

September, 1933
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QST

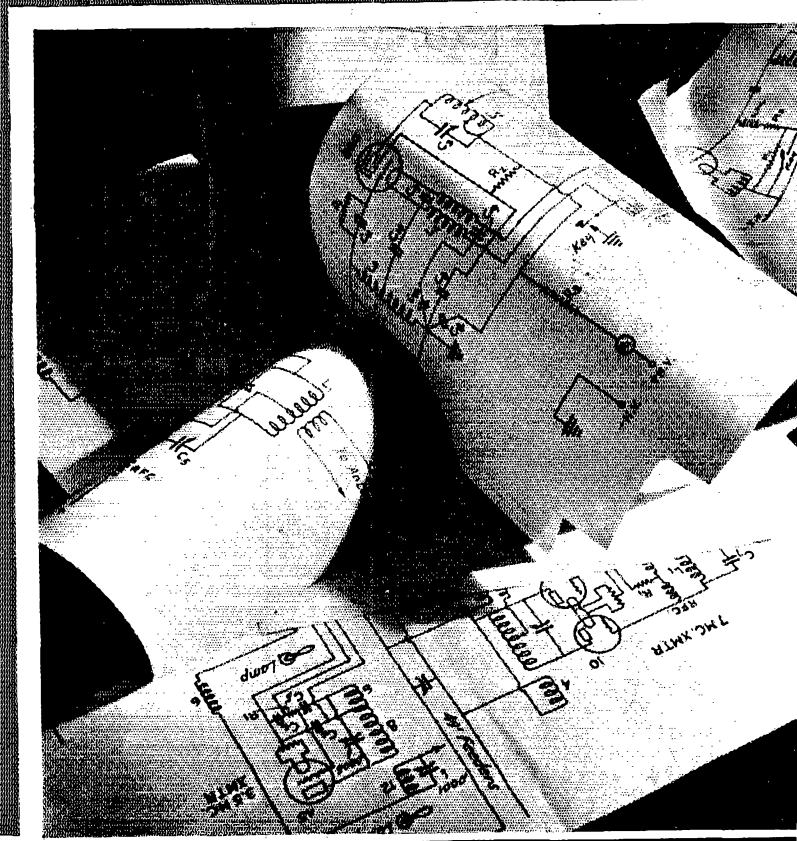
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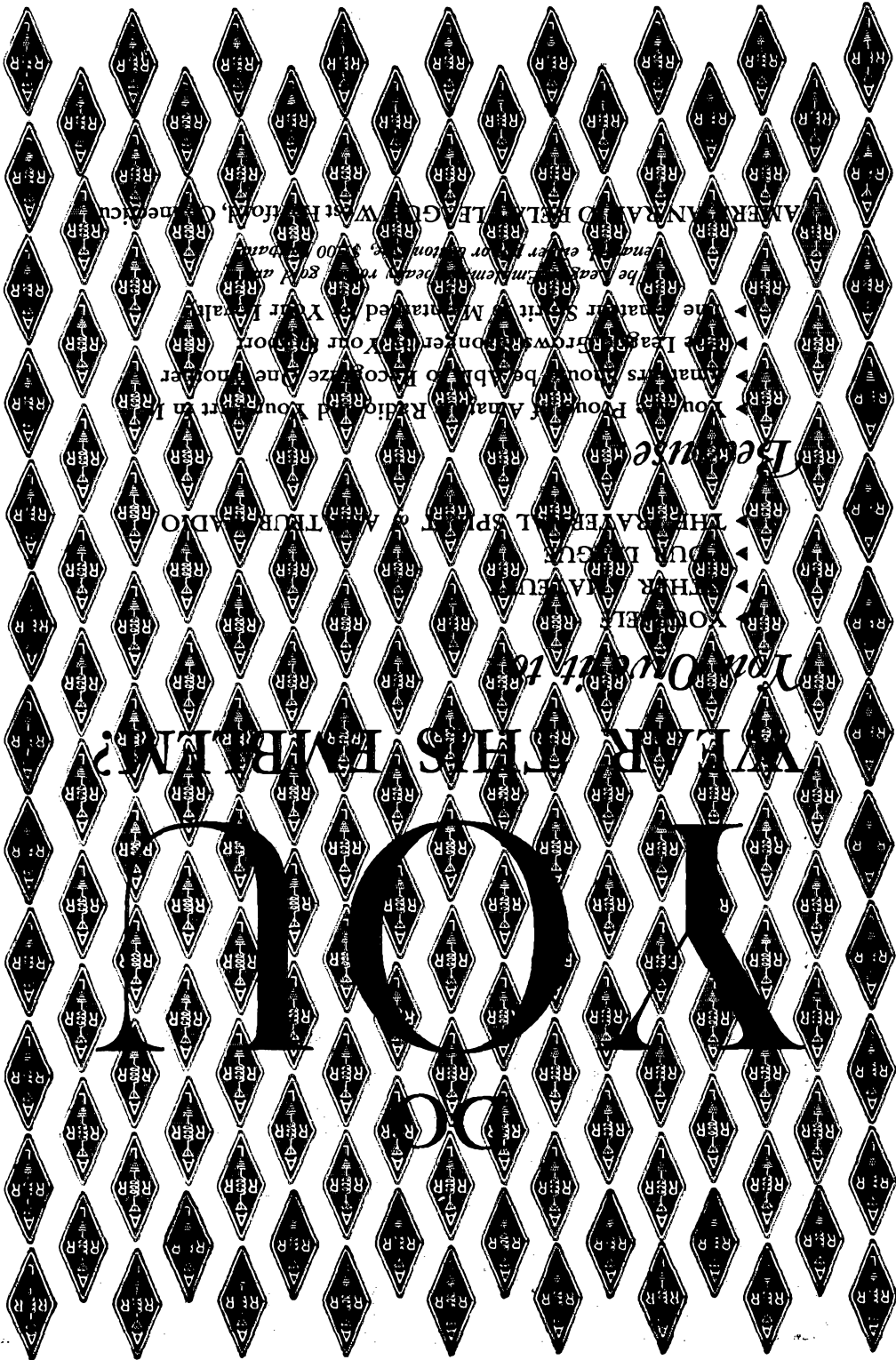
amateur radio



Complete
in this issue

The New
Amateur
Regulations





WHY THIS?

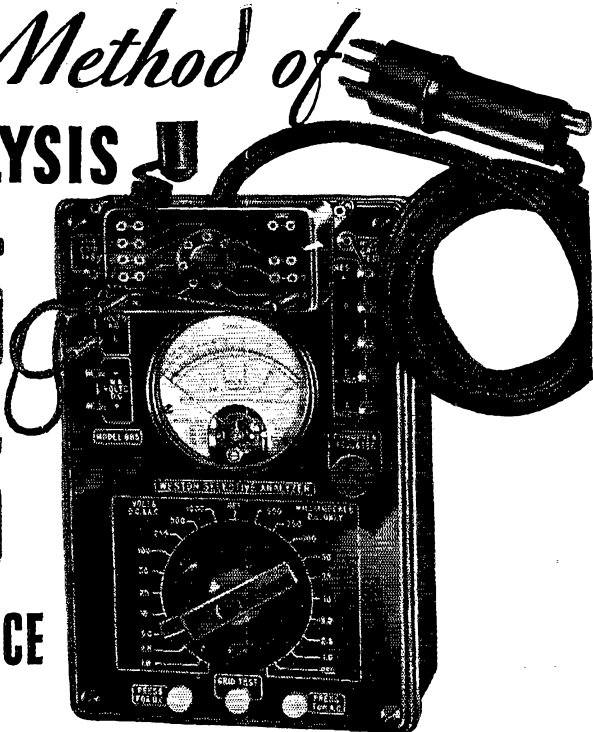
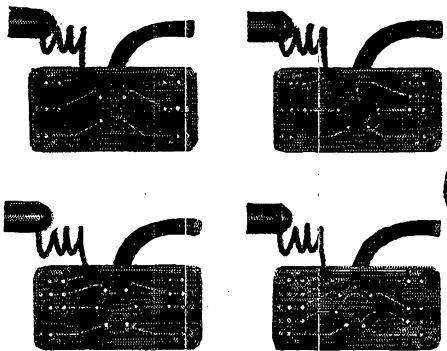
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AMERICAN ROAD BUILDING...
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THE LAYER...
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Announcing.....

the WESTON Method of **SELECTIVE ANALYSIS**



ANALYZER OBSOLESCENCE *is banished!*

No longer is there the slightest need for worrying about Analyzer obsolescence. Weston has found the solution, providing a design which is always up-to-date regardless of tube developments. It's a method of Selective Analysis involving the new Weston Model 665 Selective Analyzer and suitable Tube Selectors.

Weston Model 665 Selective Analyzer contains all the necessary voltage, current and resistance ranges. Tube Selectors to accommodate 4, 5, 6 and 7 prong tubes are provided. You merely attach the proper Tube Selector to the Selective Analyzer.

Modernize Your Analyzer with Weston Socket Selector Units

Your present Analyzer can be brought up-to-date and kept that way by means of the new, inexpensive Weston Tube Selectors, which can be used with all models and makes of Analyzers. Return the coupon for descriptive bulletin.

Next insert the plug into the tube socket of the radio set. Then by plugging into the proper jacks, voltage, current and resistance may be read in any part of the entire network leading to the tube socket.

The Weston Model 665 Selective Analyzer with Tube Selectors truly is universal in its capacity to analyze radio receivers. New tubes merely mean a new, inexpensive Tube Selector. That's how obsolescence is eliminated. Return the coupon today for complete information... Weston Electrical Instrument Corporation, 602 Frelinghuysen Avenue, Newark, New Jersey.

WESTON *Radio Instruments*

Weston Electrical Instrument Corporation
602 Frelinghuysen Avenue, Newark, New Jersey.
Please send bulletin describing Model 665 Selective
Analyzer and Tube Selectors.

Name.....

Address.....



Westinghouse Rectox Instruments MAKE YOUR SUPER TELL THE TRUTH *about percentage modulation*

“HAMS” that are combing the ether with a superhet, either of the “siggle sniggle” type, or just a plain super, can now equip their sets with a percentage-modulation indicator at low cost.

A Rectox milliammeter or voltmeter (depending on the type of sound reproduction) in the output circuit of a superheterodyne receiver, calibrated in conjunction with a second detector plate milliammeter, gives percentage-modulation readings on a received signal.

When thus calibrated the instrument can be used for fidelity or frequency runs

on transmitters, or speech equipment associated with them; for checking and adjusting operation of the modulated stages on transmitters; and numerous other adjustments requiring readings of percentage modulation.

Another Westinghouse folder is just off the press giving data on the theory, installation, and calibration of the percentage-modulation indicator, including wiring diagrams. Send for your copy.

Watch future Westinghouse advertisements in QST for announcements of other instrument application folders.

Westinghouse

*Quality workmanship
guarantees every Westinghouse product*



SEND FOR INFORMATION

Westinghouse Electric & Manufacturing Company
Dept. 105, Room 2-N—East Pittsburgh, Pa.

Gentlemen: Please send the booklets checked below.
 F. 8310—Rectox Instruments as Output Indicators.
 Catalog 43-340—Types MX and NX Instruments.

