. He has made plans for his station for this fall. 9AWS is heard on 40 and 80 meters. 9BFG is back on 80. He is consistent and gets good "DX"; now let's see some traffic. One thing needed in this state is schedules. If all stations will make it a point to arrange schedules with 4 or 5 different stations in as many directions, traffic will certainly be cared for in much better shape. Long jumps are not necessary and should be left in favor of a distance which can be consistently worked under all conditions.

With WNP going north again, all stations should get in on some of this interesting and valuable work. 9BFG and 9BOQ are new O.R.S.

9BDU of Lincoln has worked a dozen foreigners. He works both coasts in daylight on 20 meters. 9DAC is having a little hard luck. 9AKS had a fire at his home and now he is sick. A report from Australia was quite a tonic. 9EHW hopes to keep his station going all summer. 9DQC promises some action. 9BOQ is a regular. 9PN worked 6TS in daylight on 20 meters. 9CGO certainly has a lot of punch.

Traffic: 9NL, 25; 9DUO, 18; 9AWS, 18; 9CIM, 13; 9CJT, 2; 9EB, 2; 9PN, 4; 9CGQ, 4; 9EHW, 2; 9BOQ, 2; 9BDU, 1.

MISSOURI—Thanks for the reports. OM! We have the best round representation of all sections of the state of the season.

Stations in St. Louis county are now under 9DXN. Those who did not report correctly this month take notice. 9DMJ is doing 40 meter work on an 8 foot aerial. 9ZK operates on 40 and 80 meters. 9ACI is off for the month. 9BHI made a new transformer. Stations not mentioned reported no traffic. 9DLB and 9BEQ have received their O.R.S.

We welcome the following new stations reporting for the first time: 9DVF, 9CDF and 9EBY. 9DEU is to visit on the east coast. 9DIX got down to 20 and 40 meters with his transmitter. 9DNO is going down. 9CDF and 9ARA work on 80 meters with 5 watts each. 9CEO has a spark-coil and "fiver" on 170 meters. 9DVF uses two 201-A's on 40 and 80 meters. 9DAD went to St. Louis to get a job for the summer. 9UI took his set to camp. 9CYK has been experimenting. 9AQB has installed some "S" tubes. 9DAE moved his set again. 9DZO is in Mexico. 9BUE handled a few messages.

All O.R.S. in Dist. No. 3 reported. 9DWK is back after considerable absence from the air. 9BSH did a lot of experimenting and handled a few messages to keep in practice.

9ST and 9TJ take the prize for traffic-handling. New stations helped to boost the traffic totals. 9FF received his O.R.S. "Ham" visits are again being considered. You fellows know what travelers the Kansas City fellows are. Watch out!

9CHE handled a "bunch" of traffic. 9CTG did fine "DX" work on 40 meters. 9LJ sticks to higher wavelengths. 9BLU gets out well with a 201A. 9DLH does the same with a UV202. 9AYF flooded everything with water in the basement. 9BYN burned out his plate transformer. 9BWX operates on 80 meters.

Traffic: 9DMJ, 11; 9DXN, 2; 9ZK, 9; 9BEQ, 10; 9BHL, 14; 9BVK, 2; 9AQB, 5; 9CYK, 6; 9BUE, 4; 9DVF, 17; 9DAE, 2; 9CHE, 117; 9DWK, 5; 9BSH, 6; 9ADR, 4; 9FF, 16; 9ELT, 9; 9ST, 98; 9EEZ, 5; 9BND, 25; 9RR, 4; 9ZD, 2; 9TJ, 46.

IOWA—Beek, 9CZO, of Dist. No. 1, has resigned. Send your reports to A.D.M. Watts at Clear Lake until a new D.S. has been appointed.

Mrs. 9AXD hasn't given him a chance to erect his antenna yet. 9BCD gets plenty of traffic from passing tourists. 9HK handled a lot on 40 meters. 9DOA has been digging trenches for water mains so that he can buy a vibroplex. 9BZE was busy at college. 9DAU handled a little traffic. 9DJA has started to rebuild. 9CGY hasn't been able to get his pole up yet. 9CS burned out his tubes. DMS operates on 40 meters. 9CZC had trouble with his filter. 9AEF and 9DEX have a "50" operating on 40 meters. 9AFW is married. 9BKV's mast is all right, but his tubes are burned out. 9BEW and 9DXW are rebuilding their stations.

Traffic: 9BCD, 82; 9HK, 65; 9DAU, 4; 9BZE, 6; 9CS, 1; 9AED, 2; 9CZO, 4; 9DMS, 6; 9DEX, 14; 9BKV, 17.

KANSAS—But for the call of the great outdoors, our total would be high. 9EHT represented Lawrence this month. 9DNG has his tube at last. 9ZE, ex-9AOG, has left for the west coast to operate. 9BVN expects to follow him. 9BMZ is one of the best pole vaulters in the state. 9DMZ is using 40 meters. 9BVN handled a bunch of traffic. 9CKM has gone to Colorado.

9ACQ has a new city location. 9CVI, has a "fiver" working. 9CFI has a "250" and is building again.

9CCS worked NRRL, aZYI, aZYG, aZBK and zIAO. He heard jAA. How about it, OM?

Traffic: 9BVN, 33; 9BGX, 10; 9CVL, 4; 9EHT, 5; 9DNG, 2; 9CFI, 3; 9CCS, 12.

NEW ENGLAND DIVISION L. Vermilya, Mgr.

ATENTION: New England Division! To stimulate interest in FAST traffic, schedules, complete logs, and good operating and routing, A.D.M. Cushing will file six Special Prize Test Messages monthly for the next six months.

The messages will bear no indication that they are test messages. They will be addressed to persons where delivery can be made without trouble. The place of origination and delivery will always be different. The text will not disclose the fact that it is a "Test" message. The route of each message must be had or no prizes will be donated. A tracer will follow each "Test" message by mail, and each station receiving this tracer is asked to designate the next station to whom this message was given and the day, hour, and minute transmitted, in the proper columns. Then mail this tracer to the next station. The tracer should follow the route of the message, arriving at the delivery station about two days after the message.

A Prize each month will be given: The names of stations handling the message making the best time (miles per hour) and having the tracer completed properly to show correct routing, will be placed in a "Hat" at Headquarters and one name will be drawn. To this station will go the Monthly Prize.

THINGS TO REMEMBER

Forward all messages promptly.

Keep a log to show where each message came from and who you sent it to.

Be sure to have the number, address and text right before OKing.

Fill in and forward a tracer promptly when received to be sure of your chance at the prize.

Let's see how fast you can put a message across New England. If you can't beat a man walking, no prize will be given.

NEW HAMPSHIRE—1YB has closed for the summer. Other stations must be on the job to handle their traffic. 1BFT is building a new radio shack at Riverhill. He will be on about the 20th. Anyone hearing his signals please send him a report. 1BNK is in a flying boat and will not be on the air until fall. 1AVL will be operating on eighty meters. Kindly give him your traffic.

Traffic: 1YB, 67; 1BJF, 58; 1AVL, 45; 1BTF, 17.

MAINE—A.D.M. Wheelden wants to hear from all Maine amateurs who are on forty meters. He advises others to get down there as they are missing something. He worked all but the 5th, 6th and 7th inspection districts and Porto Rico on forty meters in daylight with a UV201A. 1PD is moving to Connecticut and LAUR has taken his place as D.S. 1FM will be off all summer. 1BHR has sent in his resignation as D. S., but we don't know whether to recognize it or not. We hope to have some reports from Augusta next month. 1EF and 1HB went to Wisconsin to see WNP off for the north and while there they saw 1MY, 1CKP, 9CXX and 4DM. 1VF has a fifty watter on the way. 1KL is City Correspondent for a paper in his town, and he is working hard for the League. FR, OM, keep up the good work.

Traffic: 1EF, 43; 1KL, 13; 1HB, 14.

EASTERN MASSACHUSETTS—1AEO is using Tungar bulbs in his plate supply circuit. 1NV is using a 48 jar chemical rectifier without a filter. 1IU sent in his first report. 1GA operates on forty meters most of the time. He worked across the Atlantic a number of times in daylight, once using a twenty meter wavelength. 1BUO handled some traffic. 1ZW has been changing his transmitter and receiver. 1BZQ sent in a good traffic report. He has a fine new location. 1AAC-1ZO is going to live in Springfield. Good luck to you, OM. 1KY has a temporary licensed set, 1CUL, at Saunderstown, R. I. 1BBG and 1EW have combined stations.

1AYX will not be operating this summer. He will be on the air again in October with a new transmitter. 1AIR is ready for the short wave summer. 1ADM lost his mast in a recent storm. He will be in Maine till college opens. 1AHL has come to life and is on forty meters. 1ACI has a new "sky hoop" and is rebuilding. 1NT is quiet. 1CC works everything there is to work. 1UW works foreign stations on forty and twenty meters. 1SE did some good twenty meter work with England. 1AQY lost his antenna system in a recent storm. He hopes to work WNP. A few stations failed to report. Will they please do so next month?

Traffic: 1CC, 1; 1UL, 4; 1AGJ, 2; 1SE, 6; 1QIR, 10; 1AVY, 2; 1BBY, 19; 1BCN, 13; 1BUO, 64; 1CPQ, 6; 1COT, 26; 1GA, 58; 1QEO, 26; 1CEQ, 4; 1IU, 22; 1LW, 4; 1NV, 12; 1BZQ, 92; 1KY, 9.

WESTERN MASSACHUSETTS—1CLN, using one "S" tube and a 100 henry choke with a 20 Mfd. condenser bank, is reported as "DC." This shows what a filter can be made to do. 1OM and 1ARH are doing well with a pure D.C. filtered note that is a model for all to shoot at. 1AMS tuned the 320th Artillery's new 20 watt set and after a week-end of sweating blood he reported that two of the "fivers" were Kenotrons. They wouldn't oscillate because of the "minus" grids! Quick, Kruse, the hypodermic! 1VC was heard in Australia with one little giant in the socket and an antenna twenty feet high. "Weed 'em and reap!" 1XU has set a trap for a 250-watter. He has four "fifties" on forty and twenty meters. 1ARE says his "Airbrake" No. 20 receiver is doing fine this summer. rCB8, f8QK, f8BV and 1ER all heard with a loud speaker volume at 1AWW. He worked 1ER and g2FM on the forty meter band. 1AIN is at Pleasure Beach, Conn., for the summer. 1ABF is getting a new 250-watt bottle. 1AEP should be a good traffic station as he has a 50-watt bottle and 1ABF's old transformer. 1AAY is doing "DX" with a 250-watt Mullard tube. 1AAY will be found on the forty meter band soon. The volume of traffic has slumped, although 1PY, 1BLU, 1APL and 1AWW are active. 1BIZ is handling a lot of forty meter traffic. 1VC was high man for Western Massachusetts this month.

IAAL and IAKZ handle messages regularly each month. IAKZ is a good relay point for northern towns in the state. IASU is on eighty meters with two transmitters. IBBP moved to Boston. IBIP has been busy at school. IBQK has worked Europe on forty meters. Masou is a one operator. IDB is on evenings after putting the "Junior op." to bed. IJE is rebuilding. IXZ is closing for the summer. The school is losing IAAC, who graduated. IBAL is on consistently and has a wicked signal. IAJM is a new Leominster station with a good operator.

Traffic: ICLN, 6; IARE, 14; IBZ, 24; IAPL, 4; IPY, 4; IAWW, 22; IBVR, 1; IBLU, 4; IAAL, 8; IAKZ, 5; IASU, 9; IBIP, 2; IBQK, 2; IDB, 12.

RHODE ISLAND—Things are going even if it is summer. Traffic is picking up on forty meters.

IAHE has built a new receiver which is producing results. C.M. IDP has the rebuilding fever. The Pawtucket "gang" are requested to report to him on or before the 13th of each month.

IAWV of Providence has sent an even dozen "fivers" to eternal rest. IAWE worked the four corners of the earth. IABP operates on forty meters. IBHI reports. IBCC delivers his messages in person. IAID is on frequently. Her traffic total is good for this time of year. III-12S has moved to the country. He worked Australia and New Zealand. IOW is temporarily off.

IAOA has done some good work at Newport. IAFN will continue to operate during the summer. IBQD is getting ready to leave this life of single bliss.

IAAP reports Westerly traffic light. A new twenty and forty meter receiver has been constructed. IBVB and IAAP are getting ready for forty meter work. Dr. Helfrich and IBVB are to conduct some experiments in beam transmission. Inspector Tong visited Westerly a few weeks ago. He checked IAAP and IBVB and found things ok. He logged some commercials and from the looks of his log there are some ship "ops" who will be looking for a job. The main interference came from WSA who must improve his decrement.

Traffic: IHL, 4; IAID, 31; IABP, 7; IAWV, 3; IAWE, 10; IBHI, 5; IBCC, 136; IAOA, 14; IAAP, 9; IBVB, 24.

CONNECTICUT—A.D.M. Comstock has resigned on account of the pressure of his business. Mr. H. E. Nichols, 60 Benham Ave., Bridgeport, Conn., I.B.M., has been appointed his successor. Give him your support, fellows. We expect to see some Connecticut state relay ROUTES functioning as soon as he gets the re-organization under way. By the time this is in print Headquarters station, IMK, will be operating every noon hour, on the 37.5-42.8 meter wavelength band.

Traffic: IAVX, 6; IAPC, 1; IZL-IAVW, 6; IIV, 7; IBGO, 7; IBNM, 9; IADW, 14; ICKP, 2; IMY, 118.

NORTHWESTERN DIVISION Everett Kick, Mgr.

IT is good to see most stations on the lower waves. The summer slump is not so pronounced this year. It's also glorious to note that there is a new station opening for every one that closes. The D.M. is one of the unfortunate ones; he is camping for the summer and can't push a key until October. Please report a bit early as mail deliveries are rather poor.

WASHINGTON—The A.D.M. urges you to arrange schedules with the stations you work most consistently. The real traffic stations of the future will work on schedule. Pick your wavelengths and stations making the "point" system and you will be surprised how traffic figures will jump. TXK is leaving and TAO will assume his duties as D.S. TAO has a parody entitled "I'm Forever Blowing Bubbles." TBJ is doing some short-wave experimenting. TBU and TQT heard European stations regularly. TOY is camping with TMM, a portable set. TABF is operator on the "President Grant." TMA sold his set to his 65-year-old Dad. TFD is getting his set ready for 20, 40, and 80 meter work. TUE, and ex-BGL, hopes to be going this fall. TWA will operate on 80 meters. TABB relayed a few before going away.

Traffic: TAO, 17; TDF, 11; TOY, 10; TBJ, 9; TBU, 7; TABB, 6; TDC, 5; TWS, 5; TZZ, 5; TDM, 4; TGE, 4; TABF, 2.

OREGON—One can hear as many stations on the air as in the good old winter time. The routes in the state are working well and any part of the state can be reached at any time. Twenty meter stations are increasing in number. A number of fellows have gone north. Vacancies are filled by newcomers and fellows who are home from school. Some of the Eugene fellows are commercial "ops" for the summer. TGG is on the "Dewey", TLR is on the "Mazama" and two others are in Alaskan waters. TEC takes the cake for the highest traffic report. TAJB is an active competitor. TOK is on with a new "50". TMF, TLS, THH, and TFR are doing well on 80 meters. TAV, a consistent station in Portland phones messages to any part of the city. TUJ handled traffic for NRRL. TKG has a storage battery plate supply. TOZ is so prosperous "hopping bells" that his "fiver" may be a "fifty" soon. TIW moved but is on with a "fifty" and a new antenna. Eugene amateurs are co-operating with the Radio Dealers Association in tracing B.C.L. complaints.

Traffic: TEC, 107; TAJB, 62; TAV, 9; TGG, 16; TMF, 9; TALK, 1; TFR-ACM, 1.

IDAHO—This state is almost as active as it was last winter. The short-waves have doomed the old saying that radio is no good in summer. What's wrong with the traffic totals? It seems strange that a state the size of Idaho reported "no traffic." TTA, with a "fifty" on 40 meters communicated with NRRL several times. TUH has left for California. TKI is at the National Guard encampment at Boise. TSI is at Salt Lake. TMU is rebuilding. TOL hopes his new O.W. will let him operate.

MONTANA—With the spring thaw, came some real activity from the Butte district, exploding the idea that, "you can't do anything in Butte in the summer time." TMT worked NRRL and 6CST. TDD was heard in Chile. TACI lost no time in putting up a station when he moved to Hamilton. TGG is doing radio sales work. TGS operated at TMT. TFL is working hard to get his station in shape and to get in line for an O.R.S. (EB, OM). No reports were received from other parts of the state on account of changing A.D.M.'s. TMB is reconstructing his station. TZU is on the air again. Welcome! The A.D.M. has talked to several of the Montana "gang". They deplore the difficulty had in working each other. What do you say, fellows, to a "MONTANA TEST NIGHT" each month. Let's "QSO" with some "ECC" stuff. Try the first and third Saturdays at noon, 6, 8, 10, p.m., and midnight. Send "CQ MONT." three times before your call. Report results in your monthly report. The A.D.M. would like to have pictures and station descriptions with activities and schedules. TMX has submitted his. He has a 5'er working on either 78 or 88 meters. He wants schedules with stations who can work him Tuesday, Wednesday, Friday and Sunday between 7 and 10:30 p.m.

Traffic: TMX, 119; TMT, 38; TDD, 4.

PACIFIC DIVISION M. E. McCreery, Mgr.

EVERY member of the Division should send his report to the C.M. or D.S. not later than the twelfth of the month in order that they get to Hartford in time for QST.

All A.D.M.'s are requested to get reports from their affiliated clubs.

A gradual settling of the forty and twenty meter wavelength bands has taken place.

Arizona reports during summer for the first time in history.

Hawaiian stations are very active.

In Nevada A.D.M. Smart is away for a short time. ARIZONA—GANO has moved to Superior, Arizona, for the summer. He is operating on forty meters. GAAM is also on forty meters. BRBH and 6BQM are active. 6CSO was heard in many foreign lands besides doing good work at home. He has some schedules for traffic handling and did very good work.

Traffic: 6CSO, 167.

SOUTHERN CALIFORNIA—It is expected that good activity will last throughout the summer season. A few new O.R.S. have been appointed. Others have been cancelled. A lot of good work has been done by Vigilance Committees at Los Angeles, Whit-

tier, Pasadena and San Diego. Some fellows are rebuilding their stations. Most of the fellows use forty meter wavelength. A bunch are working on twenty meters. 6CTO is a new D.S. We hope he will hold to 6ALF's old standard. Practically every station owner has his eye on a merit certificate.

6CNK is doing good low power work. 6OP has been operating actively since school closed. 6APP, 6AHQ, 6CGO and 6BAS are on forty meters. 6AIB is rebuilding. 6ZH-6XBQ has been experimenting. 6ZQ is on the air, using a "fiver" with crystal control. 6CFJ was heard in N.Z. 6AHQ is the first San Diego station to communicate with N.Z. and Hawaii. 6BAS has transmitters working on both forty and eighty meters. 6SB has a new antenna and counterpoise. 6CHX will be on twenty meters this summer. 6TS, 6AJJ, 6AGK, 6BUR, 6CAE and 6CGW are the most active stations using twenty meter wavelength bands. Three "ops" at 6TS keep the station on the air. 6AJJ worked a "1," using only an oscillator. 6ZBE has a new "fifty." 6AKW is waiting for a new tube. 6CGW is working everything in sight; 6CGK has a 250 watter; 6AHP, 6CHZ, 6CTX and 6BUR of Whittier are consistently working good "DX." 6CSS complains of power leaks. 6UA is using a 50 watter. Pasadena stations handled most of the traffic. Don't compel them to do all the work, fellows. 6BBQ worked J1AA. 6CMQ still operates on 200 meters. 6BJX, 6AFG, 6CSW and 6VC keep Los Angeles on the map. 6BJX is C.M. there. Give him your cooperation. 6IH awaits a fifty. 6BQR is trying 5 meters. 6BRA has gone to sea; he left another "op" on the job. 6RF and 6CTO certainly have their troubles. 6PL has given up his appointments for a few years. The Los Angeles Vigilance Committee is under way.

Everyone in Dist. No. 3 is working on the shorter wavelengths. 6AKZ and 6ASV have dropped their wavelengths and are going still lower. 6JJ has installed pyrex antenna insulation. 6CMD and 6AAN are making plans for fall. 6CAQ is most active. He worked several "Aussies" and "Z's" as well as NRRL. 6CDG has installed a chemical rectifier.

Traffic: 6CGO, 23; 6HU, 28; 6CGO, 19; 6AHQ, 18; 6BWY, 14; 6CNK, 9; 6CHX, 6; 6AIB, 5; 6BAS, 3; 6OP, 2; 6CIA, 5; 6US, 13; 6NE, 10; 6AJJ, 13; 6TS, 12; 6AGK, 6; 6BBQ, 128; 6CMQ, 56; 6RN, 38; 6BUR, 26; 6AHP, 12; 6UA, 5; 6CSS, 9; 6CIX, 12; 6AFG, 45; 6BBV, 8; 6BJX, 24; 6CSW, 21; 6IH, 4; 6RF, 9; 6OF, 17; 6CTO, 31; 6VC, 63; 6CGW, 14; 6CAE, 1; 6CGK, 13; 6CMD, 2; 6CAQ, 24; 6AA-6CDG, 16; 6ASV, 20; 6AKZ, 2.

CENTRAL CALIFORNIA—The report for this month is good from all districts. Traffic and "DX" work are just as good as they were last winter. Berkeley C.M. is on his vacation. Mr. Doell sent in a fine report in his stead. Geritz also sent us a good report. We look for great things from his direction. Quement and Becker turned in "A-1" reports.

The Vigilance Committees of Oakland and Berkeley handled over two hundred complaints, most of which have been rectified. Little amateur interference was found.

The San Francisco Polytechnic Radio Club handled 14 messages, and hope to have a larger and better report next month. The A.D.M. wants reports from the Affiliated Clubs in his district. Get your Club Secretaries busy, fellows.

6UF leads in "DX" work, while 6CLP continues to top the list for messages handled in district No. 4. 6AJZ has completely overhauled his transmitter. 6CKV did good traffic handling work. 6AMM reports messages scarce. 6ALW and 6CJV are on forty meters now. 6NX has a regular schedule with the "Italia." 6CLP worked all U.S. inspection districts using one "fiver." 6UF worked 2ZDY, 2ZAC, 2ZAE, 2ZXA, 2ZAC, J1AA and NRRL. 6FY and 6OI are going to sea this summer. 6HC is going to experiment with real short waves now school is out.