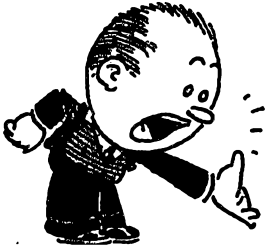
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QST

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devoted entirely to

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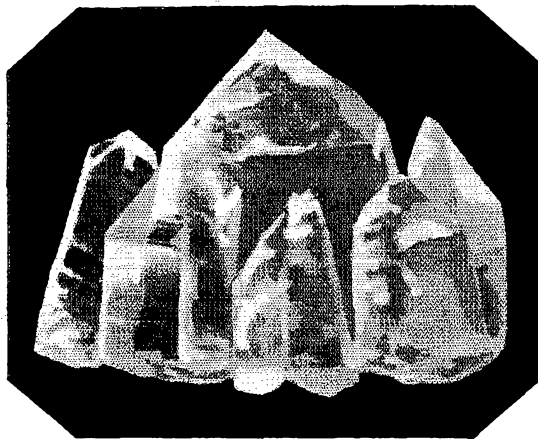
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SINGLE-SIGNAL RECEPTION

with the

COMET "PRO"

A New Model Uses an Improved

CRYSTAL FILTER

HAMMARLUND's interpretation of "Single-Signal" reception with a crystal filter is unique.

Characteristically thorough, Hammarlund has not rushed blindly into premature enthusiasm. It has required time and care to perfect the application of a quartz crystal to so excellent a receiver as the COMET "PRO," without losing more efficiency than is gained.

Now, it is here — the famous COMET "PRO," retaining all of its former desirable features — PLUS 100 PERCENT OF CRYSTAL SELECTIVITY.

A flip of a switch on the front panel instantly converts the standard "Pro" to the crystal "Pro." Another front-panel control varies the response characteristics of the crystal filter, *without detuning the circuit or reducing efficiency in any respect.*

Specially-tested quartz crystals are used, carefully selected for their low resistance and absence of spurious frequencies.

The COMET "PRO" thus reaffirms its leadership. It is a *complete* receiver, with built-in power supply. It provides band-spread tuning *at all frequencies.* Four sets of coils (*included*) cover all bands from 20,000 to 1,200 kc. *No extras to buy.*

The intermediate transformers are Litz-wound and are tuned by AIR-dielectric condensers. Peak I.F. selectivity is thus maintained regardless of weather or atmospheric conditions.

Built to professional standards, the COMET "PRO" is used all over the world by armies, navies, broadcasting networks, steamships, air-transport lines, police and news services. No finer recommendation could be made for any receiver.

A.C., D.C., and Battery models are available.

SPECIAL: — New 10-meter coils now ready — \$5 a pair.

MAIL COUPON FOR DETAILS

HAMMARLUND MANUFACTURING CO.
424 W. 33rd St., New York

— Check here for new booklet describing the "PRO" in detail. — Check here for General Catalog. — Check here for folder on new Air-Tuned I.F. Transformers.

Name.....

Address.....

.....Q-9



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Philippines*	K4IXA	Newton E. Thompson	714 Tennessee	Manila, P. I.
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Alabama	W4KP	SOUTHEASTERN DIVISION L. D. Elwell	1066 Waverly St.	Tarrant
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Western Florida	W4MS	Edward J. Collins	1517 East Brainerd St.	Pensacola
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Oklahoma	W5VO	Emil Gisel	1st Balloon Co.	Fort Sill
Southern Texas	W5BHO	David H. Calk	6726 Ave. Q	Houston
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Manitoba	VE4GC	PRAIRIE DIVISION Reg. Strong	284 Marlon St.	Winnipeg
Saskatchewan	VE4EL	Wilfred Skaife	2040 McTavish St.	Regina

* Officials appointed to act until the membership of the Section through permanent SCM's by nomination and election.

A Complete List of Collins Transformers

For some time, the Collins Radio Company has made a practice of selling separately the various transformers which are used in the construction of COLLINS transmitters and speech equipment. These transformers have been widely used by broadcasting stations, sound equipment engineers and others. Rapid developments in tubes and circuits within the last few months have made it desirable to add many new items to the list of standard COLLINS transformers and this complete list has been prepared showing most of the new items.

BROADCAST SERIES

No.	Description	Price
Frequency Range 35 to 12,000 C. P. S.		
LINE TO GRID TRANSFORMERS		
605	200 ohm to single or pushpull grids.....	\$ 4.00
610	500 ohm to single or pushpull grids.....	4.00
TUBE TO LINE TRANSFORMERS		
516	10,000 ohm plate to 200/50 ohms.....	4.00
517	10,000 ohm plate to 500 ohms.....	4.00
INTERSTAGE TRANSFORMERS		
307	10,000 ohm plate to single or pushpull grids.....	4.00
309	Pushpull 10,000 ohm plates to pushpull grids.....	4.00
CLASS A OUTPUT TRANSFORMERS		
450	Pushpull 45's to 500 ohms.....	4.00
451	Pushpull 45's to 3-5, 5-8, 8-15 ohms.....	4.00
460	Pushpull 2A3's to 500 ohms.....	4.00
461	Pushpull 2A3's to 3-5, 5-8, 8-15 ohms.....	4.00
MIXING TRANSFORMERS		
220	50/200 ohms to 50/200 ohms.....	4.00
221	50/200 ohms to 500 ohms.....	4.00
225	500 ohms to 500 ohms.....	4.00
CLASS B INPUT TRANSFORMERS		
714	Single 46 or 59 to Class B 46's or 59's 3.1 to 1.....	4.00
715	Pushpull 45's to Class B grids (general purpose) 3.2 to 1.....	4.00
716	Pushpull 45's to Class B 46's (for 25 watts output) 6 to 1.....	4.00
717	Pushpull 845's to Class B 204A's or 849's.....	12.00
718	Pushpull 2A3's to Class B 203A's — 3.2 to 1.....	8.00
719	Pushpull 45's or 2A3's to Class B 210's — 2.2 to 1.....	4.00
720B	Single 2A3 Class A to 2 46's Class B.....	4.00
RIBBON MICROPHONE TRANSFORMER		
515	Ribbon to 50/200 ohms.....	4.00
CLASS B OUTPUT TRANSFORMERS		
761	Class B 46's to 500-6000 ohms — 100 Ma. D. C. in secondary.....	5.00
762	Class B 46's to 3400-4000 ohms — 125 Ma. D. C. in secondary.....	5.00
765	Class B 46's or 59's to 500 ohm line.....	5.00
770	Class B 59's to 5000 ohms — 120 Ma. D. C. in secondary.....	6.75
780	Class B 210's to 5000-6000 ohms — 150 Ma. D. C. in secondary (60-70 watts output).....	9.50
790A	203A's or 211's Class B to 5000 ohms — 200 Ma. D. C. in secondary (Bass response to 70 cycles).....	27.00
791A	203A's to 2500 or 10,000 ohms — 400 or 200 Ma. D. C. in secondary (Bass response to 70 cycles).....	27.00
794A	203A's or 211's Class B to 5000 ohms — 200 Ma. D. C. in secondary (Bass response to 35 cycles).....	50.00
793A	203A's or 211's Class B to 2500 ohms — 400 Ma. D. C. in secondary (Bass response to 35 cycles).....	50.00
792	204A's or 849's to 5000 ohms — 500 Ma. D. C. in secondary (Bass response to 35 cycles), includ- ing oil tank.....	92.00
FILAMENT TRANSFORMERS		
1020C	7.5v CT 7.5v CT 2.5v CT	
	2A 2A 10A.....	\$ 5.50
1022C	2.5v CT 10A.....	3.60
1031C	10v 12A CT 2.5v 10A CT.....	7.00
1035A	10v CT 2.5v CT 2.5v CT 2.5v CT	
	15A 10A 10A 10A.....	15.00
1040B	10v CT 8A.....	6.50
1050B	11v CT 10A.....	8.00
1051B	11v CT 20A.....	14.00
1052A	5v CT 25A.....	15.00

TINYTRANS

No.	Description	Price
Frequency Range 80 to 10,000 C. P. S.		
220z	Mixing transformer 50/200 to 50/200 ohms.	
221z	Mixing transformer 50/200 to 500 ohms.	
307z	Interstage to single or pushpull grids.	
450z	Pushpull 45's to 500 ohms.	
451z	Pushpull 45's to 3-8-15 ohms.	
471z	Pushpull pentodes to 3-8-15 ohms.	
516z	Tube to 200 or 50 ohms.	
517z	Tube to 500 ohms.	
714z	Single 46 or 59 to 46's or 59's Class B 3.1 to 1.	
740z	Class B to 5000-7000 ohms. (see chart).	
741z	Class B to 2500-3000 ohms. (see chart).	
742z	Class B to 3-8-12 ohms. (see chart).	
750z	30 Class A to 30's or 19 Class B.	
751z	30's Class B to 5000 ohms.	
752z	31 or 49 Class A to 19 or 49's Class B.	
753z	56 or 37 Class A to 79.	
754z	56 Class A to 53 Class B.	
756z	500 ohms to grid.	
757x	200 ohms to grid for single or double button microphone.	
1699	2.5v 4A filament transformer. (Other stock models available.)	
PLATE-FILAMENT TRANSFORMERS		
911	325-325v 5v 2.5v 2.5v	
	60 Ma. 2A 4.5A CT 1.75A CT.....	\$ 2.50
910	350-350v 5v 2.5v 2.5v	
	100 Ma. 2A 12.5A CT 3.5A CT.....	4.00
904	500-500v 2.5v 2.5v 2.5v	
	150 Ma. 4A CT 4A CT 4A CT.....	5.85
905	500-500v 5v 2.5v 2.5v	
	175 Ma. 3A 4A CT 4A CT.....	8.00
918	650-650v 7.5v 2.5v	
	150 Ma. 2.5A CT 10A CT.....	9.85
916	600-600v 7.5v 2.5v 2.5v	
	175 Ma. 2.5A CT 10A CT 3A CT 3A CT.....	9.85
919	750-750v 7.5v 7.5v 2.5v	
	150 Ma. 2.5A CT 2.5A CT 10A CT.....	9.85
920	900-900v 10v 2.5v	
	200 Ma. 4A CT 10A CT.....	16.00
LARGE PLATE TRANSFORMERS		
930A	1350-1350v 400 Ma.....	\$22.50
937A	1500-1500v 600 Ma.....	36.00
(Other stock models available.)		
FILTER CHOKES		
807C	20-5 hy 150 Ma. D. C.....	\$ 4.00
811C	20-5 hy 400 Ma. D. C.....	9.75
840C	20 hy 100 Ma. D. C.....	2.50
841C	10 hy 150 Ma. D. C.....	4.00
842C	8 hy 500 Ma. C. C.....	9.75
MOUNTINGS		
Broadcast series audio transformers are supplied with screw lug terminals unless insulated leads out base are specified. Tinytrans are furnished in open frames with insulated leads. Plate-filament transformers and filter chokes are fully encased with insulated leads out base. Large plate transformers are fully encased with porcelain terminals.		
PRICES		
Prices shown are subject to change without notice and net f. o. b. Cedar Rapids or Chicago. Collins transformers are fully guaranteed. Order direct from Collins Radio Company or from authorized Collins distributors.		

PRICE ALL TYPES — \$2.00 EACH

Select the Proper Class B Transformers at a Glance

from this table and Figs. 1 and 2 below

	Fig	Audio Power Watts	V1 Class A	V2 Class B	T2 Input	T3 Output	B1 Volts	B2 Volts	R1 Ohms	R2 Ohms	R3 Ohms	C1	C Bias
A	1	25	45's	46's	716	761 762 765	270	400	200,000	none	750	none	0
B	1	28	45's	59's	716	770 785	270	400	200,000	none	750	none	0
C	1	60-70	45's	10's	719	785	270	650-750	200,000	20,000	750	none	60-90v
D	1	100-240	2A3's	203A's	718	790 791 793 794	360	1000 1250	200,000	10,000	700	20mfd (100v)	30-45v
E	1	500	845's	204A's 849's	717	792	1250	2500	200,000	10,000	600	none	100-180v
F	2	1	30	30's	750X	751Z	180	180	757X trans	50,000	—13.5v bias	bat. bias	22.5v
G	2	1.6 to 2.1	31 or 19 (elements in parallel)	19 (elements in pp)	752X	740Z 741Z 742Z	135	135	0.5 to 1.0 meg	none	—22.5v bias	bat. bias	0
H	2	3.5	49	49's	752X	"	135	135-180	"	none	—20v bias	bat. bias	0
I	2	8	37 or 85 (triode sec)	79 (elements in pp)	753X	"	250	250	"	"	2500	"	0
J	2	10	56 or 53 (elements in parallel)	53 (elements in pp)	754X	"	300	250-300	"	"	2500	25mfd (25v)	0
K	2	20	46	46's	714Z	761 762 765	250	400	"	"	1500	20mfd (50v)	0
L	2	25	2A3	46's	720B	"	300	400	"	"	700	20mfd (100v)	0

T1 — 605, 610, 307, 309, 756X or 307Z

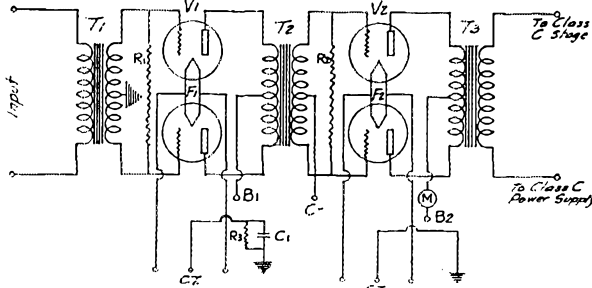
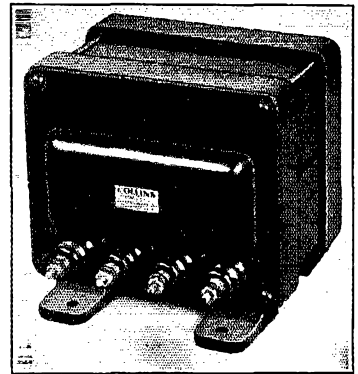
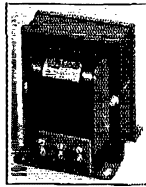


FIG. 1

BROADCAST CLASS B TRANSFORMERS (at right)



5 METER CLASS B MODULATORS



CLASS B 59's

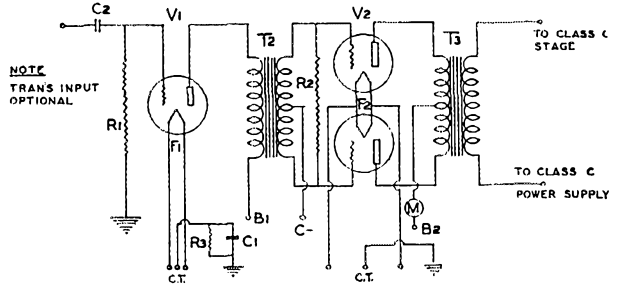


FIG. 2

NOTE
TRANS INPUT
OPTIONAL

Collins Radio Co.

Cedar Rapids, Iowa

The American Radio Relay League



• **T**HE 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.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

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THE EDITOR'S MILL

YOUR old A.R.R.L. is in its twentieth year, a long period embellished with a history of constant accomplishment on behalf of the radio amateur. We hams who make up the A.R.R.L. have created in our organization a spectacle unique in American life—a democratic, non-commercial, self-governing society which has built up our hobby and art to its present tremendous proportions. Down through the years the League has represented the radio amateur, fought for him, preserved his rights and privileges, made amateur radio what it is. The record shows an unperturbed course of doing things, regardless of the criticisms of those with ulterior motives. The system behind this progress is right because in all its fundamentals the things for which A.R.R.L. works are specified by a governing board elected by you readers, the members. Through the whole history of amateur radio you can see A.R.R.L. the true and recognized spokesman of the amateur, year after year actually doing the things that make amateur radio. You fellows can be proud of your ol' League.

It isn't done with mirrors, either. A.R.R.L. history is an open book, a record that stands anybody's inspection. It isn't particularly remarkable that your League, with all these years of experience, should know how to do things for amateur radio. It's only natural that a Board with nineteen years of experience should know how to chart the course of amateur radio, that a Headquarters with personnel who are devoting their lives to the advancement of amateur radio should know how to accomplish the things that are needed. To hear some folks talk you'd think somebody always had to stand behind A.R.R.L. with a sharp pitchfork to get the League to do even the simple little things that are necessary for our well-being as amateurs. And without boosting your gain-control a bit you can hear minute particulars as to just how A.R.R.L. ought to have done a certain job in a distinctly different manner. Now we ask you, who ought to know what can be done and what is the best way of going about doing it? Force? Sure, when that's the indicated treatment, and plenty of it. We modestly assert that nobody should know better than your own A.R.R.L. how to raise the devil and exert force when it is necessary to protect some amateur right. Even when we amateurs don't have everything we want, believe

us that A.R.R.L. still knows what is what, what is possible, the ins and outs of this and that. With the same modesty we wish to state that nobody is in position to know as well as your A.R.R.L. what tactics really ought to be employed in a given situation, and to have the necessary realization of possible ultimate cost and that saving sense of proportion that may dictate withholding the Big Berthas when there are merely small jackals present to be shot at. The record of the League through the years is one of constantly doing the necessary things to preserve the grand old traditions of amateur radio. Surely it isn't necessary for your Headquarters to rush into print every time it accomplishes an item and shout the glad tidings, to the utter cluttering up of *QST*. That's what we're here for, and we've thought that knowledge and the League record itself sufficient.

Of course we have our critics, we regularly receive our modest quota of pan mail from some of our friends who have a gift for using intemperate language in an effective manner, and occasionally some ham-sheet addresses to the League, or the Board, or Headquarters, or your humble servant, some dear little buttercups of compliments and good wishes—not! If we were sensitive to such things they'd probably interfere with our work. But the main job of A.R.R.L. Headquarters is to continue to add to the progress of amateur radio by carrying out the orders and policies laid down by the Board of Directors in response to the expressed wishes of American amateurs, and as long as we have you fellows behind us and you know that your League is going places and doing things, we shall get on.

In a recent editorial Fourth-of-July with red smoke and everything, the amateur world was told (not by us) of the possibility of getting for amateur use some unoccupied or "abandoned" commercial channels. You can almost see the A.R.R.L. asleep at the switch. We know, from our correspondence, that hope in this idea persists amongst amateurs. But the idea is not new and it isn't a bet that A.R.R.L. overlooked. More than five years ago, in fact, the A.R.R.L. first took up that idea, with a plan for what we then called the American Eagle band. It was a good plan, we had a good patriotic story to back it up, and a wholly friendly administration at Washington to listen to it. But it was not possible

then, and it isn't possible now. There's a reason, of course: The international radio treaty assigns bands to services, such as fixed, mobile, amateur. Every nation has the right to assign frequencies to other than the specified kind of station but only on condition that no interference results to the primary use of that frequency in another country. Now we might chisel from a willing government an amateur assignment in frequencies not otherwise occupied by United States stations, say in the fixed band. But the instant our operation there interfered with fixed-station operation in any other country on the globe, our government would be treaty-bound to make us cease and desist. You may think the situation unfair but it is precisely this arrangement that protects our own bands. Periodically some foreign commercial cuts loose in our bands on the theory that it's all right if they can get away without producing international interference; then A.R.R.L. steps in and makes representations through our government that drive the marauder out. The same thing would happen to us with the boot on the other foot. (Incidentally, that business of shoeing foreign non-amateur stations off our frequencies is just one of the many details that Headquarters constantly handles, without ballyhoo.)

But the chief point we want to make is that that idea of additional amateur frequencies isn't exactly so new that it is rattling the back teeth of A.R.R.L. Headquarters. Lord knows we'd like it well enough and for five years we have dug into the idea, reluctant to accept the unanimous verdict of all the experts that it's simply impossible under treaty. But that's the verdict. We write this just to let you fellows know that the idea has previously been thoroughly explored by A.R.R.L. But it may still sell subscriptions.

An interesting thing is happening in this business of d.c. plate supply for all stations, a thing that ought to show us amateurs something about ourselves. As we write it is exactly ten weeks since the Board meeting resolved upon that recommendation. Directors reported to their members, bulletins and broadcasts carried the word everywhere, *QST* reported it in detail. For nine of those weeks we received not one single letter from an amateur objecting to this course, all the letters approved it. We know that amateur radio generally has wanted this thing, that every director present at the meeting reported his division in favor of it, and that the board unanimously so voted. Clearly amateur radio wanted d.c., clearly it accepts that action of our Board.

Yet a week ago we got a few letters and a resolution of protest and it may be that another "movement" is on. As we observe it from this particular swivel chair, we radio amateurs are a pretty temperamental bunch. "Movements" can start in some far region of our vast ham empire and snowball across the country in great

swaths, gathering adherents by the way and crashing into West Hartford with the impact of a meteor. We've seen a number of these snowballs and in most cases their genesis is simple: Somebody doesn't like something, gets up in a club meeting and sells a few fellows on it, they talk it over the air, other fellows pick it up—and another rolling crescendo is on its way to Connecticut.

Now don't misunderstand us. There's a big difference between honest difference of opinion and destructive criticism for ulterior motive, and we're not confusing them an instant. A.R.R.L. isn't run on "gag rule" and we don't tell you what you must think. Anybody has the right to like or to dislike a regulation, just as he jolly well chooses. It is to be expected that some amateurs will not like the new regulation requiring d.c.; Utopia will have arrived when 40,000 amateurs unanimously agree upon anything. You are not to be characterized as a dangerous radical if you do not like this regulation yourself. The fellow amateur who tells you of his disapproval of it is not for that reason an unwholesome agitator.

But we want to say that if another snowball gets headed down east on this particular question, it cannot honestly be regarded as indicative of the true desire of radio amateurs. We know that we, the hams of the country, have wanted such a regulation for a year or two and that a big majority of us in every division have so told our directors. For over two months after the announcement we all accepted it as fine business. Will it not tell us something unpleasant about ourselves as a tribe if we let ourselves be led into joining a movement of protest at this date? Really now, isn't this cause for each one of us to resolve to go slowly and to do our own thinking when approached to join a movement of protest about this or that?

K. B. W.

Kansas State Convention (Midwest Division)

Place: Topeka, Kansas, Chamber of Commerce.
Date: September 9th-10th.
Auspices: Kaw Valley Radio Club.
Registration Fee: \$2.50.

FREE LODGING with cots and blankets at the Armory, through courtesy Kansas National Guard. Further information from W. A. Beasley, Sec'y, 1451 Byron Ave., Topeka, Kans.