6KW uses two 50 watters and a self rectifying circuit. 6CW is remodeling his station. 6BQL is busy selling and installing broadcast receivers. 6AWW was heard in China. 6AWT says summer makes no difference in his signals. 6CHL did some fine work as long as his tube lasted.

6WP reports that the Berkeley Vigilance Committee has not yet received one complaint on amateur interference. Berkeley stations are observing voluntary quiet hours. 6CEG is arranging schedules and prom-

ises to handle more traffic. 6BFU is building a "super-station" for traffic handling. 6CDP is on his vacation. 6ARB moved to Oakland. He is with 6CFZ (6XBN) and we now expect to see a "HR" station on this side of the bay. 6CLZ is operating on forty meters. 6HP blows ties now instead of tubes. 6EW hung up some good forty meter records. 6RQ delights in grabbing the messages. 6ANW is operating on forty meters. 6CTX has been busy with Scout meetings. 6CTX worked Alaska and the east coast with his "fiver." The Richmond Vigilance Committee is functioning smoothly.

6BEZ is taking a trip around the world. He has a small receiver with him. Good luck and bon voyage. OM. 6ACT has been teaching the coming generation mathematics. 6KR worked 6RV on forty meters June 14th. 6CCT is the star station for traffic handling. Better send 'em in for checking. OM. 6CEJ is doing some forty meter work.

A resume of the reports shows that everyone is not going after traffic as he should. The high power stations should handle most messages but they are lowest in the reports. If some of you would accept and originate more worth while traffic and not be on the air simply to be heard, reports would be more interesting. To you fellows that have handled traffic I say you have done well. I hope that you will increase your batting average in July. Let's give QST the biggest report ever for mid-summer.

Traffic: 6AWW, 18; 6RW, 8; 6CLS, 10; 6AWT, 70; 6CHL, 20; 6BFU, 6; 6CEG, 15; 6CLZ, 20; 6ANW, 27; 6CTX, 26; 6AOA, 37; 6CKV, 12; 6AMM, 4; 6CJV, 2; 6ALW, 9; 6CLP, 32; 6UF, 4; 6CFI, 1; 6BMW, 16; 6CJJ, 1; 6ADB, 6; 6CCY, 2; 6AOI, 10; 6MP, 4.

HAWAIIAN ISLANDS—The Radio Club of Hawaii, station 6BUC, is on the air on forty meters. The first night of operation New Zealand, Australia and Samoa were worked with "FS" at the key.

6CST, working on forty meters, got his signals across without difficulty. 6CPO has dropped to a forty meter wavelength. 6ASR has replaced his flat top with a one-way antenna. 6BCG is doing good work with his receiver.

ROANOKE DIVISION W. T. Gravelly, Mgr.

NORTH CAROLINA—The increasing number of active stations has routed the summer slump.

4WT has gone to Durham for the summer. 4OG and 4LO are doing good 80 meter work. 4AF is home from State College.

Traffic: 4OG, 20.

The District No. 2 report came from 4MI to 4JR by radio. The Radio Inspector was at Asheville. Most of the fellows now have first-class licenses. 4RY is at Montreal now. 4SX plays his saxophone. 4UM is doing good work. 4VQ is at the Anniston, Alabama, ROTC, camp. 4GW has been accepted in the U.S.N.R.F. 4NJ has a hard time getting on 40 meters. 4MI is using a temporary antenna system.

Traffic: 4RY, 30; 4MI, 11; 4NJ, 6.

4VQ and 4RY spent a week-end with 4TJ and 4JR. 4JS is home from college. 4JR is having tube trouble.

Traffic: 4JR originated 11, delivered 21, and relayed 25 messages.

4BX is moving to Charlotte. We are sorry to lose him as leader of District No. 4. 4RW has moved again. 4MA-4NT are on every night. 4NT just returned from a two weeks' trip on a sub-chaser. 4RX operates daily from 6 to 7:30. 4EA visited the D.S.

Traffic: 4MA-4NT, 19; 4BX, 13; 4RW, 4.

VIRGINIA—3MK uses 50, 20 and 5 watt tubes. 3TI operates on 40 meters. 3AFX suffers from the heat in his attic. 3CKA plans a quick change-over scheme for 40 and 80 meter work. 3SB and 3AHL use those wavelengths, too. 3CJU had the mumps. 3BS played tennis. 3BNE is operating nicely.

Traffic: 3MK, 10; 3TI, 6.

3ATB is playing with an orchestra aboard ship and will be in Europe for two months. 3SG has quit the game again. 3ABS contemplates installing a station at the Y.M.C.A. 3BMN has been doing his work on 40 meters. 3APR, 3UY and 3HM are working regularly on 80 meters.

3BFE was heard in New Zealand. 3BGS is inoper-

ative because of no power. 3FX has returned home. 3IW has applied for an ORS certificate.

Traffic: 3IW, 12.

3CKL is working on 40, 20 and 5 meters. 3BZ is experimenting.

Traffic: 3CKL, 6.

ROCKY MOUNTAIN DIVISION N. R. Hood, Mgr.

COLORADO—Activity for the summer is increasing all through Colorado, contrary to the general rule. If anyone knows of an active station unknown to the A.D.M. please let him know about it.

One of the Denver "gang" has been married. Another is engaged. Denver claims the youngest licensed YL "op" in the country. She is Miss Ada



MISS ADA GIESKIENG, 9BDF

Gieskieng, one of the "ops" at 9BDF. She is 11 years old, and can make some fellows sit up and take notice when it comes to the handling of "Continental". This explains the YL "op" at 9CAA. Her brother burned out the tubes at 9BDF and left town. She operated 9CAA temporarily. The two stations are across the street from each other.

9CJY and 9WO are working on eighty and forty meters. 9WO has a "50" now. 9CDW has given up his soda fountain job and will operate more. 9DVL put over some good work anyway. 9BEU visited the A.D.M. 9AON has been on some. 9AVV is leaving Colorado.

9CDE and 9CHT were in Denver and saw the A.D.M. 9CDE was a nervous wreck after having 9CAA drive him around. 9DFH is working on twenty, forty, and eighty meters. 9CDE is reducing his wavelength. 9EAE has been moving. 9FE put through some traffic. 9DFY and 9ABG are at Colorado Springs. 9EAA is a new station in Kiowa.

Traffic: 9AOL, 60; 9DVL, 7; 9AVV, 17; 9WO, 17; 9CDW, 1; 9DED, 35; 9CJY, 2; 9CDE, 2; 9CHT, 10; 9DFH, 25; 9EAE, 11; 9FE, 5.

UTAH—Short wave radio is booming here. Several stations have been rebuilt, several new ones have opened, and it appears that the general trend is to the shorter wavelengths.

6CJB installed a new gutterpipe antenna. It is mounted on a large power line insulator and is forty feet high. 6CJB worked NRRL.

6BUH has returned from a fishing expedition, but he managed to get a few messages through before he left. He is using a water-cooled five watt tube on a forty meter wavelength. He has a tin can soldered around the top of the brass base of the tube and he fills this with water. 6CBU has gone

to Lucin, Utah to work for six months. 6CRR is a new O.R.S. and a leader in traffic handling. 6CRS will be on soon with a new 50 watt. 6RM has moved again. 6ZT has a "50" on forty meters. The first night of operation he heard WAP on 75 meters with traffic for Washington, D. C. 6BTX did some noteworthy message-handling.

Traffic: 6BUH, 6; 6CJB, 6; 6CRR, 30; 6BTX, 22. **WYOMING**—7HX was damaged by storm. He is busy rebuilding.

SOUTHEASTERN DIVISION H. L. Reid, Mgr.

FLORIDA—Who said "summer slump?" The time-worn tradition has outlived its usefulness.

Florida amateurs have no such word in their vocabulary, and if there is a spot in the whole U. S. where such a thing were justified, it is Florida.

Our sympathies are extended to 4SB and his family; their little girl died June 4th.

4DM and 4TV worked NRRL several times. 4XE worked WNP and copied "JL's" 39 meter phone and C. W. Mix has left us and will be at 9EK this summer, returning to 4DM in the fall.

Our better operating drive is reaping a real harvest; real messages with complete preambles are heard flitting about, and the handling of alleged messages, with incomplete preambles, just "isn't being done" by Florida O.R.S.

Miami maintains her recently acquired position as first in everything. 4FM runs a commercial radio company, operates two commercial stations and still holds his place as "star brass pounder". Miami and Jacksonville have good contact through 4VS and 4UX, respectively. 4TR keeps in daily touch with 4ZMK and handles traffic to and from 4ZMK's sick mother who lives in Sebring. 4TR has schedules with three Cuban stations. 4XE has the liveliest NRF outfit on record. He holds weekly drills and roll calls over the air, from his own station, this adding new spice to the every increasing fascination of amateur radio. 4TV does good traffic handling work. 4BL gets home from his ship once a week and clears traffic. 4UX, 4EZ, 4UK, 4KK, and 4PK constitute the active Jacksonville "gang." These stations have contact with all Florida points, and outside contact is mainly through South Carolina and Georgia.

Traffic: 4FM, 65; 4UX, 61; 4TR, 47; 4TV, 32; 4IU-4XE, 31; 4VS, 40; 4DM, 30; 4EZ, 30; 4UA, 13; 4QY, 10; 4FS, 10; 4UK, 7; 4PR, 6; 4CH, 4; 4PK, 8; 4BL, 2.

ALABAMA—5AMH again leads by handling 137 messages. This station is active and is considered a model station. Activity everywhere has dropped but Alabama is still alive with "honest-to-goodness" amateurs.

Supt. Connolly needs your backing, fellows. Get busy and give your D.S. the support he needs. Get that report in early. 5AMH is leading this district and is very dependable station. The O.W. at this station is one of the best "ops" in the country. 5MI and 5ZAS are hoping to take some laurels this fall. These two stations are the best in the district. Connolly and Bell are to be given credit for their experimental work and their "DX" records. 4ARJ will be one of the traffic leaders of the state by fall if he keeps up the good work he has started.

Superintendent Rush is on the job. This district is growing in population and Rush is to be credited for the activity. 5AC is operating on forty meters and comes through like a cyclone. He has worked Cuba and Honduras. 5QF is operating on the shorter wavelengths. 5AOM, who recently married, threatens to return to the game. He has purchased a thirty watt Telefunken tube. 5AR is working around the world on eighty meters.

This district is very active. Howell deserves much credit for organizing the Montgomery fellows. 5ADA is the steadiest traffic handler. He is a fine traffic manager for Montgomery. 5AJP has just finished rebuilding his station. 5ASU is remodeling. 5DI is Selma. "pounding the brass." Bewig is building up Selma—he is jealous of Montgomery. 5WI at Dothan is on forty meters taking everything that comes his way. Hallman is a veteran and pounds the air with a mighty pretty fist. Hallman is doing fine work as D.M. of Dothan. 5AHK lost more tubes. 5ASR is a promising station. 5AUJ, 5AUTK, 5AUN, and 5NL are on vacations.

The A.D.M. earnestly solicits correspondence from Alabama amateurs. He wants criticism and suggestions. We want to put Alabama on the map. Co-operation means efficiency and the A.D.M. wants co-operation from every man in the state. The A.D.M. desires a postal from every amateur in this state, giving his present call, name, address, O.R.S. number, office, transmitting and receiving equipment, and wavelengths used.

Traffic: 5AC, 36; 5AHK, 2; 5ADA, 36; 5AJP, 31; 5AR, 7; 5ASU, 9; 5AMH, 187; 5DI, 37; 5MI, 5; 5QK, 5; 5WL, 38; 5NL, 10; 5ARJ, 83; 5ATP, 24.

PORTO RICO—QRN is not preventing our "gang" from communicating nightly with the United States. Most work is being done on the 38042 meter wavelength band. 4SA has worked three more foreign countries. 4JE, 4KT, and 4RL are taking most of the inland traffic. 4BJ, 4RX and 4UR are doing their share of the work.

Traffic: 4SA, 20; 4JE, 28; 4KT, 12; 4RL, 11; 4BJ, 7; 4RX, 9.

GEORGIA—4KO is still in England. He rooms near g2SH and pounds the key at that station quite often. We believe he expects to stay over there until September.

Most stations are using the lower wavelengths to escape the static. Down there one runs into some broadly-tuned synchronous rectifier transmitters. It would be a tonic for the whole game if some of the R.I.'s would revoke a few licenses.

Again there are no reports from the rest of Georgia. One last warning! Some new appointments are going to be made if this happens again. And there is no excuse for a late report.

Atlanta stations work on forty meters with the exception of a few who stick to eighty regardless of QRN. 4RM is trying to get his tube oscillating on twenty meters. 4AU is on forty meters. He manages to work Australia now and then. 4KL and 4GP are trying new aeriels. 4AAH takes traffic honors for the city, using a "fiver." Although in a location far from ideal he has stuck to it and now works the west coast fairly regularly. 4AAE is another new station doing good work. 4EQ has rebuilt his set and is doing better work than ever before.

Traffic: 4AAH, 26; 4EQ, 18; 4KT, 5.

WEST GULF DIVISION Frank M. Corlett, Mgr.

IT was not necessary for any station to send a file of messages handled to the D.M. this month because no single OPERATOR handled over 100 messages. How about some of you getting in the Brass Pounders' race? Clip off a hundred or so, bundle up the message file and send to Division Headquarters to check.

Your D.M. is going to ask that you send your questions that refer to subjects that the A.R.R.L. Information Service can answer to that department and not to Division Headquarters. Your D.M. has all he can do to attempt to take care of traffic matters. Thanks.

NEW MEXICO—5LG is the only station reporting he is working a 50 watt on 40 meters.

Traffic: 5LG, 28.

OKLAHOMA—The "gang" are breaking down the old Summer traditions. The fellows here have called Old Man Static's bluff and stripped the hoary whiskers from his face. The "Terrible Ogre" is relegated to the unknown limbo. Exit!

At the close of school 5ZAV-5AIU was dismantled. Now 5AIU and 5AHR are together at Oklahoma City. They have been in contact with Australia and New Zealand six times during the last month and they worked NRRL twice. 5ZAV is taking a trip to the West Coast. 5BN is going to Florida. 4ADE is waiting for a new "50." 5AAV's "bottle" took the usual route after doing some good work. 5LQ and 5AWG are new stations in Oklahoma City. 5AGN is preparing a downy bed for the "big bottle" which he will have going soon. Practically all stations are operating on 40 meters, although 5APG, the A.D.M., has been running some tests with 9DWK on 80 and 200 meters. 5AQW spends his time listening. 5ABE is sweating over a new 40 meter transmitter. 5APZ sends in some good suggestions. 5ANL complains of no traffic on 200 meters. We find most traffic on "40," although 5ADO complains that he can't get any.—Hey! Page Diogenes! 5ASK sends in his first report. He is "doing his stuff" on 80 and 200 meters. Cushing needs a C.M., having six old and two new stations. 5GJ has been working on "80," but he is coming down to "40" with the rest of the Christians. 5XBF is back from Northwestern University. 5JU is located in Ada. 5TW has arranged a schedule with WNP. He wants to know who will be first in the Fifth District to connect. He is open for tests on 10 meters and has seven receivers covering waves from 3¼ to 200 meters.

The short wave tests will be in progress soon. The "gang" should get busy because we want Oklahoma to stack up well in the final scene. Let's show progress every month. Do your bit!

Traffic: 5APZ, 11; 5ANL, 5; 5ADO, 6; 5ASK, 9; 5GJ, 7; 5ATV, 27; 5AHR, 10; 5ATK, 18.

NORTHERN TEXAS—Summer's here for good. A large per cent of the stations will be closed for several months. That sounds bad, but it can't be helped—it's too hot to stay in the old shack and the fellows must take vacations.

9TC requests that U.S. hams listen for him on 91 meters at 3 a.m. C.S.T. daily. 5AJJ is taking out his station to make room for a YL, who is to be Mrs. Shields. He wants to resign his appointments. We hate to lose such a good City Mgr.—A.D.M.

5ACL holds the best "DX" records for this section for the past few months. He worked Australia eleven times during the past month.

Traffic: 5AQL, 1; 5ADD, 5; 5AMB, 4; 5ATH, 1; 5QY, 3; 5AFH, 3; 5OQ, 11; 5HY, 16; 5ACL, 20; 5AKN, 2; 5AEX, 4; 5AQC, 3; 5ASZ, 1; 5ATZ, 21; 5CV, 1; 5AKZ, 86.

SOUTHERN TEXAS—The A.D.M. has apologized for the brevity of this report. Some reports mailed to Austin from New Braunfels failed to reach him in time. Reports thus delayed will appear in the "Bulletin." However, cards have been mailed to some, from which no reply has been received. Considerable traffic was handled. Seven stations reporting handled 77 messages. 5VL deserves special mention for working NPM at Hawaii. Our short waves can still annihilate distance at the worst part of the year. Mr. Tilley, 5ZU, has returned from his California trip. 5FT is busy. 5AIR and 5AME have been on little. San Antonio was represented by 5HC, 5HS, 5ACZ and 5VL. 5ZAI at Beeville filed the biggest traffic report. Houston and Galveston station reports were in the delayed mails.

Traffic: 5ZAI, 27; 5HC, 3; 5HS, 12; 5ACZ, 10; 5VL, 20; 5ZAE, 0; 5MS, 33.

CANADA

THIS month witnessed preparations for the departure of VDM. Particulars are noted elsewhere in this issue. It is hoped that all Canadian stations will keep a watch on 40 and 120 meters throughout the summer for this station. VDM will keep a special schedule with Canadian 120 meter stations in

connection with the weekly "brayer meeting." This should be an added incentive to us to be on the air at that time and wavelength.

The C.G.M. urgently requests that, despite difficulties in reception, closer attention be paid to our exclusive wavelength during the summer months.

MARITIME DIVISION

William C. Borrett, Mgr.

THE outstanding thing in Maritime Division activity this month is the attendance on Wednesday nights of the stations in the different towns around the Provinces. ICX, ex-1CY of Glace Bay, is a regular attendant at the weekly "prayer meetings". IDM and IAE are getting in operating shape again. IED has the loudest signal of the bunch down there nowadays. IAW was visited by UJXAM of WNP. IAW is getting organized in fine shape. Cape Breton will be one of the busiest sections this coming season.

ICO can be found on forty meters except on Wednesday nights. IBZ is rebuilding to have a whack at the lower bands. IAC of Liverpool, Nova Scotia, is on the job. Mr. Carlton of Bridgetown will complete relay route organization in that direction.

IAA is the station of Tom Murray. Tom can do about "forty" with ease. We wish we had more "ops" like IAA. IAO has been on a few times this month. IAR has been on a few times this month. IAR returned from a trip to the first and eighth U.S.A. radio inspection districts. IDJ lost his pole and some tubes. He is working in good style with a "201" until new tubes arrive. IEB and IDJ are the only active stations in Halifax. IBQ has taken unto himself a bride. Congratulations, O.M.! We hope that when he gets settled he will again take a leading part in Maritime Division activities. IEF is now in the U.S.A. IDF is at sea with the Canadian Merchant Marine. He occasionally works ZBE who is also a commercial "op" and at sea. Dr. Ritchie may try some radio photograph transmission this fall. The DM wants to hear from members who are interested and can arrange schedules for this and other purposes. IDD is on 40 meters most of the time and sends the weekly QST Saturdays at 8:30 PM Halifax Daylight Time (7:30 Atlantic Standard) on this band. He welcomes reports.

IAM and IAN of Fredericton usually operate on a 40 meter wavelength. IAP has the best note in the division. He is regular at the "prayer meetings" and does good work by visiting different New Brunswick stations and keeping up interest. IAI is on the job. SAR has returned from Paris. He has several sets under construction. SAW has a low power set and he and SAR hope to put Newfoundland on the map.

ONTARIO DIVISION

W. M. Sutton, Mgr.

TO create more interest in the Wednesday night "prayer meetings" on 120 meters the CGM is donating a small shield to be competed for by the various O.R.S. throughout Canada. We hope that an Ontario station will be first to hang this shield in his shack. Let's hear you on the air Wednesday nights, fellows.

3GO could not be spared this year to go with VDM so Foster of Montreal has gone with the "Arctic". Here's hoping he has a pleasant trip, and that we can do our part in making his communication good. 3VH put out O.R.S. Bulletins for the local gang and created so much interest that the CGM deemed it worthy of greater scope. A Dominion-wide bulletin with headquarters at Toronto will be sent out. The DMs supply information to the editor in Toronto from time to time. This will make the time between issues of QST seem quite small.

EASTERN ONTARIO—A number of stations operate regularly. Ottawa stations are all active. 3XL and 3XM are building transmitters. 3GV has joined the Naval Reserve; he expects to visit some Halifax stations while in that vicinity. Bob Foster worked his home town from 2AFP. 3HE and 3AEL keep Kingston on the map. 3NF is moving to St. Catharines for the summer. 3FU worked the east coast. 3MT has a new plate transformer to replace the one he burnt out. 3AP and 3DK are new 201a stations in Arnprior. We wish them success.

CENTRAL ONTARIO—3GL on eighty meters is reaching out well. 3PH visited him while at Oshawa recently.

We welcome 3WG after his illness. He wants to arrange a weekly schedule with a Toronto and a Montreal station. 3AER visited 3VH a while ago. 3ACH has a 50 watt and twin S tubes. 3AO has his European "Jug" percolating at last. 3AJ is mak-

ing a good start. 3AZ worked BER and mIAA. He has a 5 meter transmitter. His tube is a veteran having seen service at 9AL, 3CO, 3VH, 3LY and 3KQ. 3BR worked Mexico. 3BL worked around town with 11 volts A.C. plate, 3CK now uses a "VH" receiver. 3NI has his usual "peg". 3EI will re-appear soon with a new tuner and a shorter wave. 3EL worked all U.S. and three Canadian Districts with 10 watts plate input. 3FC changed his location. 3IZ is Capt. H. W. Scardfield, 255 Spadina Road. 3KQ put up one of the prettiest cages we have ever seen. 3OH is on 80 meters. 3PH will be on the short waves as soon as his new tuner is completed. 3QS' fifteen nights' reception of NRRL is an enviable record and fine performance! Who will connect first? 3TF had a 50 watt casualty. 3CQ has moved and now 3TV operates on 40 meters. 3VH is now 9CS. He has a single No. 12 enamelled wire with 18 inch Pyrex insulators. 9CS has a daily schedule with 48BMZ. 9AL has Pyrexed his entire radiating system. He leads the district in message-handling. 9BJ's QRA is 622 Lakeshore Avenue, Hanlans Point, Toronto.