Southeastern Division Convention

Thomas Jefferson Hotel, Birmingham, Ala.,
October 27th and 28th

A CORDIAL invitation is extended to all hams within this division to attend the official division convention being held under the auspices

(Continued on page 62)

Plate Supplies to Conform to the New Regulations

By George Grammer, Assistant Technical Editor

IN THEORY, at least, it should be akin to carrying coals to Newcastle or something equally ineffective to attempt to tell a fellow who has complied with the old regulations, by using an unfiltered plate supply only on amplifier stages, how to get d.c. because he has already installed a good filter on his oscillator and buffer stages and knows what he needs to do. There is some room for discussion, though, because (economic conditions being what they are) it is of importance to a good many hams to know what constitutes "adequate filtering," and how it can be obtained without having to sell the transmitter to buy high-voltage filter condensers.

What is an "adequate" filter? Since we amateurs always have contended that our transmitters should be judged by their effects and not by the type of apparatus employed — on the perfectly sound thesis that the best of apparatus in the hands of an incompetent operator is likely to cause more QRM than the simplest equipment operated by a man who knows what he is about — and further, since the new plate-supply regulation is the result of an overwhelming determination on the part of a great majority of us to rid the air of rotten signals, we may say what should or should not constitute adequate filtering because we are the ones concerned with the effects. What we have asked for is that every transmitting amateur be required to adjust his transmitter so it will cause the least QRM; in the language of the regulations, "prevent frequency modulation and the emission of broad signals."

There, it seems to us, is the explanation of the word "adequate." A signal which has no frequency modulation and carries with it no band-wrecking sidebands caused by amplitude modulation is what most of us want to hear. Of course the fellows who already have oscillator-amplifier transmitters with d.c. on the oscillator and buffer stages have taken steps to prevent frequency modulation; therefore, the remaining question is simply that of washing out unwanted sidebands to a sufficient extent.

It does not seem to us that the regulations demand a signal absolutely free of the slightest trace of plate-supply ripple modulation. The kind which most of us call "near d.c." or "d.c. with

slight ripple" causes no more interference than the "pure d.c." signal in ordinary heterodyne reception, assuming equal signal strength in both cases. The sideband power in such a signal is an extremely small percentage of the power in the carrier frequency and hence will not cause appreciable interference, even in an S. S. receiver capable of separating the carrier from the sidebands. In a receiver without such selectivity the difference in interference-producing proclivities between the two types is nil. It is a fact, although

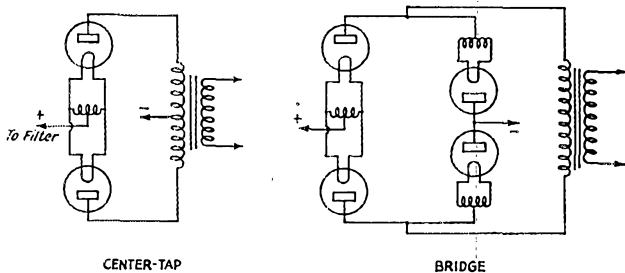


FIG. 1 — CENTER-TAP AND BRIDGE RECTIFIER CIRCUITS

In both circuits, the peak inverse voltage is equal to the total secondary voltage of the transformer multiplied by 1.4. Therefore, twice as much voltage can be obtained from the bridge as from the center-tap rectifier without exceeding the tube ratings. The tubes will pass the same load current in both cases.

not often recognized, that a pure d.c. signal will cause every bit as much QRM as one having a small amount of residual plate-supply modulation, in receivers having anything less than razor-sharp selectivity. Much of the interference that has been blamed on r.a.c. plate supplies has not been the fault of the transmitter but simply that most hams have horribly unselective receivers — and the r.a.c.-on-amplifier fellow has the high power which makes an unholy mess in such receivers.

PRACTICAL PLATE SUPPLY SYSTEMS

Not a great deal of equipment is needed to make the kind of plate supply that will satisfy all but the man who wants purest d.c. or nothing. The power transformer is of course already in the shack. Plate supplies of 1000 volts and higher will require at least a pair of 866 rectifiers. The newer 866's (866-A) are rated at an inverse peak voltage of 10,000, which means that a pair of the tubes will handle a full-wave center-tapped rectifier system with r.m.s. voltages up to 3500 each side of the center-tap. The older tubes with the 7500-

volt inverse-peak rating will take voltages up to 2600 in similar systems. These voltage ratings can be doubled if four tubes are used in a bridge rectifier. The circuits are shown in Fig. 1.

The current that can be drawn from the plate-supply system will depend upon the type of filter used as well as the volt-ampere capacity of the power transformer. As has been pointed out many times previously in these pages, a choke-input filter system with a large-enough choke increases the current-handling capacity of the rectifier tubes considerably over what can be expected with a condenser-input filter. As a general rule it

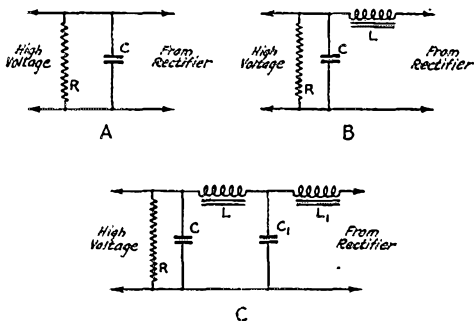


FIG. 2 — THREE SIMPLE FILTER CIRCUITS

The single condenser with its associated bleeder shown at A often will make an effective filter, but possesses several bad features, as explained in the text. The single-section choke-input filter at B should be all that is necessary for the plate supply of a high-power stage that is excited by smaller tubes with well-filtered plate supplies. It will have good voltage regulation and satisfactorily-low ripple when L is 20 to 30 henrys and C 2 μ f. or more for 60-cycle supply, as explained in the text. The filter shown at C is more elaborate and will reduce ripple to very small values using chokes and condensers of the same size as in B. The power dissipated in the bleeder resistance is equal to the product of the voltage across it by the current through it.

is not safe to take more than 200 milliamperes from a pair of 866 tubes working into a condenser-input filter; with an input choke of about 10 henrys this current can be doubled with less strain on the tube filaments. Naturally the increase is not obtained without sacrificing something, so we find that the output voltage is lowered with choke input. On the other hand the voltage regulation is considerably better and in the final analysis it will be found that more actual power can be taken from a plate-supply system with a choke-input filter than from the condenser-input type. The reason for this is that with condenser input a current as large if not larger than that delivered to the transmitting tube plates flows around the circuit formed by the power-transformer secondary, the rectifier tubes and the first filter condenser. This is a useless current since it does not get to the load circuit, but it heats the transformer secondary and uses up plenty of filament emission so that the plate-supply system cannot deliver all the power externally that the transformer capacity and rectifier peak-current

ratings would warrant. It is easy to see that if half the current flowing in the secondary of a 1000 va. transformer is doing nothing but heating the transformer winding, only 500 va. is available for the load — and that is not far from the type of performance obtained with a condenser-input filter. With a fairly large input choke, however, very nearly the full transformer va. capacity can be realized.

The same thing is true of the rectifier tube filaments. With a large input choke, the current that can be drawn from the circuit approaches the peak-current rating of the tubes. A pair of 866's will handle a kilowatt in a properly-designed plate-supply system.

FILTER CONSIDERATIONS

With either type of filter the output voltage is likely to be quite different from that obtained from the same transformer when straight a.c. or rectified but unfiltered a.c. is used. Self-rectified systems are apt to mislead one in power calculations; a d.c. meter in the plate circuit reads the average value of the current, whereas the current that should be used for power calculations is the effective value; actually 1.11 times the meter reading. The effective voltage is the r.m.s. voltage of the transformer secondary. Now when a filter is used the story reverses; if the ripple in the output voltage is small the d.c. meter will read the actual current, but the voltage may be something quite different from the rated transformer voltage. Just what it is will depend upon the load current, the characteristics of the apparatus used in the plate supply system, and the type of filter.

A single-condenser filter such as is shown in Fig. 2A is not very good practice, as the discussion above indicates, but often is sufficient from the purely filtering standpoint to give a note which is nearly pure d.c. — if the condenser is large enough. Something like 2 to 4 μ f. will do a pretty good job of smoothing the output of a full-wave rectifier on 60-cycle supply; about twice that much will be needed for 25 cycles. But this type of filter has poor regulation; the output voltage will build up to 1.41 times the r.m.s. transformer voltage at light loads and will swoop rapidly to lower voltages as the load is increased. From two angles this is bad business; the filter condenser must be rated to stand the peak voltage, which costs extra money because otherwise unneeded insulation is being paid for, and the voltage build-up during keying spaces puts a considerably higher-than-normal voltage on the tubes at the instant of starting dots and dashes, making key-thumps much worse than they would be if the power supply had good voltage regulation.

The simple filter shown at B, using an input choke in conjunction with the same 2- or 4- μ f. condenser, is much superior to the single condenser in every way except that of available out-

put voltage. The load on the transformer and rectifier tubes is less; the actual power that can be taken from the system is greater although it is delivered at a lower voltage; the filter condenser need be rated only for the working voltage when the light bleeder resistance is used (one should be used in any case for several very good reasons), the voltage regulation is good, making it easier to eliminate key clicks, and finally, the addition of the choke materially improves the smoothing. Furthermore, the actual d.c. voltage at the plates of the tubes can be calculated to a fairly close approximation. The choke tends to reduce the rectified transformer voltage to the *average* value of the a.c. input wave, which, for waves of normal sine shape, is in round figures 90% of the r.m.s. or rated transformer voltage. Then if the resistances of the choke and the transformer winding are known (one side of transformer center-tap only) the voltage drop caused by these resistances can be calculated for the normal load current, and the result subtracted from the 90% value. The drop in the rectifier tubes also should be subtracted, although it can generally be neglected with mercury-vapor rectifiers. A filter condenser with a rated working voltage equal to the rated transformer voltage will have a 10% factor of safety.

The bleeder resistance is necessary to prevent the build-up of voltage which is characteristic of the condenser-input filter. If no current at all is drawn from the system, this build-up to the peak of the a.c. wave will take place, but if the sizes of the choke and bleeder resistance are properly proportioned the voltage will drop very rapidly with small currents until it reaches the *average* of the a.c. input wave, after which the additional drop is caused by the resistance in the circuit. The relationship between input-choke inductance and load resistance (the bleeder constitutes the only load on the plate supply system during keying spaces) has been discussed thoroughly in the articles by F. S. Dellenbaugh, Jr., and R. S. Quimby in the February and March, 1932 issues of *QST*, and for 60-cycle supply with full wave rectification can be expressed by the formula

$$L = \frac{R}{1000}$$

where L is in henrys and R in ohms. In other words, the greater the bleeder current the smaller will be the choke inductance required. Assuming a 20,000-ohm bleeder — a good size for most plate-supply systems — the choke inductance from the formula is 20 henrys. At 2000 volts the bleeder current will be 100 milliamperes, requiring resistors capable of dissipating a total of 200 watts. Assuming a pair of 866 tubes is being used, 300 ma. is left for the tubes. If this looks like too much power being wasted in the bleeder, the choke inductance can be increased to 30 henrys and the bleeder to 30,000 ohms, which will reduce the bleeder current to 67 ma. and the power loss to 133 watts. Fortunately the chokes only

need the high inductance at light loads, so that a decrease of inductance with load current does no particular harm — unless the decrease is much greater than would be expected from a choke of good make. A “swinging” choke actually is advantageous, as explained in the articles referred to above. For supply frequencies other than 60 cycles, the required choke inductance will be inversely proportional to the frequency.

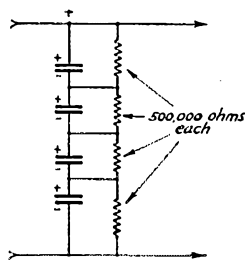


FIG. 3 — ILLUSTRATING THE METHOD OF USING RESISTORS TO EQUALIZE THE VOLTAGES ACROSS A STRING OF CONDENSERS IN SERIES

The condensers in the string should have the same capacity. If electrolytic condensers are used, care should be taken to see that the units are correctly poled.

Although a simple filter like that shown in Fig. 2B will not wholly eliminate plate supply ripple, it will get rid of much the biggest part of it. Provided real d.c. is used on the lower-power stages of the set — where cost is negligible — the resulting signal will be all that anyone except the most hypercritical could ask for. The bigger the choke and condenser, of course, the better will be the smoothing. Let the monitor be your guide.

The combination at C in Fig. 2 will be of interest to those who want the purest practicable d.c. It amounts to a combination of two of the filters shown at B, using the same values as suggested above — perhaps going in a little more heavily on condenser capacity if desired. This type of filter should be adequate for a 'phone transmitter, since the ripple will be less than 1%.

CHOKES AND CONDENSERS

Regarding the chokes and condensers themselves, there is only one safe rule to follow — buy the best ones you can get. Real economy often results from spending a little more at the outset. There is nothing so useless as a blown-out filter condenser — unless it's a burned-out tube. High-voltage filter condensers often can be made up quite economically by putting low-voltage condensers in series. One scheme many amateurs have found useful is to buy inexpensive high-capacity electrolytic condensers rated at about 400 volts working; five such condensers of 8 μ f. capacity each strung in series will provide a condenser of nearly 2 μ f. suitable for 2000 (actual) volts. When condensers are put in series they

(Continued on page 60)

The Inverted Ultraudion Amplifier

Working the Triode as a Screen-Grid Transmitting Amplifier

By Hugo Romander, W2NB*

THERE is no part of the average amateur's equipment whose basic principles of operation are so little understood as the r. f. power amplifier. This is particularly true of the Class-B and Class-C amplifiers, where the load impedance for maximum output has no simple relation to the plate impedance, and where the limitations in operation are of an entirely different nature than is the case of the Class-A amplifier. A clear understanding of these principles, fortunately, is not as essential to the successful operation for the triode amplifier at frequencies above 1500 kc. as is a thorough knowledge of the nature of the incidental coupling between the grid circuit

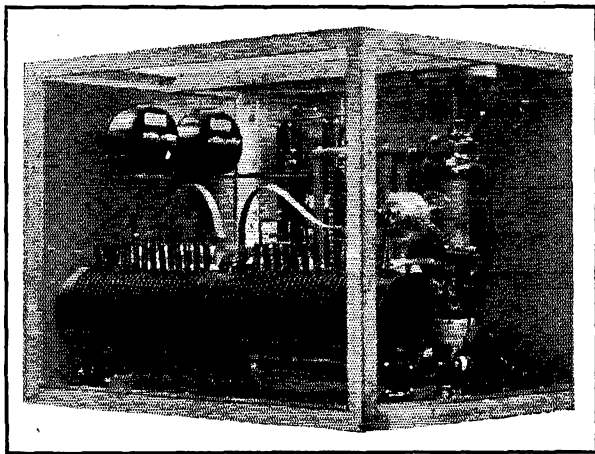
impedance, the difficulty in modulating both its screen and plate voltages for 'phone transmitters, and most important of all, the relatively high cost of the tubes. Thus the amateur prefers to put up with the inconvenience of having to neutralize his 210 or 852 stage rather than to invest in the more expensive 865 or 860.

Now it would be very desirable to use the three-element amplifier in a circuit in which the feedback through the tube was not only minimized but was of such phase as not to cause self oscillations. Such a circuit has been evolved as the result of an investigation of the possibilities of using the triode as a screen-grid amplifier in such

manner as to take advantage of the electrostatic shielding effect of the control grid between the plate and the filament. To elaborate upon this idea, let us suppose that a three-element tube has been especially designed with a close-mesh (high- μ) grid structure which completely surrounds and shields the filament from the plate in exactly the same way that the screen grid shields the signal grid from the plate in a tetrode. A type 860 tube with the signal grid missing would be an example of such a tube. A measurement of the direct inter-electrode capacity *between the plate and filament* of our specially designed tube would then show a capacity of only a fraction of one micro-microfarad.

Still further, if this minute capacity could be made the only capacity through which feedback from the output circuit to the input (excitation) circuit could occur, then our problem

of a stable amplifier, requiring no further neutralization, is solved. To explain the evolution by which such a circuit was obtained, reference is made to Fig. 1, where a type of circuit commonly known as the ultraudion is shown. With proper adjustments of I_G , C_p , and of the tank circuit L_T , C_T , this is a vigorous oscillator at low frequencies as well as at high frequencies. A significant feature of this circuit is the fact that self oscillation requires a certain amount of capacity current from plate to filament, through the condenser C_p . With most triodes the inter-electrode capacity from plate to filament is sufficient to provide this capacity current at frequencies



PANEL VIEW OF THE COMPLETE TRANSMITTER. TUNING CONTROLS OF THE ELECTRON-COUPLED OSCILLATOR ARE AT THE LEFT, INVERTED POWER AMPLIFIER STAGE AT THE RIGHT

and the plate circuit through the plate-to-grid capacity, the complications arising from this coupling, and the operation of the circuit network which compensates for or "neutralizes" this coupling.

The neutralization of capacity feedback in the triode amplifier to prevent self-oscillation came to be such an added complication that the screen-grid type of tube was evolved to eliminate the necessity for such neutralization. In receiver circuits this has proved an excellent solution, but in the transmitter power amplifier the screen-grid tube is at a disadvantage because of its high plate

* 62 Court St., Newark, N. J.

above 10,000 kc. and an externally connected condenser need not be used. With our specially constructed tube, however, *the circuit would not oscillate without an external condenser*, except, possibly, at ultra-high frequencies.

The next logical step, then, is to take our special tube and further simulate the screen-grid tube *by grounding the grid*. This, of course, means that the filament must be at other than ground potential for radio frequencies, resulting in the circuit of Fig. 2. It will be noted that the essential change from the circuit of Fig. 1 is the point at which it is grounded. The capacity C_p is intended to represent the direct plate-to-filament capacity of the tube which, in our special tube, is so small that its effect can be neglected.

We now have an interesting situation wherein a three-element tube may be operated as an amplifier at frequencies at least as high as 30,000 kc. and, without an external neutralizing network, will have negligible tendency to self-oscillate. In fact, the only material effect the plate-grid circuit has on the filament-grid circuit is that resulting from electronic coupling. Tests have shown that this electronic coupling effect is not materially different from that experienced with the ordinary neutralized triode amplifier.

PRACTICAL TUBES

First on the list of practical considerations in connection with this circuit is the question of what tube now readily available to the amateur would operate successfully as an inverted ultraudion amplifier. Since there are no three-element tubes with grid structures designed to meet exactly the specifications of the tube just described, one must compromise with such standard tubes

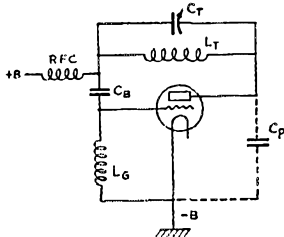
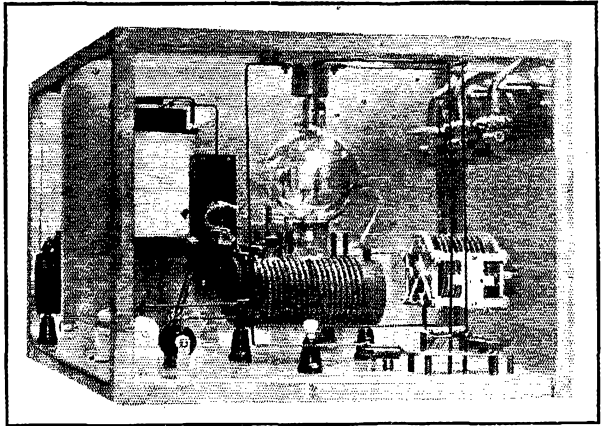


FIG. 1—IN THE ULTRAUDION CIRCUIT SELF-OSCILLATION REQUIRES PLATE-TO-FILAMENT COUPLING THROUGH C_P

as do not have an excessive plate-to-filament capacity. Foremost among these are the 852 and the Federal F-108-A. Both of these tubes come under the $2 \mu\text{fd.}$ plate-filament capacitance limit which tests so far have indicated as the maximum

allowable for satisfactory operation without neutralization.

The feedback which does occur because of an appreciable plate-to-filament capacity is degenerative for most adjustments of the plate tank circuit. This means that if a neutralization network is used on the inverted amplifier, failure to adjust this network correctly will not cause the tube to self-oscillate. The principal object of using a neutralization network with this amplifier would be, therefore, to reduce or eliminate the



THE ELECTRON-COUPLED OSCILLATOR TUBE AND OUTPUT CIRCUIT ARE IN ONE COMPARTMENT, THE FREQUENCY CONTROL CIRCUIT IN ANOTHER, BELOW

degenerative feedback into the input circuit, making its excitation easier by isolating its source of excitation from its load circuit.

It may seem that, after having achieved an amplifier circuit which required no neutralization to prevent self-oscillation, it would be a step backward to introduce the added complication of neutralization; and so it would be, if tubes with a C_p of less than $1 \mu\text{fd.}$ were available. But let us consider the advantage of adopting the simple expedient illustrated in Fig. 3, as compared with the orthodox neutralized amplifier circuit. In the first place, nearly all transmitter tubes have considerably less plate-to-filament capacity than plate-to-grid capacity. Hence, neutralization is made less critical than when neutralizing a larger capacity coupling. Furthermore, one is neutralizing by choice, rather than necessity, and the penalty of a poor neutralization adjustment is not instability, but simply a loss of excitation energy and a decrease in the isolation effect.

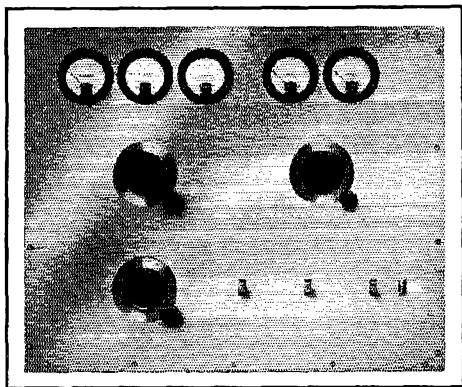
For the transmitter, therefore — and especially where tubes like the F-108-A or the 852 are in use and where plenty of excitation energy¹ is available — no neutralization at all is needed. For the modulated stage of a 'phone transmitter, however, where greater isolation effect or minimum

¹ 25 to 30 watts for the F-108-A, 15 to 20 watts for the 852.

reaction upon the exciter stage is required, neutralization of the inverted amplifier is recommended; that is, until tube manufacturers can be persuaded to design transmitting tubes with a grid that more perfectly shields the filament structure.

FILAMENT CHOKES

The only other design feature of any importance wherein the inverted amplifier differs from



THE INVERTED AMPLIFIER STAGE, WITH ITS F-108-A TUBE AND SPLIT TANK CIRCUIT

the orthodox amplifier is the pair of filament r. f. choke coils, L_2 . It might seem that these coils should present a very high impedance to the excitation frequency, but actually there appears to be no harm in using an inductance whose value is so low that it has an appreciable effect on the net inductance of the driver stage tank circuit. The idea is, when planning to operate over a wide range of frequencies, to make L_2 as small as practicable for operation at the lowest frequency used, in order that the frequency for which the coil is "too large" will be as high as possible. Tests have shown that with a properly designed choke, the working frequency range can be as much as six to one with the same inductance.