3EY is operating with a "flyer". 4BB is having his transmitter shipped from the west.
Traffic: 9AL, 34; 3VH-9CS, 18; 3KQ, 18; 3QS, 12; 3GL, 11; 3EL, 8; 3PH, 7; 3CK, 7; 3AZ, 3; 3BR, 2; 3AO, 0; 3EY, 0; 9BJ, 0.

WESTERN ONTARIO—3XX has a transmitter with battery plate supply. 3DH is on regularly. 3FU is rebuilding. 3KA, 3ZD and 3ZB are on now that school has closed. 3NP "pounds brass" at 3ZB. 3GY has a fifty going, is reaching out fine, and handling messages. He operates on 75 and 40.5 meters. 3UJ is a commercial "op". 3AD lost a UV209A but a new one is on the way.

Traffic: 3XX, 26; 3FU, 11; 3XI, 7; 3DH, 6; 3GY, 5; 3ZB, 1.

NORTHERN ONTARIO—3HP, 3AAZ and 3NI all read RRL on detector only. 3HP worked both coasts and Mexico on 40 meters with two "flyers". He lost his mast in a recent wind storm. 3WS at Leorn Harbor says Toronto stations drown 3NI's signals. 3NI rebuilt his receiver. 3NI-3WS operates on 35 meters. 3BN paid us a number of visits. 3NI took up 9CPM to VBA to see what a 5.5 KW spark set looks like. 3AAZ is busy working. 3WS is busy greasing the car these days.

Traffic: 3NI, 15; 3HP, 6.

QUEBEC DIVISION

J. V. Argyie, Manager.

FOR the first time a real banquet was held at which all the active gang, friends from other districts, and interested BLCs were present. The occasion was a farewell party to 2AG, Bob Foster, who has gone north on the annual voyage of exploration aboard the C. G. S. Arctic, VDM. The banquet room at the Queens Hotel was well filled. Many stunts and competitions made the affair interesting. C.G.M. Russell and "Bill" Choate of 3CO made the trip from Toronto. Let's, as the Eskimo lady friend of 3CO, paddled into the room in a kayak and made a great fuss in Eskimo lingo about Foster and Choate. Translated, we learn that the good Eskimo princess was angry because Foster was coming up this year and her "Bill" was going to be left behind. "Tommy" tried to paddle the kayak in the St. Lawrence, after the party with dampening results. The liars contest was won by a BCL who will soon have a station on the air. A novel contest was held, the idea being to untangle a snarl of that awful phosphor bronze stranded wire, the first one getting it out straight winning the prize. 2CI won and has since been in demand as an assistant when new antennas are being erected.

Talks were given by C. G. M. Russell, Bob Foster, Bill Choate and Fred Heavysage. The D.M. gave a short talk on Divisional matters.

Attendance at the 120 meter parties has slipped a little. With VDM and WNP on the air again no doubt more fellows will operate consistently. 2BG, 2BE, 2CG, 2AX, 2FO and 2PI are all operating regularly on 40 meters. Those who get up early hear NRRL mornings but he has not yet been worked from Quebec. (Who will be first? D.M.) 2BN hasn't got his 40 meter outfit in operation yet. On 75 meters we have 2CI, 2AU, 2AM and 2HV who are usually on in the late evenings. 2BT usually works on the 120 meter Canadian wavelength. 2JC,

Cartier of CKAC, is on the air and getting out well on 82 meters, 2GW, R. S. Coate, works on a 38 meter wavelength.

Foster on VJBM is our own Montreal man. We must give him better service than any other Division does, even though it means missing some other diversion at times. The station owner who keeps in touch with him right up to Ellesmere Island will be a proud man. Who will it be?

Traffic: 2BN, 10; 2BE, 8; 2CG, 8; 2CI, 7; 2FI, 3; 2BG, 2.

VANCOUVER DIVISION

William J. Rowan, Mgr.

I'M glad that the majority haven't fallen to that oldtime bugaboo, "THE SUMMER SLUMP" which exists in the imaginations of the various station owners. There really is no excuse for laying off. During the winter you had to wrap yourself around the heater to keep warm or wrap yourself in many layers of overcoats; you can work in comparative comfort. Summer is the season that we must conquer. We can do that by using the shorter wavelengths. If everyone does his share, success will be inevitable. "Where there's a will there's a way."

This month's reports show a good traffic total. A number of reports were missing. The next report will contain a list of inactive stations with canceled tickets.

5AN is in the hospital for special treatment. He will probably be on the air in August. 5AS is back after roaming the country seeking a living. 5BM reports right on time. He heard g-2KG testing on 75 meters. 5HS still tears a hole in the air. 5GO has his big tube in cold storage. We are sorry to have 5CG leave so suddenly. He is leaving for Ottawa in June to get his discharge from the Air Service. 5GF is keeping the route to Alaska open through 5GT. 5HB gets in some good Sunday evening work. 5BJ is disgusted with the 120 meters wavelength. 5HH had school work to bother. 5HP made a "lightning jerker" with a razor blade and two Ford Coil contacts. He managed to increase his traffic total. FB! 5AF has a fifty watt socket. Next month we hope to say he has the tube to fill it. 5CP and 5FI are still on 150 meters. 5CN is working and has sold his transmitter.

Traffic: 5AS, 3; 5BM, 13; 5MS, 7; 5BJ, 5; 5GF, 51; 5HH, 3; 5HB, 7; 5HP, 23.

VANCOUVER ISLAND.—5HK is improving his set. He wonders why his signals swing. Better tie down the antenna, OM. 5CT spends his time chasing fish. Col. Foster, 5HM has returned from Sprout Lake for the summer and is enthusiastic over short wave communication. He has a portable set, 9CK, using dry cell plate supply. Its working wavelength is 40 meters. 5AY reports poor success with fifty watt "bottles." 5BI operates occasionally.

Traffic: 5CT, 3; 5HK, 1.

PRINCE RUPERT.—Activity here is increasing. Traffic is clearing in fine shape, but there is plenty of room for more. Contact between Prince Rupert and Alaska is good through 7DE and 7KY, two low stations which come through in fine shape. 5GT continues to be the star station. He handled a bunch of real messages, many of which were originated tight in Rupert. Perhaps the reason is a tri-weekly schedule with 5GF. 5CH sold his transmitter. 5DJ is the new owner and is installing it in a floating cannery. 9BP is busy but we hope that WNP will arouse him from his slumber. An appeal is made to southern stations for TRAFFIC and all kinds of it, let's GO.

Traffic: 5CT, 30. (originated, 27.)

CALGARY.—4GT, NRRT, Australia, New Zealand, and 1AA are using a forty meter wavelength. 4AU is second "OP" at 4GT. He will soon be on the air with his own set. Another newcomer is 4AC. 4IO was heard in New Zealand. 4ED has a "50" on 20 meters. 4BH is now on the air and ready for traffic. The Alberta Radio Experimenters Ass'n held the annual meeting July 5th. They have planned nice "hamfests" and visiting amateurs will be given a good time.

Do you notice how many new fellows start in the summer time? Where is the summer slump?

Traffic: 4AX, 1; 4GT, 24; 4IO, 8.

WINNIPEG DIVISION

W. R. Pottle, Mgr.

GOOD work has been accomplished despite increasingly poor conditions. Most stations were active. However, conditions could be improved and better results obtained if more of us could operate at the same time. Wednesday night is already recognized, most stations being on the job for the 120 meter "parties." More individual schedules will help matters also.

The Winnipeg fellows are overhauling their sets. 4CH will leave for the States this fall. 4BK has sold his set. 4AE and 4DB are on their toes for business. 4DY's 85 meter signals were copied in Australia. No doubt this will end in two-way communication with Australia. Since the appointment of a new D.M., re-appointments have been made. 4DY, 4AW and 4EA have applied for appointments. Other stations will be appointed as soon as they are active again. 4EA has returned from Northern Manitoba where he has been "brass-pounding" for a mining concern. VDM, the C.G.S. "Arctic," is again cruising in Northern waters. The Winnipeg "gang" listen for her on 20, 40, 80 and 120 meters. WNP usually works on 20 and 40 meters. Let's try to make some records on these stations.

4FV hears NRRL occasionally. 4BR built a 1½ meter oscillator. He has a head full of ideas for the Jenkins "autograph." 4AJ and 4PV have been working on 40 meters.

4AV gets out well. 5FA prefers eighty meters to 160 meters wavelength. 4FC is erecting a new antenna for short wave work.

4EJ and 4IX have been experimenting with portable apparatus in a car. 4HH is sick. 4EO is "key-pounding" again. 4AO operates Wednesdays and week-ends.

4DR and 4EM are readjusting their transmitters for 40 and 80 meter work. 4GH has a new 70 foot tower. 4IX has a single wire aerial. He worked 1600 miles with 1.9 watts plate input. 4AA still uses the 150-200 meter wavelength.

Traffic: 4FV, 19; 4AJ, 6; 4AO, 12; 4DY, 20; 4AW, 12.

CLUB ACTIVITIES

WISCONSIN—The Milwaukee Amateurs' Club have made plans for a 250 watt Club station. The Radio Editor of the Milwaukee Journal awarded medals to the three stations having the highest traffic totals for May. 9DTK, 9SR, and 9BBY won gold, silver, and bronze medals for their good work. Mr. Catal has inaugurated a plan for collecting tourists messages for radio transmission. The scheme is working out very well. The annual picnic was held June 28 and the Club is planning some stunts for the National Convention.

The LaCrosse Radio Association has purchased a loop receiver for running down power leaks this fall.

The Wisconsin Amateur Radio Association has planned its annual Labor Day meeting which will be at Madison.

NEW YORK—The Radio Club of Brooklyn will have several "YL" members by fall. Several interesting meetings are planned for the summer.

MASSACHUSETTS—The Springfield Radio Association recently had an interesting meeting. Interesting talks were given by Mr. Fitch, and by 1BSJ and 1AWW. "The Parabolic Reflector and Beam Transmission" was followed by a discussion of short wave receivers and a comedy lecture.

North Adams has a new and active club. 1AMZ, 1ALQ, and 1BFE are numbered among the members. Cushing wants a report from them every month.

NEBRASKA—The Citizen Radio Club of Omaha had an outing June 14. There were plenty of cats. Contests were won by 9NL, 9EGA, 9DXY, and 9DUH. A smoker at 9NL is next on the program.



AT the time this article is written the Arctic (VDM) is scheduled to sail from Quebec on the 27th of June, carrying aboard her as operators, R. M. Foster, Canadian 2AG, and Dick Finnie, of Ottawa, as his assistant. The waves to be used are forty and one hundred and twenty meters with a possibility of



AN INTERNATIONAL PICNIC

A bunch of Canadian and American hams at a picnic on the Canadian Shore of Lake Ontario.

some work being attempted on 80. Twenty meters is not likely to be used on this trip. Complete schedules for the listening periods on the various waves are not yet to hand but will be broadcast from our official broadcasting stations as soon as they are received. In any case, special attention will be paid to the one hundred and twenty meter wave on Wednesday nights.

The set for use this year on the V.D.M. has already been on the air signing the call 90A from the test room at Ottawa and good signals were reported from Toronto and Montreal. Bobbie Foster, the operator, will have the set installed on the Arctic and be on the air shortly before her departure from Quebec.

The Quebec division on Saturday, the 13th of June, held a farewell dinner in honour of Bobbie Foster at the Queens

Hotel in Montreal. In addition to the Montreal gang 2AB of Quebec and 9AL and 3CO of Toronto were present. Many novelties were introduced at the dinner and a very enjoyable time was had by all present. 2HV, "a man of few words," presided at the dinner as toastmaster. George Wendt, of the Westinghouse Co., gave everyone present a Westinghouse spark-C and when the dinner was at its height, various musical (?) instruments were distributed which added to the uproar.

During the dinner, Bobbie Foster was presented with a large A.R.R.L. emblem to be hung up in the farthest north radio station. He was given an official relay station appointment and appointed district superintendent of the North Arctic Regions for the Quebec division amidst great applause. A letter from Mr. C. P. Edwards, the director of the radio service of the Dominion of Canada, was read at the meeting, which is hereby reproduced.

"Ottawa, 13th June 1925.

Dear Mr. Russell:—

The steamer "Arctic" being about to sail for Baffin Bay, I take advantage of this opportunity to again express the thanks of the Department to the Canadian Division of the A.R.R.L. for their co-operation in short wave tests last year, and to express the hope that we will enjoy similar co-operation during the coming summer.

The Department, as an indication of its confidence in Canadian amateurs, does not propose to establish any special station to work with the "Arctic" feeling that it can rely entirely on the amateurs to provide the service at this end.

We are once more sending a member of the Canadian Division as operator this year, having accepted your recommendation of Mr. R. Foster for this appointment.

Organization and pre-arranged schedules are essential for successful communication under the circumstances which will apply, and I am leaving this matter in the hands of yourself and Mr. Foster. The main point to be observed, and to be impressed upon the members is that every time there is a schedule it shall be somebody's business to see that at least one station is standing by on the pre-arranged

(Concluded on page 63)

Calls Heard



1WZ, 20 Clark Street, Lexington, Mass.

On 40 meters.

4aae, 4bl, 4cu, 4he, 4jt, 4km, 4pz, 4rl, 4rm, 4ua, 4xe, 5ado, 5amw, 5ath, 5nq, 5ph, 5uk, 5vs, 6aaq, 6agk, 6bhz, 6egw, 6eig, 6enc, 6il, 6ts, 7nl, 7ya, 9aef, 9aot, 9aps, 9arc, 9ark, 9ayb, 9azz, 9bbj, 9bkb, 9bmx, 9boj, 9bvh, 9bw, 9cul, 9cxw, 9czb, 9dac, 9dbq, 9dbz, 9dez, 9dng, 9dpl, 9dvw, 9dwz, 9eak, 9egu, 9ejy, 9ek, 9fk, 9hp, 9oo, 9wn, 9zt, wnp, nrri, ber, m-9a, i-1er, d-7ac, g-ziz, g-5dh, g-5lh, z-2ac, z-4ak.

2NZ, E. S. Strout, 4 Drummond Place.

Red Bank, N. J.

40 meters.

4aad, 4ah, 4ar, 4ch, 4er, 4dm, 4du, 4dx, 4gy, 4io, 4it, 4jr, 4kb, 4ke, 4kl, 4mu, 4my, 4oa, 4pd, 4pi, 4rm, 4ry, 4tn, 4tr, 4tv, 4ua, 4um, 4ux, 4vp, 4xc, 4yr, 5aah, 5aau, 5ado, 5aec, 5aej, 5aeq, 5all, 5ain, 5ajj, 5anh, 5apu, 5aur, 5aux, 5ca, 5en, 5eo, 5er, 5if, 5ka, 5ls, 5nj, 5no, 5ot, 5ph, 5pv, 5rh, 5tc, 5wo, 5za, 5zm, 6afz, 6aue, 6aji, 6ahp, 6ajr, 6alf, 6amb, 6aof, 6awt, 6bhz, 6bhz, 6bil, 6bid, 6bur, 6ce, 6cev, 6eaj, 6ege, 6go, 6ehl, 6eig, 6eic, 6elp, 6emg, 6epf, 6ess, 6esw, 6em, 6fc, 6fd, 6hm, 6hu, 6ij, 6no, 6oo, 6oi, 6ts, 6ur, 6vc, 6xz, 6xap, 6zbe, 7ay, 7cb, 7mf, 7ya, Canadians: 1ar, 2cg, 2fo, 2ft, 3aa, 3abg, 3az, Bermuda: ber, 407m, 22kf, 18-m.

2MU, Brooklyn, N. Y.

40 meters.

6age, 6agk, 6ahp, 6avj, 6awt, 6bad, 6bhz, 6bjj, 6bur, 6cft, 6cgo, 6egw, 6elr, 6eig, 6eic, 6ess, 6cto, 6il, 6ij, 6ol, 6ts, 6ul, 6vc, 6zo, 7iq, 7zb, 7uz, nrri, kfuh, N.Z.: 2ae*, 2ij, 2xa, 2yi, 4ka, 4ag, 4ak, Australia: 2bk, *2ds*, 2em, G. Britain: 2cc, 2ft, 2ms, 2h, 2wj, 6ym, French: 8bf, 8et, 8sq, 8vor, Dutch: onl, Italy: 1er, Mex.: 1b.

3BWI, Collingswood, N. J.

6aak, 6afz, 6agk, 6ahp, 6aji, 6alf, 6awt, 6bfn, 6bh, 6bhz, 6bni, 6bur, 6caq, 6egw, 6ehs, 6cix, 6enc, 6evm, 6esw, 6ess, 6cto, 6dat, 6dl, 6eb, 6ex, 6hu, 6no, 6rw, 6ts, 6tz, 6vc, 6xag, 6xap, 6xz, 7ku, 7uz, a2ay, a2bk, b2lab, c2ak, m2aa, m2a, raf2, 22xa, kfuh, lpz, nkf, npg, nrm, nrri, wtr, wiz, wnp.

4DX-4SY, 800 N. Main, Greenville, So. Carolina.

On 40 meter band.

1abp, 1aci, 1aff, 1aid, 1aiz, 1amd, 1ana, 1are, 1axa, 1awe, 1bbr, 1bcc, 1ber, 1bhm, 1bnl, 1boq, 1bsu, 1ccx, 1ckp, 1emp, 1cmx, 1cpb, 1ere, 1ef, 1ga, 1hn, 1ii, 1ka, 1my, 1nt, 1oj, 1pl, 1ql, 1qm, 1ra, 1rr, 1te, 1uw, 1ve, 1xav, 1xu, 1xz, 1yz, 1yd, 1zs, 2aau, 2aeh, 2adh, 2adu, 2aey, 2afn, QRA?, 2aew, 2aew, 2ahk, 2als, 2amn, 2apn, QRA?, 2axf, 2azz, 2bee, 2bei, 2bkr, 2blm, 2bm, 2box, 2bqb, 2br, 2brb, 2bse, 2bur, 2bw, 2cee, 2ela, 2cib, QRA?, 2cpl, 2ctb, 2ctd, 2cul, 2cxw, 2cyu, 2eyw, 2ds, 2ex, QRA?, 2kr, 2ku, 2ld, 2mu, 2xaf, 2xi, 2zv, 3adp, 3agf, 3aih, 3app, 3apy, 3avm, 3bct, 3bmn, 3bmq, 3bmz, 3bwh, 3cee, 3ekf, 3ekl, 3ng, 3i, 3jn, 3kz, 3l, 3ni, 3pc, 3tr, 3wb, 4je, 4rl, 4ra, 5aah, 5aal, 5aaz, 5acl, 5acm, 5acz, 5ado, 5aeu, 5afa, 5agz, 5ais, 5amh, 5amw, 5apu, 5avv, 5ath, 5atp, 5atv, 5aur, QRA?, 5cn, 5di, 5hi, 5ka, 5ls, 5nj, 5uv, 5ph, 5ok, 5vl, 5wi, 5yd, 6agk, 6aji, 6bad, 6bex, 6bfu, 6bhz, 6bij, 6bmw, 6bql, 6bse, 6bur, 6ceo, 6eio, 6eib, 6cpl, 6cpl, 6cso, 6cst?, 6cto, 6cub, 6dao, QRA?, 6fz, QRA?, 6hm, 6ij, 6ip, 6oi, 6od, 6oi, 6ts, 6ul, 6vc, 6vw, 6xe, 7ay, 7dd, 7il, 8aks, 8aol, 8apo, 8arw, 8aul, 8aun, 8avo, QRA?, 8axo, QRA?, 8ayv, 8bau, 8be, 8bem, 8ben, 8bgn, 8bma, 8bqk, 8brc, 8bse, 8byn, 8byv, QRA?, 8cbl, 8cbp, 8cdv, 8ceo, 8chk, 8cwp, 8cyl, 8dae, 8dal, 8dka, 8dnf, 8do, 8doi, 8dok, 8don, 8drg, 8drs, 8dxx, 8dq, QRA?, 8er, 8gz, 8ij, 8ja, 8nb, 8nx, 8nz, 8pg, 8ry, 8ze, 8zg, 8av, 9aat, 9aav, 9ado, 9aeg, 9age, 9ale, 9amh, 9amj, 9aot, 9aps,

9arh, 9att, 9baa, 9bba, 9bbe, 9bbe, 9bbj, 9bby, 9bbz, 9bcn, 9bed, 9bek, 9bht, 9bkr, 9bnb, 9boj, 9bpb, 9bsg, 9bsp, 9bvi, 9bag, 9cca, 9ccs, 9cid, 9cpl, 9cua, 9cul, 9cul, 9cwn, 9cxx, 9dat, 9dat, 9ddp, 9dht, 9diw, 9dkf, 9ddj, 9dpx, 9dti, 9dtt, 9dm, 9dwz, 9dzf, QRA?, 9das, 9ega, 9eja, 9ejy, 9ek, 9ell, 9hk, 9kd, 9nl, 9og, 9ry, 9sr, 9xi, Canadian: 1ar, 3dl, 3tv, 3afp, 4av, 9al, Hawaiian: 6zac, Bermuda: ber, 1ajw, Italian: 1er, 1mt, English: 2cc, 2kf, 2wj, French: 8sm, 8sq, 8cdi, Dutch: oil, So. African: oyl, Australian: 2ay, 2bk, 2ds, 2yi, New Zealand: 4ag, 4ar, 2ac, 2ae, 2xa, Special: nkf, nerki, nrri, kfuh, Unknown: xk, gh.

Calls heard by 6CIX, 317 N. Friends Ave.

Whittier, Calif.

On 40 meter band only.

1abf, 1aff, 1are, 1aww, 1axa, 1bs, 1bc, 1boq, 1emp, 1cmx, 1er, 1gv, 1ii, 1ow, 1pm, 1py, 1te, 1xz, 1yb, 1za, 2acp, 2aey, 2agz, 2bo, 2bee, 2brb, 2cty, 2cwx, 2gk, 2gx, 2ls, 2mu, 2qh, 2rk, 2rm, 2ud, 2wb, 2wr, 3apy, 3jw, 3il, 3rc, 4fu, 4jr, 4pu, 4sa, 4si, 4rm, 4xe, 6ct, 6zac, 8aa, 8aly, 8avt, 8apw, 8bgn, 8buq, 8byn, 8dem, 8dgp, 8drs, 8ex, 8gi, 8jj, 8ks, 8to, 8xl, 8ze, 8zk, nkf, npg, npu, nrri, wiz, kfuh, Canada: 3bq, 3qs, 4gt, Argentina: c88, Mexico: 1b, Australia: 2bk, *2cm*, 2ds, 2ij, New Zealand: 2ac, 2ae, 2xa, Unknown: cr.

7MX, Butte, Montana.

40 meter band.

1aa, 2kf, 2ks, 2dl, 3hg, 4si, 5aej, 5aje, 5ox, 5uk, 6afw, 6ahp, 6amm, 6aek, 6emg, 6ehz, 6bad, 6cto, 6enc, 6fa, 6ts, 6ul, 6vc, 6zo, 7af, 7ai, 7aj, 7au, 7cw, 7ly, 7nx, 7wz, 7ya, 8ayy, 8bau, 8hao, 8bf, 8ds, 8pl, 8df, 9aot, 9akf, 9bnf, 9dez, 9dac, 9dqu, 9mm, 9nl, 9bkb, 9beq, 9ek, NKF, NPG, m9A.

8ZE-8GX, E. W. Thatcher,

Oberlin College, Ohio.

U. S. A.: 6age, 6agk, 6ahp, 6aji, 6ajj, 6ahp, 6awt, 6bhz, 6bik, 6bid, 6bhm, 6bse, 6bui, 6bur, 6cgo, 6egw, 6ecl, 6ehz, 6eib, 6eic, 6elr, 6cpl, 6cnc, 6cpl, 6cs, 6esw, 6cto, 6dah, 6cc, 6ij, 6im, 6hw, 6ij, 6kb, 6km, 6no, 6oi, 6ul, 6ur, 6ut, 6ts, 6vc, 6xag, 6xap, 7abb, 7ay, 7zb, 7nx, 7mf, 7oz, 7ya, Foreign and Special: A2BK, *A2DS*, *A2CM*, A2AY, A2IJ, A2YI, A3BQ, C4gt, c5gt, g2kf, g6ym, P.R.: 4sa, 4ie, M1-K, M1AA, Z2AC, *Z2XA*, Z4AA, Z4AG, Z4AK, Z4AR, Hawaii: NRRL, KFUH, 6ZAC, 6XAP, Naval: NRRL, NPM, NPG, 7sgos (QRA?)

9CTO, Minneapolis, Minn.

1fn, 1ga, 1hl, 1il, 1qm, 1xz, 1aao, 1aap, 1adg, 1aep, 1ahg, 1ahl, 1ajl, 1ajk, 1alw, 1amd, 1arj, 1bbh, 1bvl, 1ckp, 2ch, 2tj, 2ha, 2jc, 2zv, 2acp, 2ad, 2aes, 2afn, 2ahk, 2als, 2bhz, 2ce, 2cgl, 2cpl, 2coe, 2cpd, 2ctf, 2xbb, 3hu, 3iv, 3mv, 3oe, 3op, 3pf, 3pu, 3qt, 3tr, 3ue, 3wr, 3zo, 3ach, 3afu, 3bco, 3blp, 3bnf, 3bnu, 3cin, 4bk, 4es, 4ch, 4dv, 4eg, 4eo, 4fj, 4ft, 4he, 4hh, 4it, 4jr, 4jy, 4km, 4il, 4lu, 4pd, 4ry, 4tv, 4vo, 4wj, 4aah, 5ac, 5ae, 5eb, 5ex, 5ek, 5eo, 5dl, 5ed, 5ev, 5jd, 5ls, 5mn, 5mq, 5nq, 5oq, 5ph, 5ok, 5ql, 5uk, 5vl, 5wi, 5abj, 5ado, 5arf, 5ail, 5apy, 5aqi, 5aqn, 5arb, 5atv, 5awf, 5zai, 6bb, 6sb, 6vc, 6abs, 6aj, 6aix, 6bhf, 6bhp, 6bmo, 6bur, 6cls, 6cnu, 6ers, 6esw, *6cto*, 7ca?, 7dc, 7ke, 7sl, 7ws, 7af, 7agz, Canada: 4gt, 5hp, Mexico: bx, 1b, 1k, 9a, Miscellaneous: dil, m3y, kio, kdef, nfv, nkf, wap, wir.

Clifford R. Dallas, R.F.D. 4,

Muscatic, Iowa.

1aa, 1abf, 1ax, 1emp, 1sk, 1wl, 1xam, 2aan, 2ach, 2acn, 2aev, 2af, 2afg, 2atf, 2bgi, 2ckk, 2cla, 2cpd, 2ctf, 2cwi, 2ld, 2am, 2zv, 3apv, 3cc, 3ck, 3ha, 3w, 3ke, 3mi, 3ot, 3vh, 3vx, 4al, 4bu, 4bw, 4bx, 4by, 4cr,

Radio Communications by the Amateurs

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More Wavemeter Calibration

Marquette, Mich.

Editor, QST:

The last article on wavemeter calibration in June QST set me thinking about accuracy and I believe this method is a winner. You know the average ham is somewhat confused about harmonics and in this method he does not have to know what harmonic he is working with until he is all through, when he can easily figure them out, if he wants to.

Here is the dope. I am using a five tube Radiodyne. I have three of these sets for testing purposes and had the wavelength dials carefully calibrated without antenna or ground. The short wave set was used on top of the Radiodyne, which gave the right amount of coupling. Having picked up a station on the short wave set, I tuned the other by zero beat method to a harmonic as low on the dial as possible. I do know what the harmonic is. The reading on the Radiodyne is 246 meters. I then pick up the next one and so on up. I get the following readings: 246, 287, 329, 369, 410, 452 and 492. The average of the differences between these readings is 41 meters and the reading at 246 meters is the sixth harmonic. If the long wave set is not calibrated, or different tubes and batteries are used, it will be necessary to check each reading with a good wavemeter.

It seems to me that by repeating the readings many times and averaging the results, great accuracy can be attained.

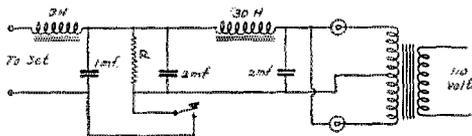
—Robert S. Rose

A.C.—An "S" Tube and a Good Filter

Havana, Cuba.

Editor, QST:

The callopie note usually resulting from this combination is about the last word in difficult stuff to copy at a distance. The



cause is primarily due to voltage fluctuation when keying in the tube circuit, and the note is equally bad when keying the 110 volt side of the plate transformer. The latter is due to the excessive lag in the transformer. The sketch shown illustrates a

very simple way to clear the note. It does, however, require an over-size transformer and a few dollars invested in good resistances. Resistance R will vary according to the characteristics of the transformer. It should be adjusted to pass about one quarter of the transformer current capacity for satisfactory operation with most forms of plate supply transformers.

—F. W. Burton, qzBY

Patents

Ouray Building,
Washington, D. C.

Editor, QST:

Replying to your letter of June 2, 1925 the best advice you can give to prospective patentees is to advise them first to have a preliminary investigation made through the Patent Office records at Washington to determine the exact status of the art in order to learn whether the necessary expenditures in filing an application for patent may be warranted.

Very often an inventor will file an application for patent without investigating the prior art only to find that his invention is fully anticipated and that he has needlessly expended the amount required in the preparation of an application for patent. The preliminary investigation, copies of reference patents and report cost but ten dollars and places the inventor in possession of full information concerning the probable scope of claims which he might secure.

The Government Filing Fee in an application for patent is twenty dollars. The Final Government Fee, which is due within six months after the case is allowed and ready for issue, is also twenty dollars. The expense in preparing, prosecuting and obtaining letters patent depends directly upon the complications and time required in properly preparing the case and presenting it before the Patent Office. The only way to determine this amount is to first fully understand the nature of the invention so that the time necessary to properly prosecute the case can be estimated.

—John B. Brady

Indexing QST Articles

757 Chrisler Ave.,
Schenectady, N. Y.

Editor, QST:

Here is an idea I have been using since 1917. Every time I get my QST I go through it carefully and note just where

to find dope on certain things. Then I enter this data in a loose leaf tabulated notebook. Thus I have the information at hand without having to search hours through *QST*. An entry looks something like this:

Topic	Issue	Page
5 meter transmission	Oct. 1926	65

While it takes a little time to jot down the articles each month in the notebook, it is possible to find back references to *QST* articles in a very few minutes later on.

—E. H. Hobbs, 2ADM

(Note—If you are interested in “cataloging” *QST* articles in a little more detailed manner, get a copy of Bureau of Standards Circular No 138, price 10 cents. This circular gives a modified Dewey decimal classification and with it comes about the most comprehensive index of radio subjects we have ever seen—Asst. Tech. Ed.)

Isolantite

Belleville, N. J.

Editor, *QST*:

A letter entitled “Losses in Sockets” and printed in the February issue of *QST* outlines that the De Forest tubes are a step in the right direction in that the bases are made of porcelain and therefore the internal capacity of the tube is lower. It is correct that the new base of the Deforest tubes has reduced their internal capacity, but the new Deforest tubes are *not* made of porcelain. The base material is called Isolantite. Altho it looks like porcelain it is not made in the same manner and the electrical efficiencies of Isolantite are much higher.

It is a known fact that porcelain is not adapted for insulation of circuits having high power at high frequencies. On inspection you will find that there are no broadcast or commercial tube transmitters using porcelain in the high frequency branches of the circuit. This is due to several factors; porcelain has a very high moisture absorption factor; it has poor mechanical strength under load stresses and it is characteristic of the material to contain voids.

On the other hand Isolantite is an insulation which has been developed for high frequency work. At present it is being used for supporting the elements in high power vacuum tubes and various parts of broadcast transmitters. The Federal Telegraph Company is using this material on high powered arc transmitters. Condenser manufacturers are using “Iso” for bushings on both receiving and transmitting condensers.

Isolantite has a very small coefficient of expansion and therefore is unaffected by heat unless the temperature reaches a point at which steel would boil. For hardness it is classed with semi-precious stones. The results of tests on Isolantite are as follows: Surface resistivity measured at relative humidity 5×10^{15} ohms, volume resistivity at 20 degrees Centigrade 6×10^{14} ; dielectric con-

stant K measured at radio frequencies 100 and 600 KC average 3.6; phase difference measured at radio frequencies .01 degree; dielectric strength 17,000 volts per mm.

Isolantite is the result of research covering a period of ten years and I think you will agree that it should be taken out of the class of porcelain or any other ceramic.

—James S. Caulfield, Radio Engineer, Isolantite Company of America.

Bugs

6015 Roy Street,
Los Angeles, California.

Editor, *QST*:

A letter to your Communications Department from Kenyon Secretan of London, in the March 1925 issue of *QST*, took some rather severe jabs at the users of bugs. Most of us will agree with him about how aggravating it is to hear a bum fist making hundreds of CQ's in a more or less aimless fashion, and will also agree that a bug when improperly used is an abomination. A bum fist is a misfortune and the bug came out in the beginning to more or less standardize sending and to help eliminate the tendency of wire operators to make “combinations.” The common trouble with inexperienced bug users is that they use too fast an adjustment for their ability, or too fast an adjustment to suit the conditions at the receiving end. A bug can be adjusted to make slow, heavy dots which should be used in all radio transmission, unless the audibilities and the operators involved are exceptional. The hams try to reach out as far as possible but quite often defeat their purpose by careless hand sending, or by bug sending that is either too light or too fast.

I have had long experience in the Marine radio communication field and know from this experience that it is slow careful sending that accomplishes the most when static and weak signals are present. The bug holds up under these conditions if it is slowed down and adjusted to make the dots quite “heavy.”

—H. D. Watson, Operator in Charge, KOK

QRN Elimination

Conway, Arkansas,
June 1, 1925.

Editor, *QST*:

Regarding the static elimination system outlined by Mr. John R. Meagher in your June issue, I would like to call attention to the fact that such a system was devised and recorded by the writer last year, prior to the publication of either the McCaa or Conrad patents on static elimination.

My plans and claims have been clearly set forth and recorded before a notary public. Evidently the McCaa patent started thought along the lines of that patent, but

I was not aware of his work at the time my plans were formed.

I have on record, too, several improvements on this plan of eliminating static, one of which is a loop made in two separate sections, that is, the wiring is so constructed, with both sections on the same frame mounted at a suitable angle with respect to each other, and so connected that the direction of current flow in one section opposes the current flow in the other. I have also a plan whereby the two separate loops may be used, but kept at the correct angle with respect to each other by mechanical means.

Due to my activity in other fields, I have not had time to develop my plan further, however, I would say, judging from what few experiments I have made, the plan of two opposing field loops will not eliminate all the static without a very severe drop in signal voltage. This defect may be overcome in time, and the use of two loops become common, however.

In the face of this defect, I have devised another way of eliminating static, a way which seems much more probable and plausible than anything yet developed. By this method, either one or two aerials of ANY kind may be used, for the ability of the arrangement to eliminate static and *practically all* other undesirable interference does NOT depend upon the directional selectivity of any form of aerial.

In my latest system, the desired signal together with whatever interference is present, is taken from a loop, or other form of aerial, and at the same time, from the same aerial, or one so placed as to receive the same interference, a second frequency including whatever undesirable interference is present is taken.

Inasmuch as this second current will be of a different frequency from the first current, it is necessary to change one or both currents by means of a suitable arrangement, after which they are allowed to oppose each other, with a resulting neutralization of undesired interference, whereas there is nothing to oppose the desired signal.

In practise this arrangement might well take the form of a super-heterodyne with two separate and distinct paths of current flow up to the input intermediate frequency transformer. Here the plate connection of one tube in one path is connected to one end of the input transformer winding, while the other end is connected to the plate terminal of the tube in the second path, or heterodyne. A center tap on the primary will be connected to the common plate B battery. In other words, two separate heterodynes are coupled to the same intermediate frequency amplifier, tho in opposition to each other. These heterodynes may receive their initial operating voltage from the same or different aerials.

It goes without saying, that this opposition may not take place until later on in

the set, possibly the output of two intermediate frequency amplifiers may be used, or even the output of two detectors.

The idea and plan in all the cases on this arrangement is the securing of desired and undesired currents at different frequencies and the changing of these frequencies so they will oppose and neutralize each other.

—B. H. Woodruff, 5XAC

Strays

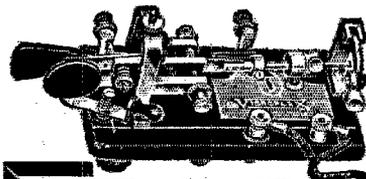
The R.C.A. advise that the new list prices on the UV-202 5-watt transmitter tube is \$4.00 and the Kenotron UV-216 is \$3.25.

A Correction. Through a well-meant but mistaken attempt to correct copy we accidentally mis-spelled the name of our good friend W. Turnor Lewis, author of "The Radiodyne Receiver," which appeared on page 21 of the June issue. The name "Turnor" is spelled with an o and not an e as we had it.

1BZQ of Waltham, Mass., has just received a new Jr op. Congrats, OM.

Some 5th district amateur has missed a nice husky thrill because his fist was sloppy. He was chunking great sobs of "9BHX u 5XMG" into New Zealand and an N. Z. amateur thought enough of it to send in a report to West Gulf Division headquarters for QSR. However, the R.I. says no such call has been issued, so the 5 somebody who couldn't make his own letters will never know that N. Z. copied him.

Who Gets the Job?



— the operator with a

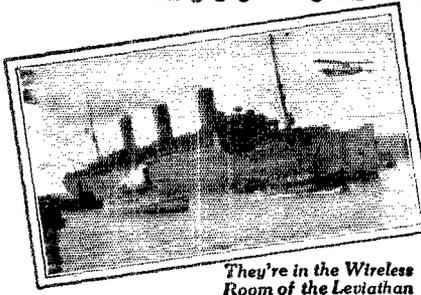
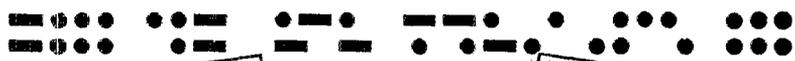
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Registered Trade Marks: Vibroplex—Bug—Lightning Bug

Transmits perfect signals at any desired speed. Easy to learn. Easy to use. Simply press the lever—it does the rest. Over 85,000 users. New and Improved. Japanese Base, \$17. Nickel-Plated Base, \$19. Special model for use without relay, \$25. Sent Anywhere on Receipt of Price

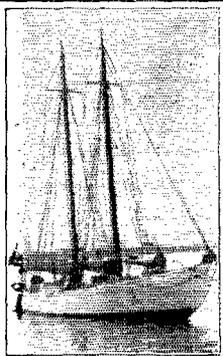
THE VIBROPLEX CO., Inc.
825 Broadway, NEW YORK

Some Adventures of the Batteries you use

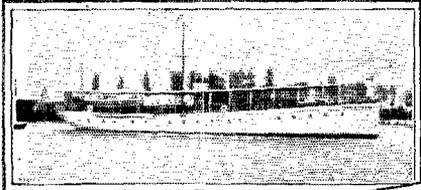


They're in the Wireless Room of the Leviathan

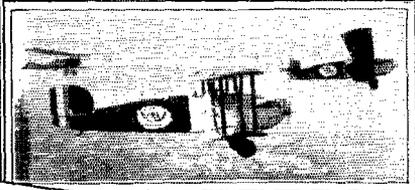
McMillan carried them to the Arctic



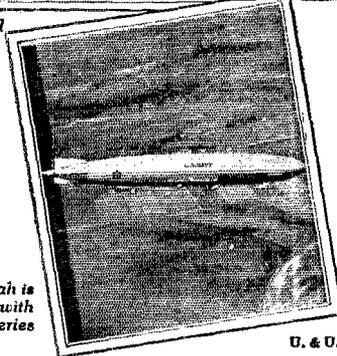
Standard Equipment of United States Submarines



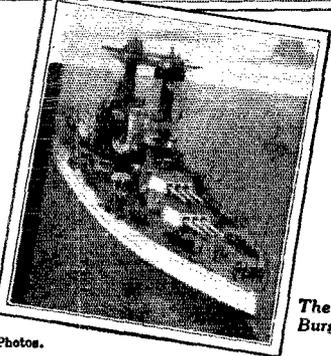
They Roamed the World in the Speerjack's Radio Room



The World Flyers Carried Burgess



The Shenandoah is Equipped with Burgess Batteries



The U.S. Navy Uses Burgess Radio Batteries

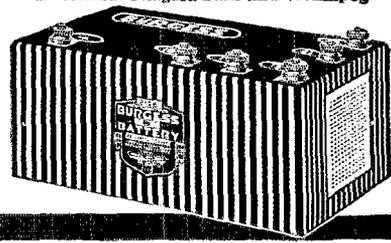
U. & U. Photos.

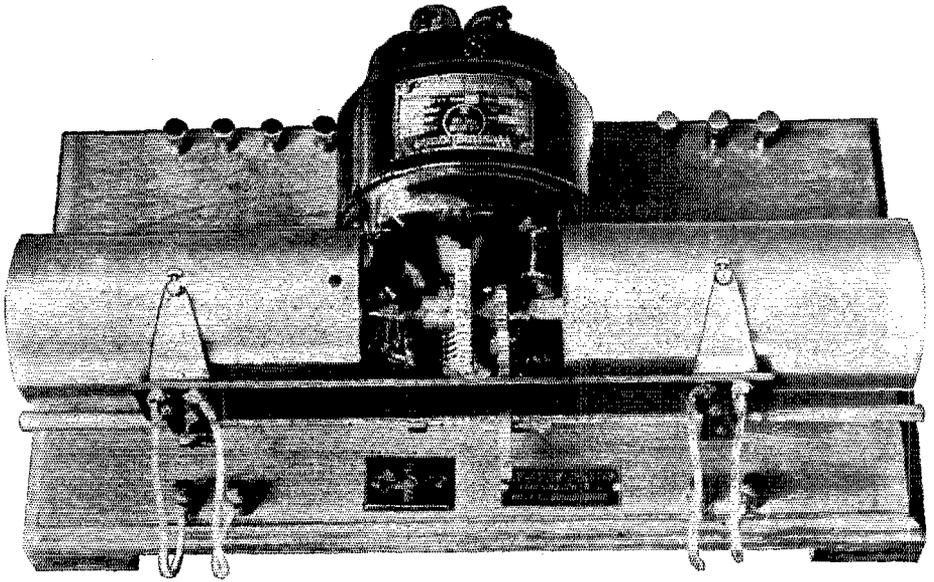
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RADIO PICTURES

We are beginning now to find out what you radio experimenters want, and have put your suggestions into the new model machine, shown above. Not only is it complete for both sending and receiving pictures and picture-messages by radio (or by wire), but it is a beautiful piece of workmanship. The price to A.R.R.L. members is but \$45—less than it costs. Why? Because we want your assistance in developing visual radio. But whether you buy a machine or not send for information about prizes for suggestions, for each of which a copy of the book "Radio Vision" is sent, whether you get in the cash prize lists or not. We are after helpful suggestions. Shoot 'em in, and we will do our part.

JENKINS LABORATORIES

1519 Connecticut Avenue

Washington, D. C.

The 1000 Cycle Transformer Is Here

*Developed Especially For the
Transmitting Amateur*

RECENTLY this magazine asked manufacturers to perfect a 1000 cycle audio transformer for use in amateur work. Many tests and experiments were necessary before it reached the present point of Erla perfection. Now you may have them in your set. They cost only \$6.50.



It is the usual practice to design audio transformers so that they will amplify as nearly equally as possible at all audio frequencies. This is in order that all the tones of a musical rendition will be amplified to an equal degree.

In telegraphic work such as amateurs are interested in, however, it is not necessary or even desirable that all the audio frequencies should be amplified. The signals may all be heterodyned to one pitch or frequency and amplified at that frequency. This frequency is usually about 1000 cycles though it may be altered at will by the receiving operator.