The design of this filament choke is similar to the one used for the type 860 tube in the electron-coupled oscillator.² A dual winding of copper wire, tight-wound on bakelite tubing in a single layer, is recommended. Since the two coils composing L_2 are wound on the coil form together, the coupling between them is practically unity and the net inductance is the inductance of either winding taken by itself. This makes calculation of the inductance easy. In designing the filament choke, it is recommended that about 500 circular mills per ampere (filament current) be allowed in determining wire size and that the value of L_2 be about twice the inductance of the driver tank circuit coil at the lowest frequency band used.

² QST, January, 1932.

If greater flexibility as regards frequency range is desired, taps may be provided on the filament choke to short out sections on it for operation on the higher frequency bands. The filament choke may even be tuned by a variable condenser, if one wants to be very particular, but the added complication does not seem to be justified.

A TYPICAL TRANSMITTER

The smaller details entering the design of this circuit, such as the size and disposition of the various by-pass condensers, the ratio of L to C in the output tank circuit and the method of coupling to an antenna, are all similar to those of the orthodox amplifier. If the amateur has a clear understanding of the principles of operation of the inverted amplifier, he should have little trouble in making one operate satisfactorily. As an example, a transmitter will be described whose output tube is used in the inverted amplifier circuit, and it is hoped that a study of this will make him more familiar with the circuit.

This transmitter has been designed for c. w. operation only, although it is planned to try plate modulation of the output stage on the 3.9- and 14.2-mc. 'phone bands — just to see if the two-tube combination can be made sufficiently stable to avoid frequency modulation. The tube line-up is simply a Type 860 electron-coupled oscillator and a Federal Type F-108-A amplifier. The oscillator generating circuit operates in the range 1.75 to 2.0 mc., with its plate circuit tuned to the second harmonic, for operation in the 3.5- to 4.0-mc. band. For operation in the 7- and 14-mc. bands, the oscillator generates on 7.0 to 7.3 mc. with its plate circuit tuned to either the 7- or 14-mc. bands. Operation in the 23- to 30-mc. bands requires the output stage to act as a frequency doubler.

The circuit diagram is shown in Fig. 4. Features

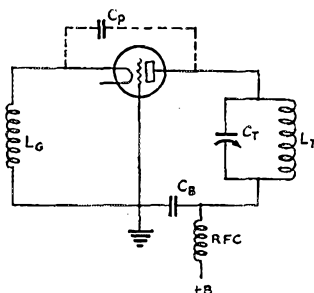


FIG. 2 — THE BASIC INVERTED AMPLIFIER CIRCUIT DERIVED FROM THE ULTRAUDION OF FIG. 1 BY GROUNDING THE GRID

of the oscillator circuit are the high- C tank and the use of tapped coils with shorting strips to avoid the use of interchangeable inductances for the various frequency bands. Variable condenser C_4 has a maximum capacitance of 500 $\mu\text{fd.}$ and is

fitted with a locking device so that it may be fixed in a desired position. It is intended that only C_5 , a 350- μfd . condenser, should be varied, giving the desired band-spread together with a relatively large total capacity.

Passing on to the inverted amplifier, an interesting feature is the use of a split-coil plate tank circuit. This circuit permits the use of a type of capacity coupling which, although commonly used in commercial transmitters, is seldom found in amateur practice. As compared with the popular inductive type of coupling, this method is more efficient and provides a higher order of discrimination against all harmonics of the frequency to which the circuit is tuned. It lacks the flexibility of inductive coupling in that a two-wire transmis-

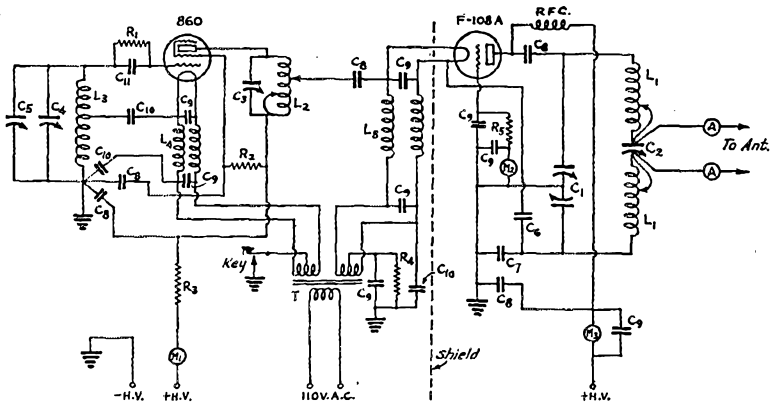


FIG. 4—SCHEMATIC OF THE OSCILLATOR-AMPLIFIER TRANSMITTER USING A TYPE 860 AS AN ELECTRON-COUPLED OSCILLATOR AND A FEDERAL TYPE F-108-A IN THE INVERTED AMPLIFIER

- L_1 —28 turns No. 10 wire, 4 turns per inch, on 3-inch diameter form. Tapped every other turn except last 6, which are tapped every turn.
- L_2 —20 turns No. 10 wire, 4 turns per inch, on 3-inch diameter form. Tapped every other turn.
- L_3 —16 turns No. 10 wire, 4 turns per inch, on 3-inch diameter form. Tapped 6 turns from ground end.
- L_4 —Filament choke, dual winding of No. 18 d.c.c., 28 turns close-wound on 2-inch diameter form.
- L_5 —Filament choke, dual winding of No. 14 d.c.c., 30 turns close-wound on 3-inch diameter form.
- C_1 —Split-stator transmitting condenser, 225- μfd . per section.
- C_2 —Transmitting condenser, 450- μfd .
- C_3 —Transmitting condenser, 150- μfd .
- C_4 —Receiving type condenser, 500- μfd ., locked at maximum.
- C_5 —Receiving type condenser, 350- μfd .
- C_6 —2- μfd . fixed air condenser.
- C_7 —10- μfd . fixed air condenser. Equivalent to two 2-inch square brass plates spaced $\frac{1}{4}$ -inch.
- C_8 —0.002- μfd . high-voltage (mica).
- C_9 —0.01- μfd . 600-volt (paper).
- C_{10} —0.002- μfd . low-voltage (mica).
- C_{11} —250- μfd . low-voltage (mica).
- R_1 —50,000-ohm 10-watt resistor.
- R_2 —100,000-ohm 200-watt.
- R_3 —20,000-ohm 200-watt.
- R_4 —1000-ohm 10-watt.
- R_5 —2000-ohm 5-watt.
- RFC—Transmitting type r.f. choke.
- M_1 —0-100 d.c. milliammeter.
- M_2 —0-300 d.c. milliammeter.
- T—Filament transformer. Note: Two separate filament transformers could be used and the primary voltage adjusted to give rated filament voltage at the filament terminals of each tube, allowing for drop in the respective filament chokes. The 860 takes 3.25 amp. at 10 volts, the F-108-A takes 11 amp. at 10 volts.

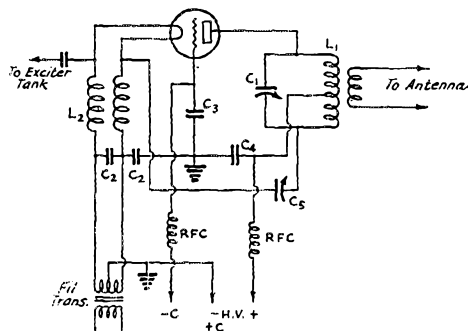


FIG. 3—THE ESSENTIALS OF AN INVERTED AMPLIFIER FOR PRACTICAL OPERATION

Neutralization is employed to make excitation easier although not required to prevent self-oscillation. Typical circuit values are as follows:
 L_1C_1 —Usual high-L output tank circuit.
 L_2 —Filament choke. See text for design.
 C_2, C_3 —0.01- μfd .
 C_4 —0.002- μfd . mica, high-voltage.
 C_5 —Neutralizing condenser. See C_4 , Fig. 4.

sion line is required, but its advantages should offset this limitation.

This type of output circuit lends itself well to the shorting-strip method of changing inductance. It has been pretty well demonstrated that this method of changing inductance does not involve any serious losses and its convenience, by avoiding a rack of interchangeable coils and the difficulty of making them quickly changeable, is well worth while. If, by a few simple motions, the operator can shift from one band to another, it is possible that the amateur's reluctance to change his band of operation may be overcome. Here, again, the advantages of the inverted amplifier become apparent, since there are no critical neutralizing adjustments to worry about when changing frequency even though a neutralization circuit is provided.

Neutralization is employed in this inverted amplifier for the reason that driving the F-108-A then becomes an easier job. Besides, the possibility of plate modulation free from frequency

wobulation is very much improved in the event the transmitter is to be used for 'phone. Fixed condenser C_6 is the neutralizing capacity. Its value can be adjusted by changing the spacing of a 2-inch square copper plate with respect to a 3.375-inch square plate which, in turn, is spaced $\frac{1}{4}$ -inch from the metal compartment wall. This results in the capacity C_7 to ground which is intended to balance the plate-to-ground capacity plus the choke distributed capacity and the stray capacity of the blocking condenser C_8 to ground, from the other end of the tank circuit. This is calculated to be 10 μfd . The value of C_6 may be adjusted to give best results with a given tube, and this adjustment need not be changed when changing to the various frequency bands. Thus, with a simple and easily constructed device, the circuit may be both neutralized and balanced electrically with respect to ground.

A combination of grid leak and cathode-drop self biasing is used in order to permit keying of the oscillator without the F-108-A drawing an excessive plate current when not excited. The self-biasing resistance was chosen to permit the F-108-A to draw just enough plate current to keep the voltage of the rectifier substantially constant during non-oscillating intervals. This eliminates the need for bleeder resistors.

The usual precautions in the disposition of the circuit elements must be observed as with any screen-grid amplifier. The filament leads as well as the filament choke should be shielded from the plate circuit, or at least placed at a safe distance from it. Complete shielding with $\frac{1}{8}$ -inch aluminum panels is used in the transmitter described.

ELECTION NOTICES

To all A.R.R.L. Members residing in the ATLANTIC, DAKOTA, DELTA, MIDWEST, PACIFIC and SOUTHEASTERN Divisions of A.R.R.L.:

1. You are hereby notified that an election for an A.R.R.L. Director, for the 1934-1935 term, is about to be held in each of the above divisions, in accordance with the constitution. Your attention is invited to Sec. 1 of Article IV of the constitution, providing for the government of A.R.R.L. by a board of directors; Sec. 2 of Article IV, defining their eligibility; and By-Laws 10 to 19, providing for their nomination and election. Copy of the constitution and by-laws will be mailed any member upon request.

2. Voting will take place between November 1 and December 20, 1933, on ballots which will be mailed from the headquarters office in the first week of November. The ballots for each division will list the names of all eligible candidates nominated by A.R.R.L. members residing in that division.

3. Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in any one division have the right to nominate any member of the League in that division as a candidate for director therefrom. The following form for nomination is suggested:

(Place and date)

Executive Committee,
American Radio Relay League,
West Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the Division, hereby nominate, of, as a candidate for director from this division for the 1934-1935 term.

(Signatures and addresses)

The signers must be League members in good standing. The nominee must be a League member in good standing and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1933. There is no limit on the number of petitions that may be filed but no member shall append his signature to more than one petition.