3 Distinct Advantages

Erla 1000 cycle audio will do this with several advantages:

1. Only one frequency, the desired one, is amplified appreciably. Consequently no static at any frequency except 1000 cycles, is amplified to the same degree as the signal.
2. Harmonics from broadcasting stations picked up by the amateurs' short wave set are amplified only at one frequency causing suppression of this interference due to the voice and music becoming so greatly distorted.
3. Enables differentiation between beat notes of different frequencies by audio tuning effect.

The 1000 cycle transformer is the same in external appearance as the present Erla audio transformer. It will be supplied with two brackets and a fixed condenser to be placed across the secondary terminals as a permanent installation. Or—this may be left off and the secondary shunted by a 1000

Mfd. variable condenser. In the latter case it will be possible for the amateur to change the frequency of resonance of the transformer so that if he prefers to read the signals at a higher or lower frequency he may bring the amplification to its highest point at that frequency.

You May Have Them Immediately

So that every amateur may have this phenomenal invention at once without waiting for distribution among dealers, orders will be filled from the factory direct. At present only a limited supply have been completed so you should order without loss of time. Enclose the low introductory price with your order. Use coupon.

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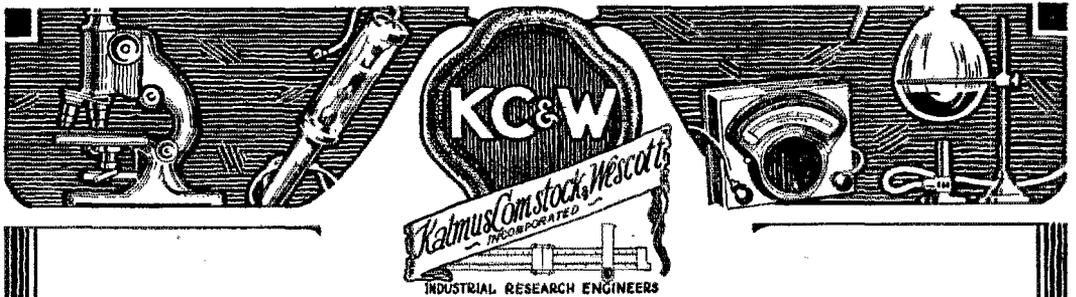
The Electrical Research Laboratories
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I enclose for Erla
1000 cycle transformers @ \$6.50 each.

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Scientific Research for Radio Manufacturers

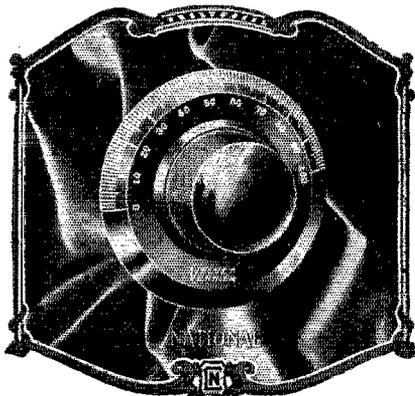
Radio Manufacturers are constantly faced with scientific problems due to the discovery of new principles and the necessity for keeping their product in the front rank in Radio's rapid advance.

Kalmus, Comstock & Wescott, Inc. offers to the Radio industry resources, equipment, and trained scientific skill necessary to solve these problems.

We maintain a staff of highly trained scientists and engineers with years of practical experience in the various fields of industrial research. Our Laboratories, personnel and experience are available to Radio Manufacturers for a reasonable compensation. It will pay you to write for complete information.

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Radio experts as well as thousands of delighted users praise NATIONAL Dials for their velocity smoothness and for precise tuning.

NATIONALS are the dials with the

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PRICES—4", \$2.50; 3 3/8" \$2.25

NATIONAL COMPANY, Inc.

110 Brookline St., Cambridge, Mass.

Sole Licensees for the Manufacture of the National Regenaformer under the Browning-Drake patents.

There's A Reason!

The fine, clear tone and volume of the Kellogg Symphony Reproducer is due to the Kellogg unit with the magnetic diaphragm control.

This exclusive Kellogg principle has produced wonders in the accurate reproduction of voice and music; piano music is unusually fine, the lowest tones of the saxophone to the highest of the violin are as clear as a bell, the soprano voice can really be admired.

Observe the rigid construction of this unit, the exactness of every detail, the size of the magnets. The unit is the reason.

See one at your dealers today.

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1066 West Adams St., Chicago, Ill.

With every Kellogg radio part, Use—Is The Test

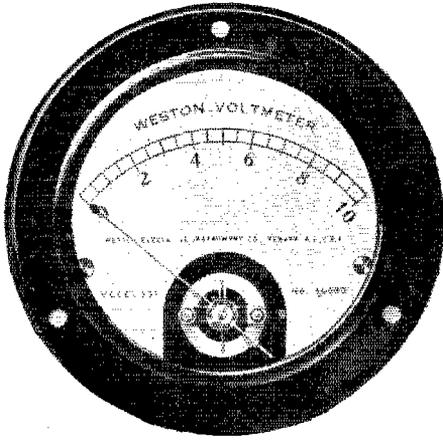


Watch for the Crosley PUP!

“It’s a Sky Terrier”

THE CROSLEY RADIO CORPORATION
CINCINNATI, OHIO
POWEL CROSLEY, Jr., President

Model 301 Voltmeter, Ammeter and Milliammeter

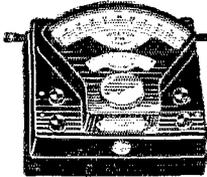


YOU will be amazed to see how the use of a Weston Model 301 Voltmeter, Ammeter or Milliammeter mounted on your panel will prolong the life of your tubes, conserve "A" and "B" batteries, insure operation under proper current conditions—increase the efficiency of your radio set, whatever make or size.

Weston made, they are finely constructed instruments of scientific precision, yet ruggedly durable.

*For further information, write for
"Weston Radio Instruments."*

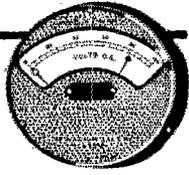
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158 Weston Avenue, Newark, N. J.



STANDARD THE WORLD OVER

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Pioneers since 1888



6 AWT

Hoover Cup Winner 1924

Uses **PYREX**

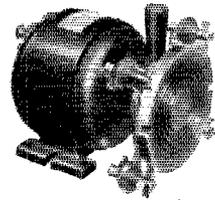
Antenna and Lead-In
Insulators

Q. S. T. May issue 1925 Page 54 says:

"Molinari sits in his shack,
taps a rubber knob and the
world listens."

6 AWT has been reported from Europe, Asia, Africa, and South America. Modernize your Antenna with PYREX Insulation.

CORNING GLASS WORKS
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More Distance!

—and mellower tone
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ADVANCE "SYNC" RECTIFIER

This Rectifier gives surprising results. Rectifies alternating current at 500 to 3000 volts to direct current for the plates of your transmitting tubes. Very efficient on short waves. Puts more energy into the antenna and counterpoise on account of actual copper-to-copper contact in rectification. Requires no attention—always ready to go and will never slip a pole. Insures true, mellow tone transmission. Thousands of ADVANCE RECTIFIERS in use in American Radio Relay League.

Revolving disk is moulded bakelite six inches in diameter. Nickel plated brush holders with adjustable gauze copper brushes. Convenient control handle. Disk, aluminum brush arm support and brush holders perfectly insulated.

Price complete with Westinghouse 1/2 H. P. Synchronous Motor.....\$40

Rectifying wheel with complete brush assembly and mounting ring to fit your own motor.....\$15

WE PAY ALL TRANSPORTATION CHARGES IN U.S.A.

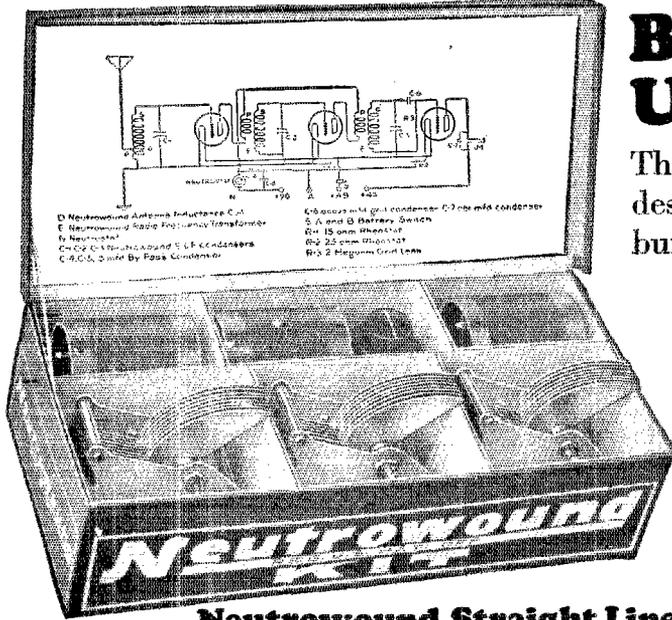
ADVANCE ELECTRIC CO.

1260-1262 West Second St., Los Angeles, California

Neutrowound KIT

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Makes a 1926 MODEL of Any Neutrodyne or Radio Frequency Set



Brings 'Em Up-To-Date

The Neutrowound Kit was designed especially for rebuilding old model sets, to supply the demand from "Radio Fans" for more selective receiving sets—and better reception—particularly on low wave length stations.

This is made possible by

Neutrowound Straight Line Frequency Condensers

It Rejuvenates Old Sets

The Neutrowound Kit consists of three Neutrowound Straight Line Frequency Condensers (all spring brass), .00028 mfd. max. cap.; two Neutrowound Radio Frequency Transformers; one Neutrowound Primary Induction Coil, and one Neutrostat.

The Neutrowound Straight Line Frequency Condensers are designed to give absolutely straight line frequency dial calibration, preventing the piling up or the crowding of stations broadcasting on low wave lengths.

The Neutrowound Coils are of the ultra low loss

type, synchronized with the Neutrowound Straight Line Frequency Condensers, and will give maximum volume with ultimate selectivity. All coils are wound with No. 24 green silk covered wire on bakelite forms.

The Neutrostat allows for minute adjustment of the plate current of the radio-frequency transformers and controls the oscillation of the set on all wave lengths, reduces "B" battery consumption and enables distant stations to be tuned in with the volume of local stations. Price \$25.00.

ASK YOUR DEALER OR MAIL COUPON

Tell us what kind of a Radio Receiving set you now have, and we will send complete instruction for rebuilding it with the Neutrowound Kit and making it as efficient as any Radio Receiver that you can buy at any price.

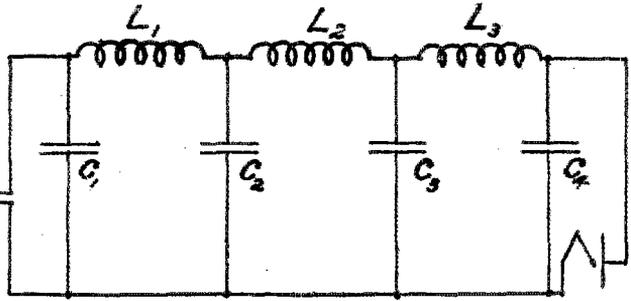
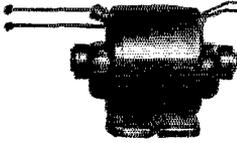
Radio Dealers: Write for our Sales Plan, Dealer's Discounts and Complete Information

Neutrowound Radio Mfg. Co.
1721 Prairie Ave., Dept. 801 Chicago, Ill.

NEUTROWOUND RADIO MFG. CO.
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Please send me complete information on the Neutrowound Kit—without obligation.

Name.....
Street.....
City..... State.....

*No. 8 of a series of 10
"FILTER FACTS"
Follow them thru monthly*



The single section of the T type of filter as described in No. 7 should be adequate with the "ESCO" motor generator set for the most exacting service. There are some combinations such as the belt driven generator with its surges caused by belt slap, the separately excited generator with a large ripple in the exciting current, or the generator boosted with an A. C. supply in series with it that will need a little more elaborate filter. This may be accomplished by adding other similar filters in series with the first. Each individual filter is known as a section. The first section reduces the disturbance a certain per cent. The next section reduces the ripple that the first passes approximately the same, per cent that the first reduced the original ripple. This action continues with each added section. The sections should be added value for value. That is, the inside condensers will be twice the outside ones and the inductances should all be equal. $L_1 = L_2 = L_3$. $C_1 = C_4$, $C_2 = C_3$ and $C_1 = 2C_2$.

Practically speaking, the necessity for using more than one section with a motor generator set is rare, with an "ESCO" motor generator never.

ELECTRIC SPECIALTY COMPANY

TRADE "ESCO" MARK

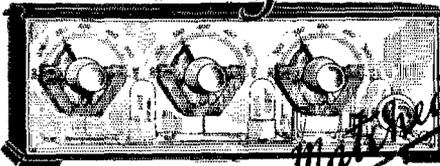
225 South Street

Stamford, Conn.

Long waves, short waves, little tubes, big tubes, there is a motor generator set built for all, and it will give the maximum miles per watt "ESCO" builds it.

MATCHED DUPLX CONDENSERS

*Always Read Alike
Because They Are ~ ~*



Just one number to log—or eliminate logging and dial by wave-lengths. Made as Bureau of Standards specifies, and guaranteed. Rugged, with wear-proof bearings. Built for accuracy. Packed in matched sets. Sealed, to remain untouched until used.

DUPLX Matched condensers assure you the most out of your radio set. Ask your dealer.

Interesting illustrated folders on request.

DUPLX CONDENSER AND RADIO CORP.
32 Flatbush Ave. Extension, Brooklyn, N. Y.

YOU

don't have to play second fiddle. You can have the most highly selective receiving set in the world, together with coast-to-coast reception at a moderate cost.

Furthermore, the Superheterodyne gives better results than any other circuit during warm weather. Build now for summer entertainment and to be prepared for fall.

Our booklet "Building the McLaughlin One-Control Superheterodyne" gives full constructional data and exact size working blueprints.

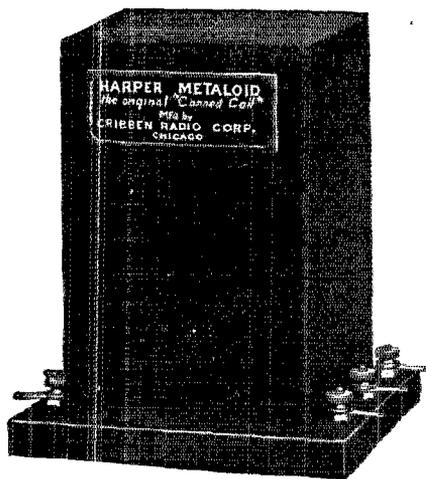
Order from your dealer or from

Precise Manufacturing Corp.

Rochester - - - - New York

Announcing the New HARPER METALOID

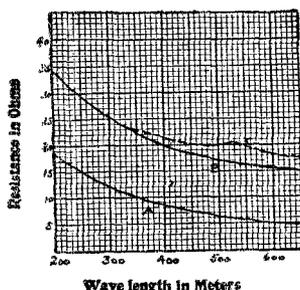
The Original Canned Coil



The HARPER METALOID is an electrically shielded radio frequency transformer of highest efficiency. It is the result of intensive research by W. W. Harper, Consulting Engineer, and member of the Experimenters Section of the A.R.R.L., and author of various QST articles.

The Metaloid consists of a small tuned radio frequency transformer with primary and secondary windings of solenoid form.

The Harper Metaloid is electromagnetically and electrostatically screened, a feature not found in any other tuned radio frequency transformer. This permits more uniform control of regeneration, eliminates stray feedback, and entirely does away with the well known critical angle—the dread of every experimenter and set builder.



CURVE A—Secondary Resistance of Harper Metaloid with Confined Field.

CURVE B—Secondary Resistance of A Popular So-Called "Low-Loss" Coil with Unconfined Field.

CURVE C—Shows effect of metallic object near the same "Low Loss" Coil with Unconfined Field. Note resistance "Hump" at 500 meters due to eddy current loss in metal. This effect is eliminated in the Harper Metaloid.

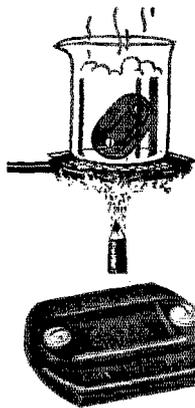
Harper Metaloid Coils cost \$5.00 each, size $3\frac{1}{4} \times 3\frac{1}{4} \times 5$ inches. Obtain a supply for your set today and increase its efficiency. Write

Why the Metaloid Is Better

1. High Efficiency—average resistance of 9.5 ohms.
2. High Inductance—pure inductance 320 microhenries.
3. Maximum Ratio of Inductance to Resistance, 33 microhenries per average ohm.
4. Low Distributed capacity—2 micromicrofarads.
5. Effective Electro Magnetic and electrostatic shielding.
6. Eliminates the usual mounting care customary in other transformers—no CRITICAL ANGLE.
7. Eliminates losses introduced by metallic objects in close proximity of coil—a recognized disadvantage in radio frequency transformers with unconfined fields. Tests made on the Harper Metaloid with various pieces of sheet iron, audio frequency transformers, and other objects placed directly on top of the Metaloid caused no measurable increase in resistance. Such a test on the ordinary unshielded radio frequency transformer would increase the resistance by several hundred percent due to eddy current loss.
8. Wiring greatly simplified.
9. Minimum mounting space—cubic volume only 45 inches considering coil and field.
10. Greatly reduces pick-up from strong local signals, thereby increasing selectivity.
11. Minimizes inter-stage stray coupling.
12. Tapped primary permits the use of large and small tubes.
13. High coefficient of coupling.
14. Gives maximum gain per stage.

CRIBBEN RADIO CORPORATION
961 Montana Street Chicago, Ill.

NOT HURT



by boiling
or freezing



Sangamo Mica Condensers

AN engineer engaged in research work for a large company needed condensers that would stand severe use and stay accurate.

So he took a Sangamo mica condenser and kept it in boiling water for several hours. Then he had it frozen into a cake of ice. When tested afterward, he found no change in the capacity. Even this severe treatment had no effect upon its accuracy! Your receiver will work far better with condensers that are accurate—and stay accurate.

Sangamo condensers are approved by every nationally recognized radio laboratory. They are guaranteed to be accurate within 10 per cent. of marked capacity and to sustain that accuracy. Soldering does not change the capacity. Neither does dampness nor salt air.

Their neat appearance appeals to those who are particular about good workmanship; solidly molded in smooth brown bakelite, all corners rounded, ribbed for mechanical strength, and decidedly easy to solder.

Made in all capacities from .00005 to .01 mfd. Prices are moderate. Supplied with resistor clips for 10 cents extra.

Good radio stores carry Sangamo Mica Condensers or can get them quickly from jobbers. Insist!



Sangamo Electric Company

Springfield, Illinois

RADIO DIVISION, 50 Church Street, New York

SALES OFFICES—PRINCIPAL CITIES

For Canada—Sangamo Electric Co. of Canada, Ltd., Toronto.
For Europe—British Sangamo Co., Ponders End, Middlesex, Eng
1820-6 For Far East—Ashida Engineering Co., Osaka, Japan

PROFESSIONAL SET BUILDERS

and
dealers who build sets

WE will shortly begin a series of newspaper advertisements, featuring the work of individuals and dealers who build sets using Cardwell Condensers.

If you build to specification or from original design, it will be to your interest to communicate with us immediately.

Ask for details of plan. Be sure to give name of your jobber.

ALLEN D. CARDWELL
MANUFACTURING CORP.
81 Prospect Street, Brooklyn, N. Y.

EAGLE



RECEIVING SETS
MEAN SATISFACTION

Every "Eagle" Receiving Set is individually inspected *eight times* before it leaves the Eagle factory.

95% Eagle Built

Durable Balanced
Guaranteed

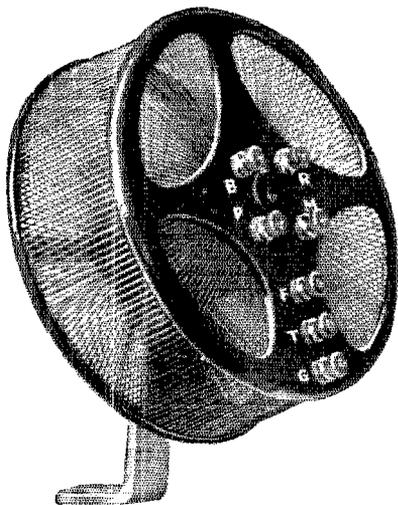


EAGLE RADIO COMPANY

23 Boyden Place Newark, N. J.

The B-T Torostyle Transformer

A Well Known Principle Now Applied to Radio



There is nothing new or startling in the principle of the "closed" or "toroidal style" coil. Telephone engineers for years have used this type inductance to prevent "Cross talk" between trunk lines.

But the successful adaptation of this coil to the high Frequencies employed in radio without attendant disadvantages is a triumph.

The mechanical difficulties alone delayed our production of this type of inductance for over a year. The most intensive and exacting laboratory work this organization has ever done, has

been necessary to develop the full possibilities of this type coil for radio, namely:

- Elimination of interstage-magnetic coupling effects.
- Nullification of the effects of external fields.
- Reduction of signal "pick-up".

In the B-T Torostyle Transformer these results have been achieved without the usual weaknesses of broad tuning and an uncontrollable tendency to oscillate.

The B-T reputation for inductance efficiency is behind the "Torostyle."

Made in three types—each for a definite purpose.

Send Coupon for Complete Information on Torostyle Transformers and B-T Sockets

The New B-T Socket

The new B-T Universal Socket—positive contact from tube prong to terminal connecting post. Impossible to develop a loose contact. Capacity reduced to minimum. Features you hadn't thought of, but will appreciate on sight.

Bremer-Tully Mfg. Co.

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Chicago

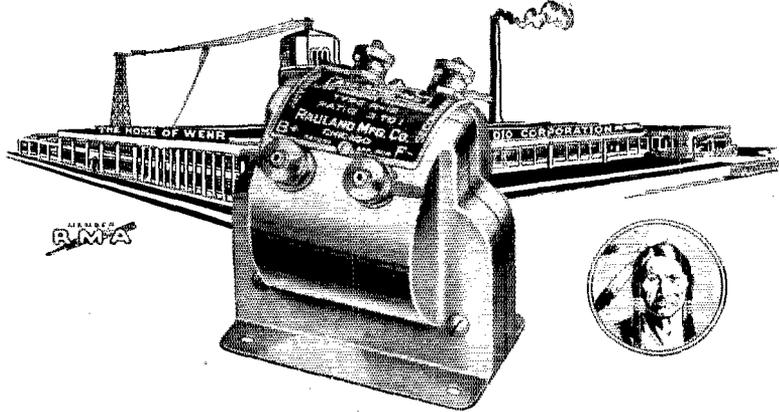
Bremer-Tully Mfg. Co.
532 S. Canal St., Chicago Dept. Q.
Please send me circulars on the Torostyle Transformer and the B-T Socket.

Name

Address
(Please Print Name and Address.)

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The assurance of reliable performance, which you have always felt when buying an ALL-AMERICAN Transformer, is now increased by a knowledge that it is the product of one of the largest and most completely equipped factories in America devoted exclusively to radio products.



The RADIO KEY BOOK—new edition—is a practical handbook for all who wish to enjoy modern radio at its best. Send 10 cents—coin or stamps—for the KEY BOOK.

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Largest Selling Transformers in the World

18 Years
EXPERIENCE

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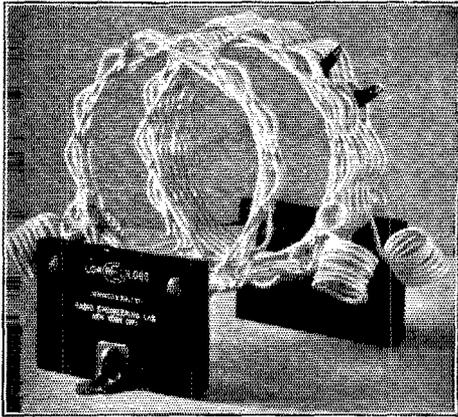
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Basket Wave Coils supported on Pyrex Rods.
Five interchangeable coils with each unit
For 20—40 and 80 Meters Wave Length Bands
Adaptable to Reinartz or Capacity Feed Back Circuits.
Furnished with flexible leads and clips, and latest receiver construction details.

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USE THE
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PERMANENCE
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TESTED GRID LEAKS
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MODEL T—ALL METAL—MICA—.00005 TO .006 MFD—
FIXED CONDENSERS
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The Perfected Product of 18 YEARS of Scientific Research and Painstaking Development

OUTSTANDING FEATURES—MODEL T—RADIO CONDENSERS

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| 1. Accurate Capacity | 6. Minimum Size |
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Wireless Specialty Apparatus Company

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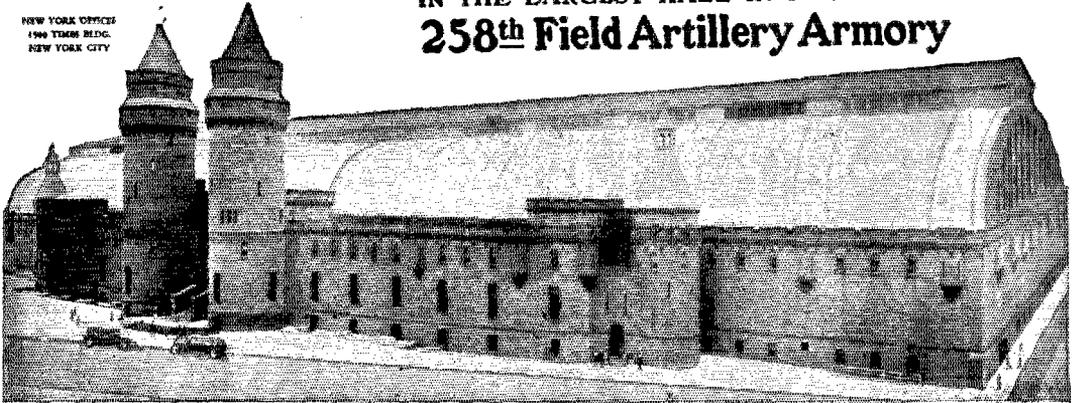
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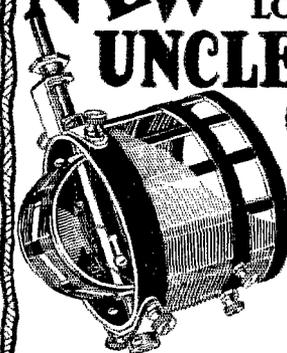


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SIZE

2 7/8 x 2 1/2 In.

Tunes from
35 to 150
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Condenser.

FREE Ask your dealer or send us four cents
in stamps for wiring diagrams in
which this unit can be used.

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We have a high-grade radio accessory and want to get in touch with men who have the selling instinct. We can prove that our "B" battery and rectifier, all in one case, is better than any other similar combination on the market, far superior to the best "H" battery eliminator. It is built on the past experience of a manufacturer old in the business, and is guaranteed to give satisfaction. Wires to get are permanently connected. Output 96 volts. To charge, merely insert a plug.

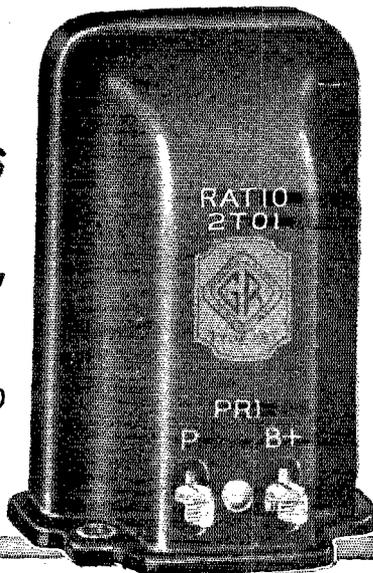
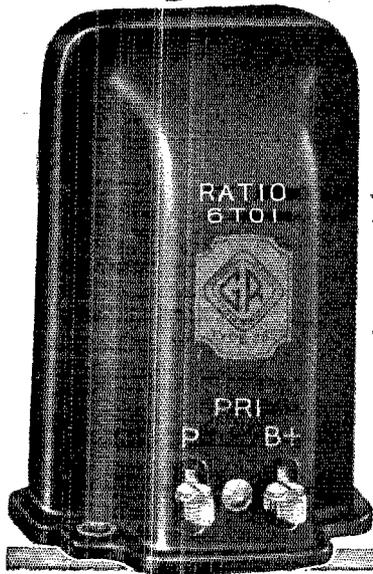
This is something to be sold as a side line to users and dealers. Jobbers' accounts not solicited. If willing to work on strictly commission basis with full protection as to territory, address C. S. K., 2055 N. Racine Ave., Chicago.

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Transformers

bring out
all the
Refinements
of
Tone Quality

USE A 6 to 1 RATIO
IN THE FIRST STAGE
AND A 2 to 1 IN THE SECOND



\$ 6 each

Two Ratios—New Prices

The better loudspeakers today are capable of reproducing music with all its truest refinements of tone quality. Consequently a higher standard of transformer design is necessary to deliver to the loudspeaker the desired volume with a purity of tone that makes radio reception delightfully natural.

In designing the General Radio Type 285 transformers great stress has been laid upon tone quality—yet volume has been increased to a very marked degree.

Due to the special design of the core and adjustment of the coil turns these transformers are capable of high and even am-

plification of all tones common to speech, instrumental and vocal music.

In spite of the pronounced superiority over other transformers they sell at a popular price.

Enjoy music in its unmodified form—as pure, full and natural in tone as it enters the microphone at the studio of the broadcasting station. Use a 6 to 1 ratio in the first stage and a 2 to 1 in the second.

Ask to see them at your local dealers, or write for our descriptive folder 285-Q showing Amplification curves and wiring diagrams.

GENERAL RADIO CO.

Cambridge, Mass.

“Behind the Panel of Better Built Sets”

What becomes of the bass notes in your set?



While the better transformers amplify quite evenly over the entire upper and middle registers of the musical scale, from about 50 cycles downward there is a pronounced loss of amplification, as indicated above. Poorer transformers begin to drop off in amplification even higher on the scale with the result that lowest notes disappear entirely.



There is no variation in amplification over the entire range of musical frequencies with Thordarson Autoformers. No note is too low—no note is too high to be lost by the Autoformer. In addition there are three other advantages.

Four Great Improvements!

Full amplification of those bass notes hitherto largely "lost"! Greater clarity on all signals! Improved reception of distant programs! Better volume control!

These are the four advantages achieved by this latest Thordarson development—the Autoformer. Thordarson has succeeded in utilizing, for the benefit of your radio set, the same principle used in the line amplifiers adopted by the more recent high-powered broadcasting stations. The excellent quality of these stations (due to perfect amplification) offers conclusive proof of Autoformer effectiveness.

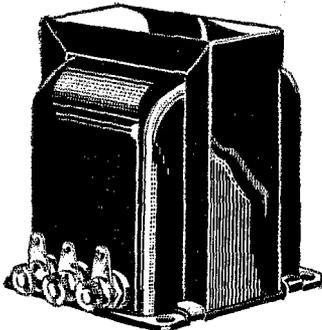
Unconditionally Guaranteed

THORDARSON Autoformer

Trade-Mark Registered

All Frequency Amplifier

Autoformer amplification is for those who seek the finest reproduction of programs to be had. It may be used with any set in place of the regular audio transformer or hook-up. Full directions, with diagrams, for building a Thordarson Autoformer Amplifier are supplied with each instrument, or



Write for the Autoformer Hook-up Bulletin—Just Out!

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WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS
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Take the "GUESS" Out of Tube Control

\$ 1.10 Everywhere

Amperite automatically controls tube current, eliminates hand rheostats, filament meters, guessing and all tube worry. Simplifies wiring, tuning and operation. Permits the use of any type of tube or any combination of tubes. Tested and used by more than 50 set manufacturers and in every popular construction set.

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AMPERITE

The "SELF-ADJUSTING" Rheostat

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FIFTEEN CENTS
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BLUEBIRD RADIO TUBES

—are powerful—sensitive for distance, give clear volume and long service.

GUARANTEED

to work in Radio Frequency, Neurodyne, Super Heterodyne and Reflex.

WITH BAKELITE BASE

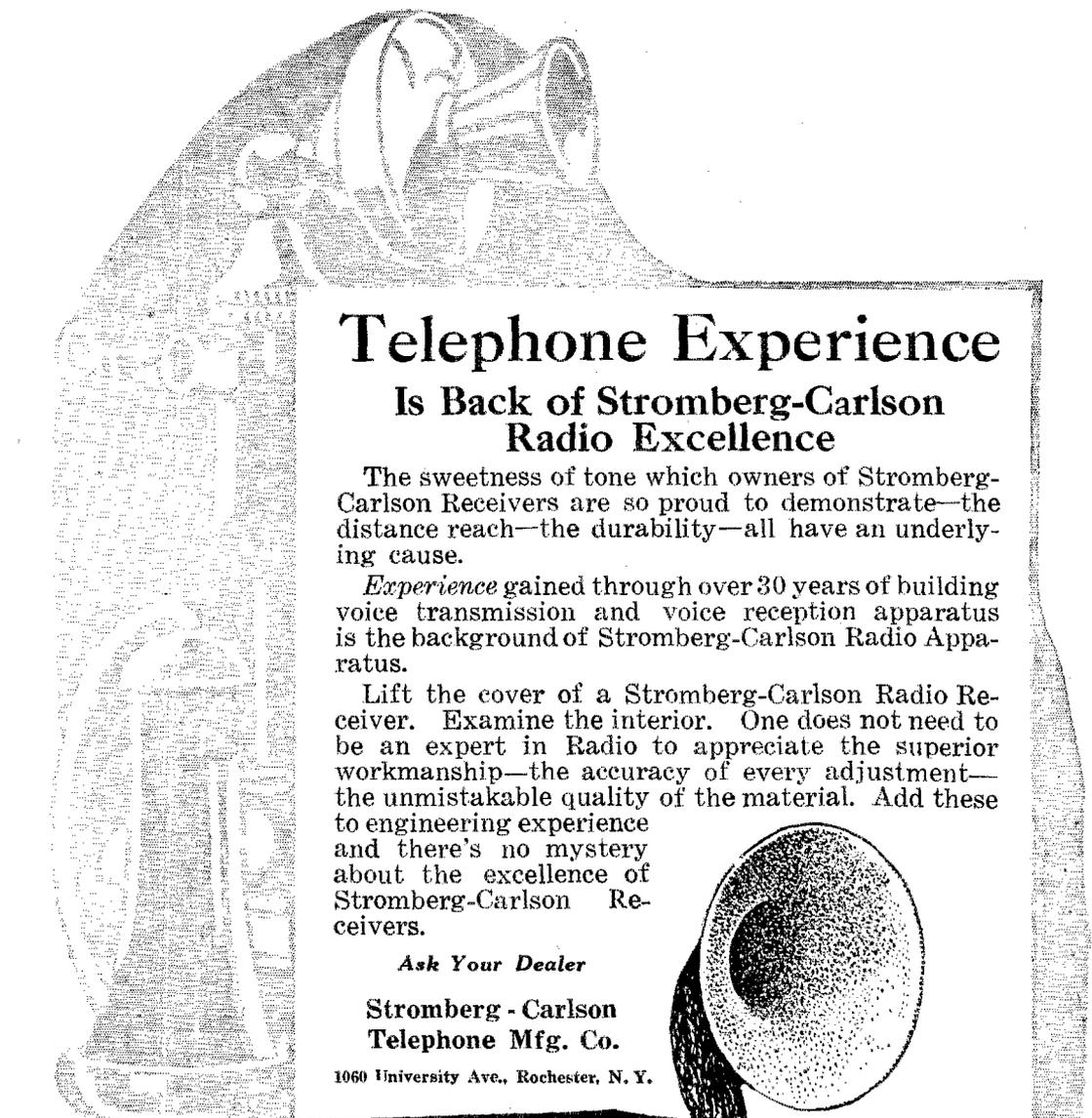
Type 200
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Type 209A with standard base
Type 202 5 watt Transmitter

\$2.00

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Telephone Experience Is Back of Stromberg-Carlson Radio Excellence

The sweetness of tone which owners of Stromberg-Carlson Receivers are so proud to demonstrate—the distance reach—the durability—all have an underlying cause.

Experience gained through over 30 years of building voice transmission and voice reception apparatus is the background of Stromberg-Carlson Radio Apparatus.

Lift the cover of a Stromberg-Carlson Radio Receiver. Examine the interior. One does not need to be an expert in Radio to appreciate the superior workmanship—the accuracy of every adjustment—the unmistakable quality of the material. Add these to engineering experience and there's no mystery about the excellence of Stromberg-Carlson Receivers.

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**Stromberg - Carlson
Telephone Mfg. Co.**

1060 University Ave., Rochester, N. Y.



No. 1 type Neurodyne Receiver, Table Type, 5 tubes. [Shown here connected with Stromberg-Carlson No. 2-A Loud Speaker]. Finished in Adam-Brown Mahogany.

Stromberg-Carlson

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

Immediate Delivery!

ON ALL **AMRAD** PRODUCTS

AMRAD "S" Tubes 4000-1 (1000 Volt)	\$10.00
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Transmitting Accessories

U. V. 202, 203, 203A, 204, 204A, Tubes
At Special Prices

**SPECIAL 5 WATT
TRANSMITTING TUBE \$ 4.00**
Guaranteed at least 750
Volts adaptable for short
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Low Loss Short Wave
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Pyrex Insulators from 3/4 to
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Transmitters built to speci-
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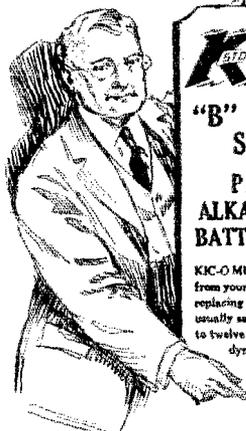
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Troy Radio Company

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KIZO
STORAGE BATTERIES

**"B" ELIMINATOR
SIMPLICITY**

**PERMANENT
ALKALINE STORAGE
BATTERY RECEPTION**

KIZO MULTI-POWER UNITS operate from your lighting line and eliminate the replacing of dry cell "B" batteries.... usually saving their cost in the first six to twelve months of service on Neutrodyne and Super Heterodyne sets.

its RECHARGER is attached to back.

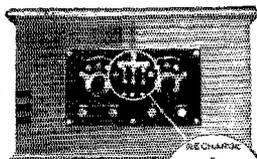
Guaranteed Two Years
PRICES
Multi-Power Units
(Complete)

180 volt. P. U. \$43.50
100 volt. P. U. \$35.00
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**POWER—ECONOMY
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Unexcelled for better Radio. Backed by years of research. Write NOW for SPECIAL FREE TRIAL OFFER! DEALERS! EVERYBODY!

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The 100%
Self-Shielded
Transformer

has made a big hit with both set makers and set manufacturers because of its small size, its amazing volume and most of all, because of its pure undistorted tone. It is half the size of other transformers, but its results are unsurpassed. Absolutely new and scientific design and construction. Ratios 1 to 3, 1 to 4, 1 to 5 \$3.50. Ratio 1 to 10 \$4.50

SEND FOR BULLETIN No. 54. Read all the exclusive features of this and other Premier Parts. Tells how to get free hook up diagrams beautifully printed in two colors.

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Manufacturers of Fine Magnet Wires, Resistance Wires, Radio and Litz Wires. Enamel, Cotton and Silk Insulations. Special combinations of Litz Wires made up on request, also other wires, according to specifications.

Prompt Deliveries

A Laboratory Product



**CRESCENT
LAVITE
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For Distortionless Amplification.

12,000, 48,000, 50,000, 100,000 Ohms. List \$1.50 ea. Special Sizes to Order \$2.50 ea. Dealers write for discounts. When Better Resistances are made they will be Crescents.
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Thorola

I S L O D Y N E

Your Most Successful Experiment

Now test a Thorola Islodyne receiver. For only a moment will it be an experiment. Then you will know that selectivity is now really a certainty; that tone can be free of distortion, fading, and scrambling; that *all* the evils of interaction are gone!

For only the Thorola Islodyne assures the *Isolated Power* principle of Thorola Low-Loss Doughnut Coils, Frank Reichmann's master radio development. Technically as well as theoretically correct, Thorola Low-Loss Doughnut Coil design encloses the field. Power is *concentrated*, and focused fully on the desired signals only.

A positive, *calculable* basis for selectivity, range, volume, tone is

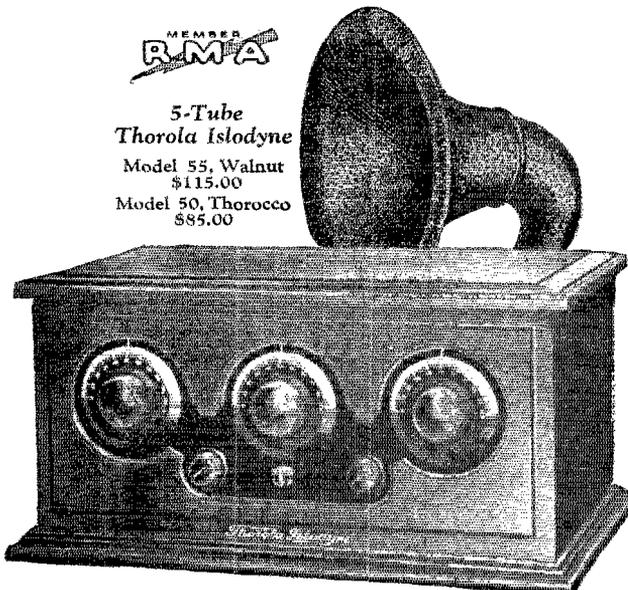
established without freak wiring or tricky mountings. You have known nothing like it in radio, since the vacuum tube itself.

You will regard a test of Thorola Islodyne receivers or Thorola Low-Loss Doughnut Coils as your most successful experiment. You will find amplification uniform over the entire wave band from 175 to 550 meters, which means from three to five times as good as ordinary five-tube sets between 450 and 500 meters. Because of the intense interest in this sensational performance, the factory itself, as well as Thorola dealers, will furnish data.

REICHMANN COMPANY
1725-39 W. 74th St., CHICAGO



5-Tube
Thorola Islodyne
Model 55, Walnut \$115.00
Model 50, Thorocco \$85.00



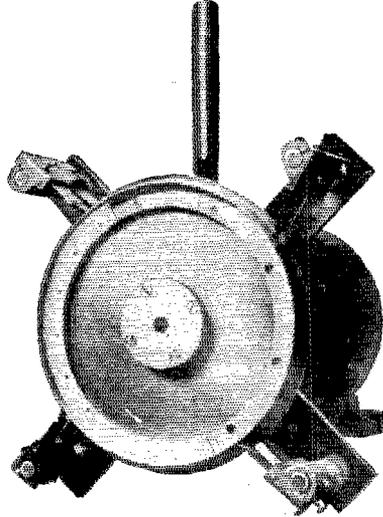
THE SUPER-SYNC

The synchronous rectifier that can be filtered

The only synchronous rectifier giving a pure D.C. tone with ordinary type filter.

The Super is so constructed that capacity in series with a small choke may be put across the output brushes and effectively filter the output of this rectifier.

Each rectifier is tested under a voltage far in excess of



its rated load before leaving our factory.

The SUPER is adaptable to both high and low powered sets as it easily handles up to 4000 volts filtered D.C.

The commutator is constructed of the best of materials using micarta for insulation throughout.

Literature sent on request.

PAT. PENDING

PRICE \$75.00 F. O. B.

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MARLO ELECTRIC CO.,

5241 Botanical Ave., St. Louis, Mo.

THE DAVEN SUPER AMPLIFIER

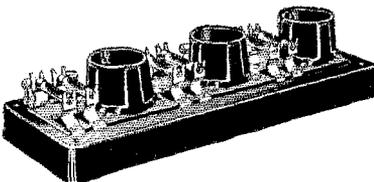
The tide has turned—Resistance Coupled Amplification is here to stay and is now riding the "topmost wave" of popularity. The Daven Super Amplifier and Amplifier Kit combined with the Daven High Mu Tubes will give to any receiver that superior amplification you demand.

The Super Amplifier	\$15.00
High Mu Tubes MU-20	4.00
Daven Power Tubes MU-6	5.00
3-Stage Amplifier Kit	9.00

At good Radio Stores only.

Read the RESISTOR MANUAL.
From your Dealer 25c. Postpaid 35c.