4. Present directors from these divisions are as follows: *Atlantic*, Prof. Eugene C. Woodruff, W8CMP, State College, Pa.; *Dakota*, Mr. Lawrence E. Lindesmith, W9GKO, Duluth, Minn.; *Delta*, Mr. M. M. Hill, W5EB, Natchitoches, La.; *Midwest*, Mr. H. W. Kerr, W9DZW-W9GP, Little Sioux, Ia.; *Pacific*, Mr. S. G. Culver, W6AN, Oakland, Calif.; *Southeastern*, Mr. J. C. Hagler, Jr., W4SS, Augusta, Ga.

5. These elections are the constitutional opportunity for members to put the man of their choice in office as the representative of their division. Members are urged to take the initiative and file nominations immediately.

For the Board of Directors:

K. B. WARNER, Secretary.

West Hartford, Conn., August 1, 1933.

To all A.R.R.L. Members residing in the DOMINION OF CANADA:

1. You are hereby notified that an election for an A.R.R.L. Canadian General Manager, for the term 1934-1935, is about to be held, in accordance with the constitution. Your attention is invited to By-Law 29, defining the policy of the League in Canada; Sec. 1 of Article IV of the Constitution, providing for the government of A.R.R.L. affairs by a board of directors, of which the Canadian General Manager is a member; Sec. 2 of Article IV, defining the eligibility of directors; By-Laws 26 and 27, specifying the

(Continued on page 78)

Our Regulations Are Revised

New Rules Effective October 1st; 'Phone Subbands Widened at Once; D.C. Power Supply Required; Combination Station-Operator Licenses Provided; Extensive Changes in Procedure

By K. B. Warner, Secretary, A.R.R.L.

WE TRUST every amateur is now aware that on June 23rd the Federal Radio Commission made certain additions to the subbands open to radiotelephone operation by all licensed amateurs, pursuant to recommendations made by the A.R.R.L. Board of Directors at its May meeting. The "160-meter 'phone band" has been widened to a full 200 kc., one-quarter of the "10-meter" band has been opened to 'phone, and 'phone is now OK in the 75-cm. band for everybody interested in trying it. The general 'phone allocations now read:

1,800 to 2,000 kc.
28,000 to 28,500 kc.
56,000 to 60,000 kc.
400,000 to 401,000 kc.

These are unrestricted bands, open to every amateur, in addition to the two restricted bands open only to the specially-qualified. The opening of the additional range 1800-1875 kc. should do much to alleviate QRM in voice communication in that band, and we are confident of much new 10-meter progress by having an A-3 ('phone) allocation there.

At our earnest recommendation the Commission made these changes effective in June but necessarily delayed the effective date of the remainder of the new regulations until October 1st, to provide time for compliance and for making the rather extensive arrangements necessary to inaugurate the new system. For over a year the Commission has been working on revised amateur regulations, intended not only to repair some deficiencies but to effect economies in administration. It goes without saying that A.R.R.L. kept in close touch with that situation and was frequently consulted as the plans were shaped. The new regs, we feel sure you will agree, are generally satisfactory and in most respects a distinct step forward. In making changes primarily for economy's sake it was constantly kept in mind that nothing must be done to weaken the position of amateur radio or lower its standards, and that there were many changes advantageous to us that could readily be made. Many an idea was examined that would provide additional economy, only to abandon it because of its adverse effect upon us as a group. Yet economy there had to be, for we have grown to big proportions while the Commission's budget, like that of every govern-

ment department, has been drastically cut. For over a year A.R.R.L. has energetically sponsored the idea of combining the station and operator license in one document that would result from one application and one examination and have a life of three years. The recent increase in the life of existing licenses to three years was the first step towards this result, but at present the twenty inspectors issue operator licenses while at Washington nine people do nothing but issue amateur station licenses. Even without renewals they get a hundred of them a day, even this mid-summer, and in middle June we passed the 40,000 mark. They estimate that during the past year an amateur license was issued every four minutes of government working time! Simplification here would clearly result in great economy and at the same time save us the nuisance of perpetually having to fill out new forms. We have been much pleased, then, to see the A.R.R.L. combination scheme adopted as the central theme of the new deal in amateur licensing.

Before we look into that in detail, however, let us take a general bird's-eye view of the new regs, particularly their technical fundamentals. At the end of this article *QST* prints the complete new text. It has been extensively changed and deserves careful reading. Yet its broad fundamentals are very much the same. There is no change in our basic frequency assignments. There are no changes in our communication regulations.

One very important change occurs in the power-supply regulation. Sponsored by the A.R.R.L. Board of Directors, this rule (382) provides that after October 1st only filtered direct-current supply may be used on all stages of transmitters in the 160-meter, 80-meter, 40-meter and 20-meter bands. This new rule, for example, prohibits the use of unfiltered 60-cycle supply and 500-cycle alternators on the last stages of transmitters, it bars the attempt to get "equivalent d.c. effects" by the use of self-rectifying a.c. transmitters, and it prohibits the use of any tone modulation anywhere in these bands. We have definitely "gone d.c." Every amateur is under the duty of seeing to it that his supply is d.c. by the first of October.

This does not apply to the frequencies above 28 mc., where every encouragement to further development is offered. Tone modulation (A-2) may be employed here, to take advantage of

super-regen reception. In fact, for the first time in our lives amateur mobile stations are permitted in the very high frequencies under certain restrictions. Amateur mobile stations may operate aboard any kind of aircraft in the 5-meter and $\frac{3}{4}$ -meter bands. Mobile is not authorized for autos, boats, trains or anything other than aircraft, however, and the 10-meter band is not included. See Rule 368.

A very interesting feature of the new rules is that a separate license is not necessary for this mobile operation, nor is a separate license necessary for a portable station. After October 1st every amateur station license not only authorizes the operation of a "fixed" amateur station at the specified address but also authorizes the holder to operate a portable station in any of the bands at his pleasure and to operate a portable-mobile station in aircraft (for amateur purposes only, of course) on the highest-frequency bands. The only requirement is that advance notice be given the district inspectors in which operation will occur, stating when and where operation will occur. It is provided, however, that such stations must report themselves every thirty days, lest they take on the aspect of a second fixed station. This is important, because hereafter the home station and the portable (and the aircraft mobile, if any) will all operate under the same call. The portable and the aircraft c.w. stations, however, identify themselves by following their call three times with the break sign (— — — —) and the numeral of the amateur call area in which operating; 'phone stations make a suitable announcement. See Rule 384. They must also log their location at each transmission.

Speaking of notifying the district inspector, it is important to note that this refers to the twenty districts where the F.R.C. now has inspectors and not to the old districts on which our calls are based. The 9th district is no longer that group of states in which amateur calls contain the numeral 9. The latter is now known simply as the 9th amateur call area, while the 9th district is now a strip of the Texas gulf coast with its headquarters in Galveston. For detailed list see page 33 of *QST* for last December, or the *Handbook* or *License Manual*. For portable operation it is now necessary to notify each of the twenty inspectors in whose districts operation will take place. But the numeral following the break-sign to indicate portable operation is not the district number — it is the number of the call area, 1 to 9. You should study this paragraph carefully and familiarize yourself with the new numbering scheme.

Another feature worth pointing out is a change affecting remote-control stations. The new rules contemplate that in normal cases the antenna and the apparatus will be at the same address. Rule 213 permits exceptions but each such case will be handled separately by the Commission on its merits, and they have canceled the old provision

that permitted distant-control up to five miles without special authority.

All the privileges and the restrictions provided in the new regs apply to every existing station license on October 1st. Our station licenses prescribe that they are subject to the rules and regulations, and when the latter are changed from time to time the changes apply without modification of the licenses themselves.

Now for the licensing procedure. First it should be said that *existing* licenses, for both station and operator, are going to be continued in force until one or the other of them expires, whichever is first. In general that means that those of us with licenses to-day continue with no change in our papers until our operator license expires. Then we act under the new procedure. Also, if we have to apply for a modification, as for a change of address, we come under the new system. And of course it applies after October 1st for all newcomers.

If you were asked to get up a new system for amateur licensing you would take account of existing evils and try to correct them. You'd provide a scheme that made it easy for a qualified and active amateur to get his authorization and keep it. You'd make it tough for non-amateurs to get an amateur license and for fellows who abandon the game from continuing to pose as amateurs by retaining station calls for years. You'd provide a reasonable but honest standard of qualification and you'd deny the amateur right to those who couldn't meet that reasonable standard. You'd make it easier for the sincere amateur to qualify, harder for the unworthy. That is the general purpose and effect of our new rules. They go a long way towards achieving it. We'll say right here that they have their inadequacies and their imperfections, including a few provisions that we downright dislike but were unable to get changed before the Commission went on summer recess. We are promised, though, that anything that shows up as unfair or an unreasonable hardship in procedure, after the regulations are put to test, will be remedied. Now let's see what we have.

Hereafter amateur examinations are going to be held only in 32 cities. One or two days a week there will be amateur exams in the 20 district offices: Boston, New York, Philadelphia, Baltimore, Norfolk, Atlanta, Miami, New Orleans, Galveston, Dallas, Los Angeles, San Francisco, Portland (Ore.), Seattle, Denver, St. Paul, Kansas City, Chicago, Detroit and Buffalo. Every Thursday there will be examinations in Washington. Every three months, on staggered preannounced schedules to be published in *QST*, there will be exams in Schenectady, Winston-Salem, Nashville, San Antonio, Oklahoma City, Des Moines, St. Louis, Pittsburgh, Cleveland, Cincinnati and Columbus (Ohio). Now let us draw circles of 125 miles airline radius around those 32 cities. Every applicant living within one

of those circles must appear in person before the inspector for examination for a new license, or for a renewal if he has been inactive his last three months. (If an amateur complies with the stipulation of minimum activity given in Rule 402 he may get renewals without reexamination; and the Commission will relax the personal-appearance requirement in worthy Chair-Warmer cases.) The personal appearance may be at any of the 32 cities, not necessarily in the district in which one resides. Applicants living *more* than 125 miles from the closest examining point are entitled to take the test by mail, but may appear in person if they prefer. Every applicant must qualify in code at 10 words per minute and pass an examination on apparatus and regulations. There is no truth to the rumor that a 5-meter amateur 'phone may be operated under a 3d-class radiotelephone operator's license, without code knowledge. Summarizing this paragraph, we have personal examination in 32 cities, with compulsory appearance for all within 125 miles airline, and mail examination for those outside these circles.

Now for another fundamental: Hereafter the holder of a station license must qualify as an amateur operator and must own or control the apparatus. No longer can an unqualified person take out a station license by promising that it will be operated by a licensed operator. No more of this business of a company getting around the regulations by having their apparatus licensed in the name of an individual. The only exception is for the *amateur* (non-government) stations of Army and Navy reserve units, which may get licenses in the name of the commanding officer. Clubs may still get licenses in the name of a trustee but he must be a qualified operator. Operators without stations can get operator licenses, but there will be no more separate station licenses.

Next basic point: Most of the amateurs of the country live within 125 miles of an examining city. When they appear the inspector tests their code, gives them the examination, but sends the papers ungraded to Washington. Remaining amateurs take the test by mail and send the papers direct to Washington. There a central examining board will grade all the papers from all the exams with a uniform system of marking. When the applicant passes he will get a combination 3-year station and operator license direct from Washington (or only an operator license if that is all he has applied for). The inspectors will only *give* the examinations, not mark them. There will be only one combination application form for applying for both station and operator privileges, only one set of questions to fill out, and of course only one exam. At the moment of writing it is believed that the combination license will be in the form of a card, station authority on one side, operator authority on the other.