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"Resistor Specialists"
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Now in stock—\$10.00 each, sent Parcel Post—C. O. D. and charges.

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FAMOUS "BH" TRANSFORMERS

BUILT TO THE HIGHEST
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AUDIO AND
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Used by the Leading
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Benjamin Hughes Elec. Co.

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SINCE 1910

Music Master Receiving Sets

A Logical Development

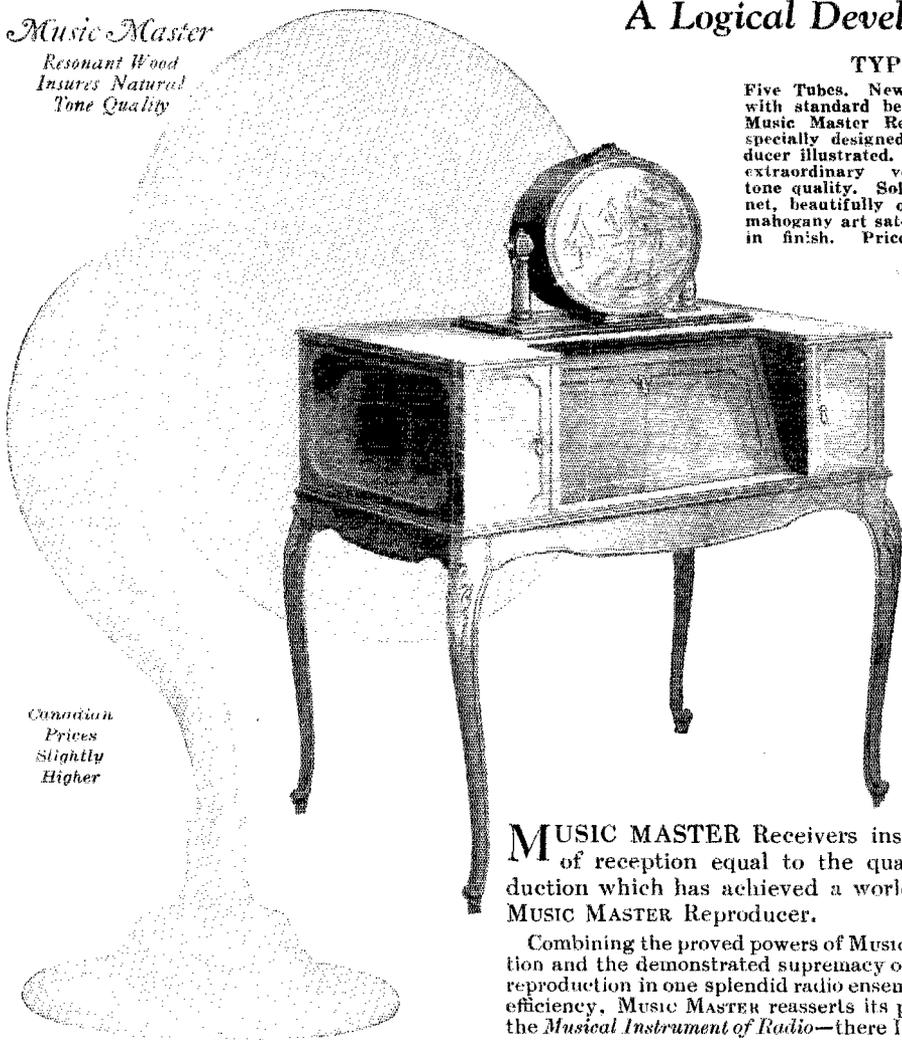
Music Master

*Resonant Wood
Insures Natural
Tone Quality*

TYPE 300

Five Tubes. New circuit. Connect with standard bell or cabinet type Music Master Reproducer or with specially designed art model reproducer illustrated. Great selectivity, extraordinary volume, wonderful tone quality. Solid mahogany cabinet, beautifully ornamented, brown mahogany art satin finish. Price **\$300**

MUSIC MASTER Reproducer Model XII, Drum Type. Specially designed art model illustrated. Price . . . \$35



*Canadian
Prices
Slightly
Higher*

MUSIC MASTER Receivers insure efficiency of reception equal to the quality of reproduction which has achieved a world-standard in MUSIC MASTER Reproducer.

Combining the proved powers of MUSIC MASTER reception and the demonstrated supremacy of MUSIC MASTER reproduction in one splendid radio ensemble of supreme efficiency, MUSIC MASTER reasserts its pre-eminence as the *Musical Instrument of Radio*—there IS no substitute.

Authorized dealers everywhere are ready to demonstrate radio as you have always wanted to hear it. See Music Master—hear—compare—before you buy ANY radio set.

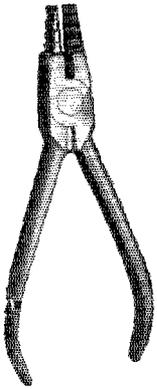
*Ten Models \$50 to \$400
Guaranteed Unconditionally*

*Sold by Authorized Music Master
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Music Master Corporation

Makers and Distributors of High-Grade Radio Apparatus
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RADIO PRODUCTS



"Windham" Wire Former

(Pat. Pending)

A complete and handy tool for electricians, radio set builders and mechanics. It will accurately form loops or eyes for No. 4, 6, 8 and 10 screws, make easy radius and sharp right angle bends, has flat jaws and wire cutters. This tool is made of the best quality steel, dropped forged and carefully tempered in oil.

We guarantee every tool against defects in workmanship and materials and will promptly replace or refund money on any found defective by purchaser.

Price \$1.25 Each

Ask your dealer

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Willimantic, Connecticut

Our Type A Wave Meter Is Ready

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Other Real Ham Apparatus Under Way

We are specialists in apparatus for the amateur and want every real ham's name on our permanent mailing list. Send 25 cents for registration and a copy of our illustrated loose leaf perpetual catalog, now in preparation.

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To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1925

American Radio Relay League,
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose \$2 (\$2.50 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with theissue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....
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.....

Station call, if any

Grade Operator's license, if any

Radio Clubs of which a member

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may write him about the League?

..... Thanks!



VACATION TIME IS MOTORING TIME!

With a good spare on the back, and an A.R.R.L. Automobile Emblem on the front, you're all set for vacation touring. You'll be surprised how many brother League Members and all-around good hams you will meet in your travels—all through the gold and black "badge of a real amateur" on your radiator.

5 x 2½", durably enameled on sheet steel, with holes top and bottom, the A.R.R.L. Automobile Emblem will be promptly sent postpaid to League Members only, for 50c, when remitted to

The American Radio Relay League, Hartford, Conn.

QST

QST

QST

The Advertising Manager Asks for Information and Help.

In order that *QST's* Advertising Department may more intelligently solicit desirable advertising upon the basis of actual facts and the needs of its readers, the following few questions are respectfully submitted. If you will only take a few minutes to sit down, carefully and fully answer the questions, and mail them in promptly, we will have a fund of information that will be of the greatest value. *QST* has well over 60,000 readers—we want at least 60,000 answers. Thank you!

Are you a subscriber, or a newsstand buyer of *QST*?
If you work in a radio store, department or on the radio page of a publication, tell where and in what capacity.
If you buy your apparatus "over the counter", give name and address of firms you patronize mainly.

Or do you buy mainly by mail from mail-order dealers and manufacturers?
If so, does *QST* fill your needs as a buying guide, or do you have to consult other magazines as well?
What type of advertising, or what specific advertiser would you like to see in *QST*?

Will you co-operate for the benefit of *QST* and all its readers by buying from *QST's* advertisers whenever possible, always mentioning *QST* in your letters to them, recommending *QST*-advertised products to others whenever possible, and generally boosting it as a desirable advertising medium whenever you can?
Please mail your replies to:

EDWIN ADAMS, Advertising Manager QST

1711 Park Street

Hartford, Conn.

HAM-ADS

**IMPORTANT NOTICE !
NEW RATES
ADVANCED CLOSING
DATE**

Effective with May QST, the HAM-AD Advertising Rates are TEN CENTS A WORD. Name and address to be counted, each initial counting as one word. These rates are shown on QST Rate Card No. 6, in force with the May issue.

The closing date for HAM-ADS is now THE TWENTY-FIFTH OF THE SECOND MONTH PRECEDING DATE OF ISSUE. For example, all HAM-ADS for the June issue must be in this office not later than April 25.

Hereafter no HAM-AD will be accorded any particular or special position.

Rates for the QRA Section remain the same; 50c straight. See heading of that section for details.

MOST IMPORTANT, IS THAT PLATE SUPPLY. WHAT IT TAKES TO MAKE IT, WE HAVEN'T ANYTHING ELSE BUT. ACME TWO HUNDRED WATT FIVE FIFTY AND SEVEN FIFTY PLATE AND TEN VOLTS FILAMENT. PRICE \$20.00. THREE HUNDRED WATT, SEVEN FIFTY AND ELEVEN HUNDRED VOLTS PLATE, TEN VOLTS FILAMENT. PRICE \$25.00. TWO HUNDRED FIFTY WATT PLATE TRANSFORMER NO FILAMENT, FIVE FIFTY AND ELEVEN HUNDRED VOLTS PRICE \$20.00. FILAMENT TRANSFORMERS, SEVENTY FIVE WATT EIGHT AND TEN VOLT TAPS PRICE \$12.00. ONE HUNDRED FIFTY WATTS, TEN AND TWELVE VOLT TAPS PRICE \$16.00. LAST TWO NAMED HAVE WIRE RHEOSTAT IN THE PRIMARY. AMRAD S TUBES \$10.00 EACH. SOCKETS TO MATCH 85c. FILTER CONDENSERS ONE MFD SEVENTEEN FIFTY VOLTS TEST, \$2.50. RADIOSTAT \$6.50. E-210 BRADLEYSTAT \$4.00 THE FILAMENT CONTROL EXTRAORDINARY. RADIO CORP. OSCILLATION TRANSFORMERS \$11.00. NOTHING MISSING IN OUR STOCK OF TRANSMITTING PARTS. WHEN YOU WANT REAL SERVICE, QUICK SHIPMENT, AND STRAIGHT SHOOTING, WRITE THE ONLY HAM STORE IN THE FIFTH DISTRICT. FORT WORTH RADIO SUPPLY CO, FORT WORTH, TEXAS.

A TROUBLE ELIMINATOR. AN SML EDISON B FOR YOUR SET. QUIET FOR DX. AMPLE CAPACITY INSURES CONSTANT VOLTAGE. THE PERFECT PLATE SUPPLY FOR ANY SET—AN EDISON B (SML KIND). NICKEL CONNECTORS ELECTRICALLY WELDED, 54 VOLT \$8.25. 100 VOLT \$15.00. OTHER SIZES. OAK CABINET. LARGEST ELEMENTS. REAL EDISON SOLUTION. A BIG 2000 MILLIAMPER HOUR B FOR THE MULTITUBE SET, 105 VOLTS \$24.00. CELL PARTS 17c. DRILLED 19c. ASSEMBLED CELLS 24c. QUANTITY DISCOUNTS. EDISON A ELEMENTS 5c. WELDED PAIRS 7½c. 3000 MILLIAMPER HOUR SUPERCCELL 33c. ANNEALED TEST TUBES ¾" 3c, 1" 4c. SHOCKPROOF JARS 1x6—4c, 1¼x6½—5c. PUREST SOFT .032 NICKEL 1c FOOT. RUBBER SEPARATORS ¼c. REAL EDISON ELECTROLYTE. \$1.25. MAKES 5 LBS. WILLYARD COLLOID—A REAL B CHARGER. 50 VOLTS \$2.00. JUMBO \$3.00. 100 VOLT FULL-WAVE \$4.00. JUMBO FULL-WAVE \$6.00. FOR HIGHEST INPUT AND OUTPUT EFFICIENCY USE

NO. 12 ENAMELED AERIAL WIRE—75c 100 FT. OHIO BRASS, WET PROCESS PORCELAINS, AND PYREX INSULATORS. A NEW QST LEADIN INSULATOR—PYREX—NEW PRICE \$1.50. GUY EGGS 25—\$2.00. ANYTHING YOU NEED. RADIO SML. FRANK M. J. MURPHY, 4987 ROCKWOOD RD., CLEVELAND, OHIO.

MOTORS—New G.E. ½ HP \$12.50 ¼ HP \$28.50 1 HP \$45. GENERATORS Radio Transmission 500V \$28.50 Battery Chargers—Farm Lighting generators all sizes. Lathes, Drill Presses, Air Pumps other Garage and Shop equipment. Wholesale Prices. New Catalog. MOTOR SPECIALTIES CO., Crafton, Penna.

Have you received a copy of our new 32-page "Ham" Bulletin? Hundreds of rare bargains in transmitting and receiving apparatus. Write for copy FREE today. Chicago Salvage Stock Stores, 509 So. State St., Dept. Q6, Chicago.

TELEGRAPHY—Morse and Wireless—taught at home in half usual time and at trifling cost. Omnigraph Automatic Transmitter will send, on Sounder or Buzzer, unlimited messages, any speed, just as expert operator would. Adopted by U. S. Govt. and used by leading Universities, Colleges, Technical and Telegraph Schools throughout U. S. Catalog free. Omnigraph Mfg. Co., 13M Hudson St., New York.

\$2.95 — OUT AT LAST!
"THE Hawley." An alkali un-acid rechargeable "B" storage Battery of 22½ volts. Not an un-assembled battery but ready to use—no extra parts to buy. Uses the largest sized tested Alkaline elements (Edison). Heavy closed top glass cells. Chemical electrolyte included and shipped separate. Any detector or amplifying voltage easily had. Special offer, 4-22½ volts (90 volts) \$10.00; 112½ volts \$12.50; 135 volts \$14.75; 157½ volts \$18.80. For those wishing to put their own together buy the knock-down kits. Put up in all voltages at still greater savings in price. The only battery of its kind sold on a 30 day trial with complete guaranteed satisfaction or your money returned in full without any ifs, ands, or buts. Further guaranteed 2 years. Order direct—send no money. Simply pay expressman its cost plus the small carrying charges. Patent pending. Same day shipments. Write for my guarantee testimonials and literature. It's free and it's interesting. Complete sample cell 35c prepaid. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

REBUILD YOUR NEUT—Use same panel, same parts. No neutralization, 22 feet gold wire, only extra part, circuit and complete, simple instructions—\$5.00 prepaid. Hundreds of Neut owners use this Kit. Details—10c. 48 page catalog parts—10c. Stamps accepted as cash. KLADAG RADIO LABORATORIES, KENT, OHIO.

PLENTY OF AMRAD "S" TUBES AT LOWEST PRICES. Ampliron Tubes, Type 199.201-A. Guaranteed \$1.50 P.P. AMRAD NO. 2796 LIGHTNING SWITCHES, MOUNTED ON ½" INCH FORTGAIN POSTS, \$1.50 POSTPAID. R.C.A. UC-1831 4000v Variable Transmitting Condensers .0001 to .0012 mfd. 93.7% efficient, \$2.00 Postpaid. Write for list now and keep posted on real bargains. State Radio Co., 286 Columbia Road, Dorchester, Mass.

MAKE \$120 WEEKLY IN SPARE TIME. Sell what the public wants—long distance radio receiving sets. Two sales weekly—pays \$120 profit. No big investment, no canvassing. Sharpe of Colorado made \$965 in one month. Representatives wanted at once. This plan is sweeping the country—write today before your county is gone. OZARKA, 253 Washington Blvd., Chicago.

RADIO EXCHANGE—Get radio receiving parts you Do want in exchange for ones you do not want. Must be perfect and LATEST models. Send descriptive list of what you have and what you want. Will exchange \$5.00 list for \$10.00 list prepaid. SPECIAL—Will accept RCA or C only tubes that light (even if dead otherwise) in exchange on GUARANTEED bakelite base, tipless 201A type tube, prepaid—send old tube and \$1.60 for new tube, advising if you want to use it for radio, audio or detector. RADIO EXCHANGE, KENT, OHIO. (We want nothing but PERFECT, LATEST MODEL apparatus and deliver nothing but perfect, tested, latest model apparatus. No sets).

Sell Amrad Receiver, Jewell Trio, Jewell 1000 Voltmeter, General Radio Laboratory Condenser, Decade Resistance Box, Audibility Meter, Wavemeter, 550 volt Motorgenerator, Honeycomb Coils, DL100 to DL1500. 9AAT, 4602A Delmar, St. Louis, Telephone, Main 328.

DID—JA—C—MI—BACK—ADDS. 3 BOV.

Send for our **FREE CODE LESSONS** showing simplicity of learning Radio. Positions secured for graduates paying \$40. to \$50. per week after short course. Fall term begins September 14. Free Scholarships for a few lucky ones. **INQUIRE!** Catalog free. **MASSACHUSETTS RADIO SCHOOL**, 18 Boylston St., Boston, Massachusetts.

REMLER TWIN-ROTOR CONDENSERS \$4.49. CURTIS-GRIFFITH, FORT WORTH, TEXAS.

INTENSE SPEED PRACTICE TESTED AND FOUND FB. SPEED INCREASED FROM 25 to 35 PER IN TWO EVENINGS. If interested ask for information. **Dodge Radio Shortkut, Mamaroneck, N. Y.**

BOUGHT \$10,000 worth United States Government Aircraft Department Radio Transmitting, Receiving Sets and Parts. Get our new and latest reduced price list. Send 2c stamp for list. Mail orders answered all over the world. **WELL'S CURIOSITY SHOP, 20 S. 2nd St., Philadelphia, Pennsylvania.**

TELEFUNKEN 30 watt power tubes on hand for immediate delivery. Filament 10 volts. 2 amperes. Plate 1000 volts, .07 amperes. Extra large elements, excellent for short wave transmission, \$16.50. **Arthur Beyer, 106 Morningside Drive, New York City.**

Sale or Exchange:—220 Kennedy with Amplifier, 175-3000 meters, forty dollars or trade for Motor-generator. Radio 6BVY, Newman, California.

EVERYTHING FOR THE HAM. MAKE THAT SHORT WAVE SET PACK A WALLOP. BETTER START IN BY PUTTING UP A HE-MAN AERIAL. NO. 12 "DYNEX" SOLID COPPER ENAMELED WIRE 1c FT., 500' \$4.75; 1000', \$9.25. NO. 10 (FOR HEAVY DUTY) 1 1/2c FT. PYREX GLASS TRANSMITTING INSULATORS \$1.50. RECEIVING SIZE 45c. LIGHTNING SWITCHES \$3.15. "DYNEX" HOOPS FOR THE CAGE 8", \$2.50; 18", \$3.00; 30", \$3.50. 1/16" LEAD & ALUMINUM 90c SQ FT. "DYNEX" KEM RECTIFIER ELEMENTS 1" x 4", 6c EACH. 1" x 6", 7c EACH. 1" x 1 1/2", 8c EACH. PYREX-GAROD GLASS SOCKETS, \$1.50. ALLEN-BRADLEY RADIOSTATS \$6.50. TYPE 210, \$4.00. "S" TUBES. (HAVE A FLOCK ON HAND NOW, NO WAITING) WITH BASES \$10. MERSHON CONDENSERS \$8.00. CARDWELL TRANSMITTING CONDENSERS, \$15.00. NO. 16 D.C.C. MAGNET WIRE, 75c LB. NO. 16 COTENAMEL 75c LB. I CARRY A STOCK OF RCA, ACME, WESTON, JEWELL, AND OTHER LEADING MAKES OF TRANSMITTING STUFF. AND DON'T FORGET "DYNEX FOR DX." **E. J. NICHOLSON, 1407 FIRST NORTH ST., SYRACUSE, N. Y.**

MOTOR GENERATOR Bargains. Robbins & Myers 110 V. generator 250 V. 100 W. \$25.00. Robbins & Myers 110 V. generator 350 V. 100 W. \$30.00. Robbins & Myers 110 V. 60 cycle single phase generator. 750 V. 250 W. \$55.00. 750 V. 350 W. \$65.00. Esco 220 V. 60 cycle 3 phase 1750 Generator 400 V. 100 W. \$25.00. Esco motor 220 V. 60 cycle single phase Generator 500 V. 200 W. \$40.00. 220 V. Direct current Generator 1000 V. 500 W. \$65.00, 1500 V. 500 W. \$75.00. All above machines are ring dilled and include field rheostat. Also many others. Write us for prices on anything in motors, generators and motor generators stating kind of current voltage, etc. **Queen City Electric Co., 1734 Grand Ave., Chicago, Ill.**

PUT UP SOME No. 12 enameled wire in the antenna and notice the difference. Only \$6.90 per 1000' here, 75c per 100' or less. No. 14 enameled \$5.00 per 1000', 55c per 100'. Use Sure Fire insulators to match the wire, \$1.15 for a 20 inch glistening white porcelain, \$1.00 each for four. Still they come for edgewise wound copper strip, 1/16 x 3/4 inch, wound 6" inside diameter 12c per turn, 4" 10c per turn. Real inductance clips only 20c. Flexible braid, 1/2 inch wide, 4c per foot. **RENT AN OMNIGRAPH TO LEARN THE CODE OR INCREASE YOUR SPEED. 9ALD HAS 'EM, ANY SIZE. JUST DEPOSIT THE PRICE OF THE OMNIGRAPH. USE IT MONTH OR MORE. RETURN IT, AND WE REFUND YOUR MONEY LESS SMALL RENTAL. 4000-1 S tubes in stock, no waiting, \$10.00, sockets 90c; 1/16 inch aluminum, 75c per square foot, lead 90c; UC-490 1 mfd. 1750 volt condensers \$2.50, 21-AA 1 mfd. 1000 volt condensers \$1.90; UC-1014 .002 mfd. 3000 volt grid or plate condenser \$2.50; 50 watt grid leaks \$1.65, 5 watt, \$1.10; UC-1831 VARIABLE CONDENSERS GOING FAST. A \$9.00 HIGH VOLTAGE TRANSMITTING CONDENSER FOR ONLY \$1.80; Primary filament rheostats, E-210 for 5 or 10 watts, \$4.00. Radiostats \$6.50; **SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T****

50 watt sockets \$2.25; UV-203-A 50 watt Radiotrons \$38.00, UV-203 \$30.00, all tested in operation; Latest Ballantine's Radio Telephony for Amateurs, \$2.00; Few UP-1016 power transformers for 2 50 watters, \$21.00; Thordarson 80 watt filament transformers \$6.30, 150 watt \$9.00; 100 W. Plate transformer \$11.70; 450 W. \$16.20; 900 watt \$27.00, special plate and filament transformer for one 5 watt \$6.75; Some of those \$20.00 RCA Thermo-ammeters, 0-5 amps, only \$7.50; \$5.00 West-house lightning switches, you need one NOW, \$1.50; No. 260 General Radio supporting insulators 25c; No. 31 Mesco keys, 1/2" removable silver contacts, only \$2.25; Transmitting inductance, like RCA, with 3 clips, \$7.50; **PLEASE INCLUDE POSTAGE WHEN YOU ORDER.** we'll ship C. O. D. if you wish. Get the new **HAMA-LOG**, full of everything needed by a ham. It's free, and it's the only real Ham Catalog. **E. F. JOHNSON, 9ALD, Waseca, Minn.**

"AMATEUR RADIO EXCLUSIVELY" WILL HELP YOU TO REMODEL YOUR STATION FOR THE COMING WINTER SEASON. LOOK OVER YOUR TRANSMITTER. IS IT IN GOOD CONDITION? WE CAN REBUILD IT FOR YOU. AND YOUR RECEIVER? HAVE YOU THE BEST? 30 METERS UP TO 125 METERS IS THE IDEAL AMATEUR RECEIVER. WE CAN SERVE ON THIS. DON'T HESITATE TO GET DOWN ON THE 5 METER BAND. A GOOD TRANSMITTER CAN BE BUILT FOR \$25.00 TO \$50.00. AND THE POWER SUPPLY AND FILTER CIRCUITS FOR THE HIGHER WAVES. ESCO MOTOR GENERATORS ARE GOOD GENERATOR SETS. WE ALSO SUPPLY POWER TUBES, POWER TRANSFORMERS, INDUCTANCES, INSULATORS, IN FACT ANYTHING TO MAKE A FIRST CLASS AMATEUR STATION. READ QST ON WHAT COUNTS. "GOOD GRADE PARTS!" NOT CHEAP MATERIAL! WE ALSO REPAIR AND REWIRE YOUR SUPER-HETERODYNE. WE BUILD SPECIAL EXPERIMENTAL EQUIPMENT. TO ORDER. ANYTHING SHOWN IN QST. WAVEMETERS KEEP THE INSPECTOR FROM THE DOOR. USE ONE! OUR PRICE IS RIGHT FOR WIRING ANY SET. IF YOU HAVE THE PARTS SEND THEM IN. ON ANYTHING IN THE HAM LINE, LET'S HAVE THE PROBLEM. SEND US YOUR INQUIRIES. ESTIMATES GLADLY GIVEN. QSO, THOS. ENSALL (ENSALL RADIO LAB.) 1208 GRANDVIEW AVE., WARREN, OHIO. ("Designers of High Grade Amateur Equipment").

REMLER GIBLIN and DeForest coils, new, mounted, only few left as follows:—100-150-200-300-400-500 turns half list price. Postage extra. Geo. Schulz, Calumet, Mich.

SPECIAL (9-1 Ratio) SAMSON "HAM" AUDIO transformers with an amplification factor of 75 with tube and transformer at 1200 cycles. Designed for code reception only. Price \$5.00. SAMSON ELECTRIC COMPANY, CANTON, MASSACHUSETTS.

2.75, postpaid. Navy 5 watt transmitting tubes. Guaranteed new. Neubauer, 1220 Pine, Philadelphia.

ARE YOU ANCHORED AT 10-15 PER—ON REQUEST WILL MAIL LATEST HONOR ROLL WITH REPORTS FROM MANY OLD METHOD KEY AND BUZZER HAMS WHO IN A FEW HOURS DOUBLED SPEED. METHOD \$2.50. KILLS HESITATION. Dodge Radio Shortkut, Mamaroneck, N. Y.

TRADE Kennedy 176-26000 receiver, excellent condition for anything—transmitting parts desired. Will sell for \$75. Box 1161, McGill, Nevada.

WANTED—50 - WATTERS. 250 - WATTERS, OMNIGRAPHS. "BIG." CURTIS-GRIFFITH, 5AQC-5RV, FORT WORTH, TEXAS.

CODE MADE EASY and interesting. Alphabet in 15 minutes. Original. New Rhythmic Memory system. Copyright \$1.00. Cheques \$1.10. Dept. Q, Kwikkode, 724 Beresford Ave., Winnipeg, Man., Canada.

200-20,000 METER receiver including radiotron \$25.00; two step amplifier \$18.00. Smith, 1416 Market, Philadelphia, Pa

EDISON B BATTERY SUPPLIES. LARGEST SIZE TYPE A ELEMENTS 4c A PAIR, DRILLED 5c A PAIR, WIRED IN PAIRS 8c. PURE NICKEL WIRE

1c A FOOT. PERFORATED RUBBER SEPARATORS FOR BATTERIES 1/3c EACH OR CUT YOUR OWN SEPARATORS FROM SHEETS 5 3/16 x 5 7/8" 3c A SHEET. CHEMICALS FOR 5 LBS. BATTERY SOLUTION, ENOUGH FOR 100 VOLTS 7c. EDISON 300 AMPERE HOUR A BATTERIES IN PERFECT CONDITION 55c. ALL ARTICLES POSTPAID. SEND REMITTANCE WITH ORDER. BERNARD STOTT, 60 PALLISTER AVENUE, DETROIT, MICH.

9AEL selling out. Real bargains. Mail card for list.

"R" POWER EDISON ELEMENT UNITS WILL GIVE YOU LASTING SATISFACTION WITHOUT NOISE OR TROUBLE. JUST CONNECT TO RECEIVER AND AC LINE PERMANENTLY. SIMPLICITY ITSELF. EQUIPT WITH CHARGE-RECEIVE SWITCH AND FULL WAVE CHARGER. 100 VOLT UNIT, \$14.00. 140 VOLT, \$18.50. COMPACT 100 VOLT TYPE A UNIT, 6" x 5" x 12", \$9.50. TYPE A ELEMENTS ELECTRICALLY WELDED ON NICKEL-SILVER STRIP CONNECTORS, 5c. NO. 20 PURE NICKEL WIRE, 1c PER FT. SEPARATORS 1/3c. SPECIAL B POWER UNITS BUILT TO ORDER. J. ZIED, 530 CALLOWHILL ST., PHILA. PA.

CEDAR RADIO CABINETS—Manufacturers of Radio Cabinets, built from cedar, birch, mahogany or gum wood. We sell direct to the consumer which gives you the profit enjoyed by the dealer. These cabinets are remarkably low priced considering quality, construction, etc. All are built to suit your requirements. Send panel sizes for prices. Mannheim Woodworking Co., Mannheim, Lancaster Co., Pa.

PURE ALUMINUM and lead rectifier elements, holes drilled, with brass screws and nuts per pair 1/16", 1" x 4", 13c. 1 x 6, 15c. 1 1/4 x 6, 17c. 1 1/2 x 6, 19c. single elements half price. Sheet aluminum 1/16", \$1.00, 1/8", \$1.90. Lead \$1.00 square foot all prepaid. Geo. Schulz, Calumet, Michigan.

SELL, Carco Ham Special, \$3.00. R.C.A. Transmitting Inductance \$3.00 W. G. Oldham, Roberts Avenue, Santa Rosa, Calif.

50 WATT transmitter complete (includes transformers) less tube, and low loss receiver. Sacrifice, Write Ex 7EM Medford.

MASTER CODE IN FIFTEEN MINUTES—16 WORD SPEED in three hours. These world records made by our students. New 1924 Honor Roll tells code learning story as reported by TWO HUNDRED students all now licensed; some in each radio district; copy free on request; method \$2.50; kills hesitation; Dodge Radio Shortcut, Mamaroneck, N. Y.

General Electric 24/1500 volt 233 ampere 6000 RPM Dynamotors. Triple commutator. Ball bearings. 750 volt tap. Unused \$45.00. Slightly used \$25.00. Guaranteed perfect. Cost government \$92.50. IDEAL FOR 32 VOLT PLANTS. With extension for belt or battery drive \$3.00 additional. Crocker-Wheeler 24/1500 volt 450 watt 6500 RPM 100 segments \$45.00. Slightly used @ \$35.00. Cost \$90.00. Either model operates on lower battery voltage delivering corresponding lower high voltage. 350 volts obtainable on six. Holtzer-Cabot 12/500 volt .07 ampere \$18.00. Cost \$40.00. Navy Flame Proof Key with "Blinker Light" Prepaid \$2.00. Cost \$16.50. Henry Kienzie, 501 East 84th Street, New York.

HERE THEY R—Complete 5 Watt Transmitter \$25; 10 Watter \$40; 25-225 Meter LOW LOSS TUNER, 4 Tubes complete \$50. All New. Other Offers. 3BOV, S. STROBEL, 3923 N. SIXTH ST., PHILA. Pa.

ONE 6 tube Federal receiving set No. 61, list \$215.00, sell for \$95.00. This set is new. One 8 tube EIS Super \$75. One 6 volt homecharger battery charger, list \$18.50, sell for \$9.00. Might trade for transmitting apparatus. All letters answered. Blum, 935 Ebner Street, Columbus, Ohio.

WANT TO MEMORIZE THE WIRELESS CODE? The Corydon Snyder Code Method, Patented, is quickest. Send 50c coin, stamps or M.O. to C. Snyder, 1423 Elm-dale Ave., Chicago, Ill.

ROICE 5-WATT DX BABY \$3.00. CURTISS-GRIFFITH, FORT WORTH, TEXAS.

OMNIGRAPHS, METERS, MOTOR-GENERATORS.

SUPER-HETERODYNES. BOUGHT. SOLD. RYAN RADIO COMPANY, HANNIBAL, MISSOURI.

EXCHANGE: Cameras and kodaks, all sizes, for Radio Sets or parts. Rexford De Tompkins, Ottawa, Ill.

Let Me calibrate your wavemeter. 15 to 200 meters. Standard accurate to .01 of 1%. Any range \$2.00. My meter any range \$3.00, 2% accurate. Write for circular of other Ham goods. Edgar Purdom, Vaneburg, Ky.

ARE YOU AMBITIOUS TO BECOME ORS—ASK FOR LATEST HONOR ROLL—Read reports from many students who by little effort won that certificate of proficiency. Method \$2.50. Kills hesitation. Dodge Radio Shortcut, Mamaroneck, N. Y.

NEW REMLER VARIOMETERS \$3.00. Lopez Tuners. AMATEUR, BROADCAST \$5.00. John Kelechi, 2857 Ambler, Cleveland, Ohio.

ABSOLUTELY NEW—Philco 90 amps, \$16.00, Manhattan Jr. Speaker \$3.90. Radiola Speaker \$16.00. Dill Radio, 439 East Diamond Ave., Hazelton, Penn.

QSL cards 80c per 100 and up. Samples free. L-AOP, Theodore Parker, 23 East St., Fitchburg, Massachusetts.

Radiola VI 6 tube loop aerial set cost \$162.50 will sell for \$38.00, never used, can be converted to a superhet at small cost. Barnes Electric Co., Emporium, Pa.

GREBE SETS WANTED. SIX TUBE RADIODYNE IN EXCHANGE. PAYNE, WINCHESTER, INDIANA.

Kenotron, large, \$5.00; new socket \$1.50; microphone \$1.00. BDAW, Minneapolis.

SACRIFICE—50 watt transmitter \$50. Robert McCracken, Cuyahoga Falls, Ohio.

FOR SALE—Esco 110 AC-550V D.C. MG. Set new, used only two weeks—Perfect—Item No. 7 Esco Catalogue—Cash \$50—4XE—W. J. Lee, Winter Park, Florida.

EDGEWISE wound copper ribbon, the only really satisfactory antenna inductance .350" wide; 3 1/2" outside diameter 10c turn; 4 1/4" 13c turn; 5 1/4" 15c turn; 6 1/4" 17c turn; 7 1/4" 20c turn. prepaid any number turns in one piece; Geo. Schulz, Calumet, Michigan.

TELEFUNKEN 200 WATT POWER TUBE, \$60.00 Filament 14 volts, 4 amperes Plate 3000 volts. Arthur Beyer, 106 Morningside Drive, New York City.

DID YOU KNOW THE CODE BUT SOMEHOW FAIL TO PASS? Latest Honor Roll with reports from many Previous Failures who quickly and easily obtained Amateur License mailed on request. Method \$2.50, Kills Hesitation. Dodge Radio Shortcut, Mamaroneck, N. Y.

GET YOURS, Bargains. Spintites 25c Set. High Grade Binding Posts, no mud, two for nickel. More dollar assortments. R. P. BARROWS, 4 Columbia Rd. Portland, Maine.

TWO Westinghouse Dynamotors 10 Volt supply—350 Volt 100 Milliamp output—never used. \$11.00 each—15 dial Omnigraph \$10 one set dials. 4XX.

GOING. 3QG's 50 watt transmitter. All waves. Upton, 1017 Lowry NE, Mpls.

HAMS. Get our Samples and Prices on Printed Call Cards made to order as YOU want them. 9APY, HINDS & EDGARTON, 19 S. Wells St., Chicago, Ill.

SALE OR EXCHANGE:—Western Electric 7A Power Amplifier with three 116A tubes. Forty dollars or swap for Motor-generator. Radio 6BVY, Newman, California.

1Mfd. Western Electric fixed condenser new stand 1000 volts. \$1.00, 3 for \$2.50. Prepaid. Geo. Schulz, Calumet, Michigan.

TACK SIX MONTHS MORE TO THAT DYING BROADCAST TUBE. NO JUNK TO BUY. MY METHOD 50c. MONEY BACK GUARANTEE. CHRIS, MEISTER, ROSLYN, PENN.

Generators, new, rated at 275 volts but give output up to 600v. \$5. UC1831 variable transmitting condensers. IT IN QST—IT IDENTIFIES YOU AND HELPS QST

Q R A SECTION

50c straight, with copy in following form only: CALL—NAME—ADDRESS. Any other form takes regular HAM-AD rates.

\$1.75. UC1015, \$2. VT-1 \$5. VT-2 \$5.50. 1/4 H.P. AC motors \$12. No. 12 enameled solid wire 75c per 100 ft. No. 14, 50c. Number of used generators in A-1 order of different voltages on hand. Postage extra. R. Wood, 38 Way Ave., Corona, N. Y.

HARP 201A TUBES \$1.59. CURTIS-GRIFFITH, FORT WORTH.

BEST cash offer takes General Radio 174B wavemeter chokes and transformers for Schikerling eliminator tube. Write for dope and list. Leitch, Park Drive, West Orange, N. J.

BARGAIN—10 watt transmitter 2 meters, R.C.A. trans. 1 tube, etc. \$35.00 takes it, Carlton Nopper, 2C Carlton Apts., Rhode Island and Madison Aves., Atlantic City, N. J.

"WHEN WINTER COMES"—Get DX with a good note. Quick delivery on Amrad "S" tubes. SPECIAL LOW PRICES ON RADIO APPARATUS. JIM LISK, 902 S. ELIZABETH, LIMA, OHIO.

\$5.00 New United States Government Aviators, Automobile, Racing and Motorcycle leather Helmet with head-phones and microphones, cost \$25.00. Postage Free. Limited supply; other Government Radio bargains. Send stamp for list. WEIL'S CURIOSITY SHOP, 20 South 2nd Street, Philadelphia, Pa.

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4DS—J. Kenneth Brown, 307 College St., Greenville, Tennessee.

5AEN, H. T. Duson, Box 183, Crowley, La.

711, R. C. Naser, R. F. D. 1, Guemes Island, Anacortes, Wash.

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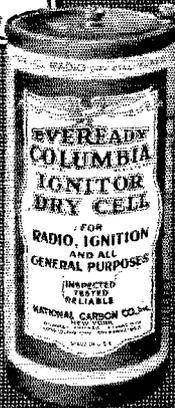
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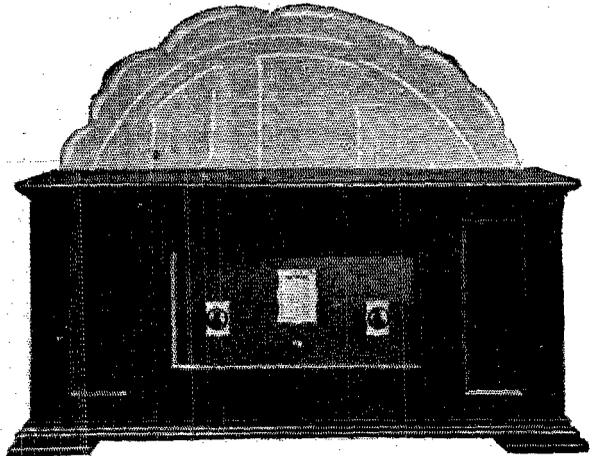
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QST'S INDEX OF ADVERTISERS IN THIS ISSUE

Acme Apparatus Co., The	2	Marlo, Elec.	86
Advance Electric Co.	72	Martindale & Co., Thos.	86
All American Radio Corp.	78	Music Master Corp.	87
Allen-Bradley Co., The	3rd Cover		
ADV Questionnaire	89		
A.R.R.L. Application Blank	38		
A.R.R.L. Emblem	89	National Carbon Co., Inc.	94
		National Company	70
		Neutrowound Radio Mfg. Co.	73
Bluebird Tube Co.	82		
Bremier-Tully Mfg. Co.	77	Facent Electric Co.	78
Burgess Battery Co.	67	Phenix Radio Corp.	1
		Precise Mfg. Co.	74
		Premier Elec. Co.	84
Cardwell Corp., Allen D.	76		
Corning Glass Works	72	Radial Co.	82
Crescent Radio Supply Co.	84	Radio Corp. of America	4th Cover
Cribben Radio Corp.	75	Radio Engineering Lab.	78
Crosley Mfg. Co.	71	Radio Frequency Lab.	96
Cunningham, E. T., Inc.	2nd Cover	Radio World's Fair	80
		Reichmann Co.	85
Daven Radio Corp.	86		
Duplex Cond. & Radio Corp.	74	Sangamo Elec. Co.	76
		Stromberg-Carlson Telephone Mfg. Co.	89
H. H. Eby Co.	82	Super-Insulated Wire Co.	84
Electrical Research Lab.	69		
Eagle Radio Co.	76	Thordarson Elec. Mfg. Co.	82
Electric Specialty Co.	74	Toaz Engineering & Sales Co.	93
		Troy Radio Co.	84
General Radio Co.	81		
Goyer Company, The	88	Uncle Sam Electric Co.	80
		U. S. Tool Co.	80
HAM ADS	90-93		
Benjamin Hughes Elec. Co.	86	Vibroplex Co.	66
Jenkins Lab., The	68	Walbert Mfg. Co.	86
Jewett Radio & Phonograph Co., The	4	Weston Elec. Inst. Corp.	72
		Wireless Mfg. Co., The	88
Kalmus, Comstock & Westcott, Inc.	70	Wireless Specialty Apparatus Co.	79
Kellogg Switchboard & Supply Co.	70		
Kimley Electric Co.	84		

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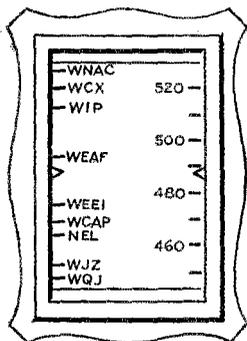
Announcing
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THREE YEARS ago a group of men organized the Radio Frequency Laboratories, Inc., because they believed in the future of the radio industry. One result has been the development of a broadcast receiving system which is unique in its combination of power with simplicity.

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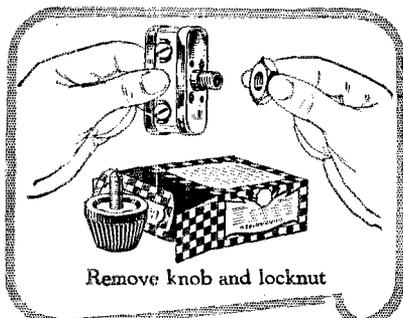
*Illuminated
 Station Selector operated
 by knob at right of panel.
 Volume control at left.*

RADIO FREQUENCY LABORATORIES, Inc.
Boonton, New Jersey

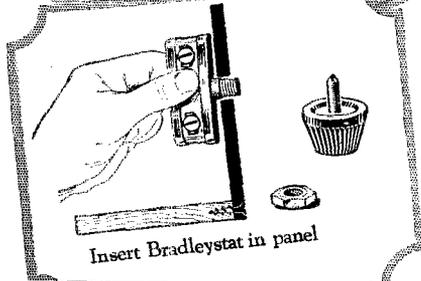
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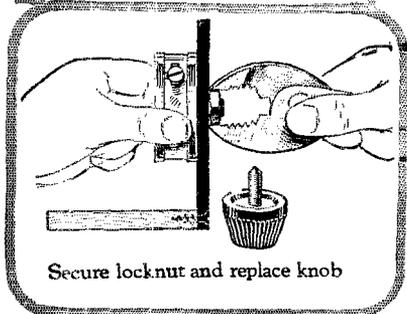
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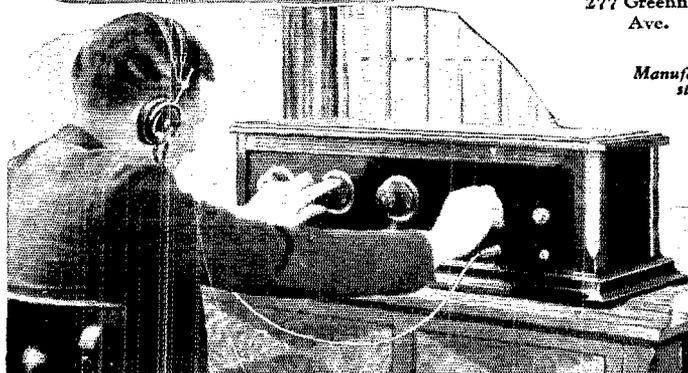
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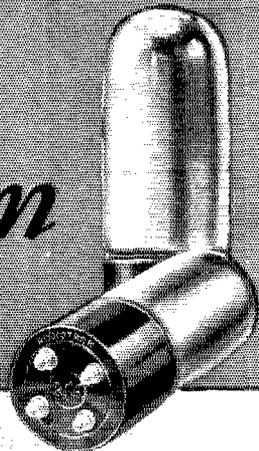
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