Now a real fundamental: We abandon the terms Temporary, First Class, Extra First Class,

Unlimited 'Phone. Instead, every license will provide three blank places where it may be certified by the Commission for Class A, Class B, or Class C privileges, depending upon the application and upon eligibility and qualifications. Let us look at these classifications, commencing with Class B because it is basic.

Class B is about the same as the present First Class. The amateur appears in person (and he must if he lives within the 125-mile radius) and is given the exam by the inspector. Like the present First Class, the license carries every amateur right except to the use of the two restricted telephony bands, 3900-4000 and 14,150-14,250 kc. The examination will be new, on a new theory. Instead of exhaustively determining everything the applicant knows, it will take small cross-sections or test slices of his knowledge at various places through the required field. To accomplish this, *several hundred* completely different sets of 10 questions each are being prepared in sealed envelopes. Not even the inspector will know what set of questions an applicant gets. If he can answer any ten of several thousand questions satisfactorily, it can be assumed that he knows his stuff without necessarily demonstrating his entire knowledge. The new exam for Class B will include some 'phone questions, since every such amateur is given general 'phone privileges, but the questions will not be of the Unlimited caliber. In general, the new exam will be simpler and shorter but it will more effectively determine the applicant's qualifications than the present system.

Class A carries unlimited privileges; that is to say, it includes the present "unlimited 'phone." To be eligible for it the applicant must have been a licensed amateur operator for at least one year, as at present required, and must appear in person. The test includes the Class-B requirements plus extra material on 'phone as at present. There will be new questions for this exam too.

Class C involves a real change in licensing policy. It takes the place of the old Temporary but changes the theory. The policy used to be to give a temporary to an applicant who barely had the ability to pass the skimpiest possible test, relying upon calling him up for personal examination in a very short while and determining then whether he was actually qualified. Originally limited to one year and non-renewable, lack of examining facilities made it necessary to renew temporaries, with the result that thousands of unqualified operators were enjoying the same privileges that their brethren within the old 100-mile circles had to work to get. The new Class-C policy is intended to require the same qualifications of those amateurs who cannot be examined personally as those who appear before an inspector. Presumed qualified when they pass, they then get three-year licenses. Class C, then, is the same as Class B except that the applicant must

live more than 125 miles from any examining point and takes the examination by mail. The privileges are the same as Class B except that the Commission reserves the right to compel any Class-C holder who gets into trouble to appear for personal examination any time during the life of his license. Failure to appear or failure to pass will result in cancellation and inability to get another Class-C license.

To get the Class-C ticket the applicant writes his inspector and receives forms and a set of examination questions in a sealed envelope. The examination is the same as a Class-B applicant must pass. To insure square shooting, the envelope may be opened only by a witness, who must remain present while the examination is taken and be willing to certify under oath that he opened the envelope and that the candidate answered the questions unaided, of his own knowledge, without recourse to notes or texts. The code examination must be administered by another licensed operator who certifies under oath that he has examined the candidate and that he can copy at least 10 words a minute. Following printed instructions the completed papers are then sent direct to the Commission at Washington for grading and the issuance of licenses.

Now let's summarize this procedure, at least for common cases:

If you live within 125 miles airline of one of the 32 examining points:

Write or visit the inspector of the district in which you live, asking for application blanks and the date when examinations will be held in the city at which you wish to appear.

Fill out and file the application and appear at the specified time for personal exam. First the inspector gives you the code test. When you pass that he gives you the written test.

The inspector certifies that you passed the code test and forwards all the papers to Washington.

Washington examines the application and grades the papers, and if all is OK the combination license comes direct to you.

If you live more than 125 miles airline from any of the 32 examining points:

Write the inspector of the district in which you live. He will send you application blanks, a sealed envelope containing the examination questions, and instructions for handling the latter.

Following these instructions, get someone of legal age to open the envelope and witness your writing of the examination. The witness must then make oath that he opened the envelope and that you gave yourself the examination without any assistance. Get in touch with a licensed operator (who may also be your witness) who will give you a code test and make oath thereon.

All the papers being completed, forward them direct to the F.R.C. at Washington. Thereafter the action is the same as above; Washington examines, grades, issues.

In either case, if you are already a licensed operator and are applying only for a station license, when you file your forms send along your existing operator license for cancellation; your new license will be a combination one, without reexamination as to operator.

As to renewals after October 1st: No amateur station license expires before January 6, 1935, so renewal applications after October will come about through operator expirations. If you have a Temporary it will be necessary for you, when it expires, to take the Class-B or Class-C examination, depending upon where you live. If you have a First Class license and have been inactive, you will have to be reexamined for Class B or Class C, again depending upon where you live. If you have met the minimum-activity specification of Rule 402 you do not have to take the examination. Depending upon where you live, you are eligible for Class B or Class C without reexamination, simply filing the application forms. In any of these cases you get the new combination license which replaces your old station license as well as renews your operator authorization.

The chap who now has a station license but isn't an operator may get the new combination license if he qualifies as an operator. And for the operator not interested in a station license there will be a simpler application minus the questions about the station.

The portion of the exam dealing with radio theory and practice may be escaped by Class-A, Class-B or Class-C applicants if within five years they have held a commercial operator license of Radiotelephone Second Class or higher or have possessed unlimited amateur 'phone privileges. They need only reprove their code ability and pass an exam on radio laws, treaties and regulations dealing with amateur radio.

Both the apparatus part of the exam and the code test may be eliminated for Class-B and Class-C applicants if within five years they have held a commercial operator license of Radiotelegraph Third Class or higher or have possessed an Amateur Extra First Class ticket. They need only pass that part of the exam relating to radio laws, treaties and regulations affecting amateurs.

Another item about portables and portable-mobiles: The Commission issues only the one license. If you avail yourself of the right to use a portable or an aircraft-mobile, you must provide yourself with a photostat copy of your station license. The photostat copy of the station license is OK for any of the stations you may have, but it is not accepted in the case of the operator authority. Let's see how this works out. Suppose you have a portable and want to run some tests between it and your own home station. Two operators are necessary, yourself and a friend. You have a photostat copy of your station license. If you want to take the portable into the field,

FEDERAL RADIO COMMISSION

Rules and Regulations Governing Amateur Radio Stations

leave the photostat at the home station to authorize its operation and take your original combination license along with you, since that is your only operator authorization. If you want to operate the home station, send the photostat along with the portable. Your friend of course has his own license with him in either event, to act as operator of either station. Whenever you operate anybody else's station, have your original combination license with you, and see that the other fellow's original or photostat copy is on hand to authorize the station operation. If, when you operate somebody else's station and have your original with you for that purpose, another fellow is operating your own rig, be sure you have left a photostat copy back home for him and that he has his own license with him.

Much of the foregoing paragraph applies at once to everybody, even though it may be years before we all possess combination licenses. We can operate portables after October 1st whether we have a separate license for it or not. Photostat copies of station licenses are acceptable, but the operator must always have his operator license with him, even if it is an old extended Department-of-Commerce license.

Hereafter licenses may be renewed under reasonable provisions but in Rule 402 is a specification of minimum activity if the station call is to be retained. Inactive stations cannot indefinitely hold licenses. Within the last three months before renewal the station must have been in commission and have communicated with at least three other stations. And an operator must have been similarly active.

It isn't amiss here to call attention to Rule 24. We're going to have some enforcement, we now judge, with a rather particular attempt to see that our new regulations are complied with. Ten of the offices are being equipped with new AGS receivers to facilitate rapid monitoring and these offices are obliged to spend a minimum of two hours a day patrolling the amateur bands. When violations are noted the amateur is sent a "discrepancy report" which requires him to file an explanation with the Commission at Washington at once, with disciplinary action the expected result in cases without adequate explanation. Law-abiding amateurs will be glad to see recalcitrants lugged into line; it will make a better game for all of us. We think that we should all take care to be found in full compliance with the new regs after October 1st, with particular care to the business of d.c. plate supplies below 14-400 kc.

And now for the text itself. We include a few excerpts from general regulations where they apply to amateur stations, then our revised rules. This article of interpretation, while adequate we hope, cannot cover all the details. Again we urge every amateur familiarize himself with the wording of the new rules.

1. Each application for an instrument of authorization shall be made in writing on the appropriate form prescribed by the Commission for the purpose. Separate application shall be filed for each instrument of authorization. The required forms except as provided in Rule 408 for amateur applicants, may be obtained from the Commission or from the office of any Inspector. For a list of such offices and related geographical districts, see paragraph 30.

* * *

2. (2) Each application for amateur facilities shall be filed in accordance with the following instructions:

(a) Applications for amateur station and/or operators' licenses from applicants residing within 125 miles of Washington, D. C., a radio district office of the Commission, or an examining city (see Rule 30): One copy to the Inspector-in-Charge of the Radio District in which the applicant resides.

(b) Applications for amateur station and/or operators' licenses from applicants residing more than 125 miles from Washington, D. C., a radio district office of the Commission, or an examining city (see Rule 30): One copy direct to the Federal Radio Commission, Washington, D. C., in accordance with the instructions specifically set forth on the application form.

* * *

14. Each application for new license, where a construction permit is not prerequisite thereto, shall be filed at least 60 days prior to the contemplated operation of the station.

* * *

16. Unless otherwise directed by the Commission, each application for renewal of license shall be filed at least 60 days prior to the expiration date of the license sought to be renewed.

* * *

20. The transfer of a radio station license, or the rights granted thereunder, without consent of the Commission shall be sufficient ground for the revocation of such license or denial of any application for its renewal. Amateur station licenses and call signals are not transferable.

* * *

22. The Commission may grant special authority to the licensee of an existing station authorizing the operation of such station for a limited time in a manner, to an extent, or for a service other or beyond that authorized in the license.

* * *

24. Any licensee receiving official notice of a violation of Federal laws, the Commission's rules and regulations, or the terms and conditions of a license, shall within three days from such receipt send a written reply direct to the Federal Radio Commission at Washington, D. C. The answer to each notice shall be complete in itself and shall not be abbreviated by reference to other communications or answers to other notices. If the notice relates to some violation that may be due to the physical or electrical characteristics of the transmitting apparatus, the answer shall state fully what steps, if any, are taken to prevent future violations, and if any new apparatus is to be installed, the date such apparatus was ordered, the name of the manufacturer, and promised date of delivery.

* * *

26. If the notice of violation relates to some lack of attention or improper operation of the transmitter, the name and license number of the operator in charge shall be given.

27. All station licenses will be issued so as to expire at the hour of 3 a.m., eastern standard time. The normal license periods and expiration dates are as follows:

(e) The licenses for amateur stations will be issued for a normal license period of three years from the date of expiration of old license or the date of granting a new license or modification of a license.

28. Insofar as practicable, call signals of radio stations will be designated in alphabetical order from groups available for assignment, depending upon the class of station to be licensed. Because of the large number of amateur stations, calls will be assigned thereto in regular order and requests for particular calls will not be considered.

29. Call signals of stations will be deleted in each of the following cases:

(a) Where an existing instrument of authorization has expired and no application for renewal or extension thereof has been filed.

- (b) Where a license has been revoked.
 (c) Where a license is surrendered or cancelled.
 (d) Other cause, such as death, loss of citizenship, or adjudged insanity of the station licensee. Such occurrences coming to notice should be reported to the Commission, preferably accompanied by the station license for cancellation, if available.

* * *

30. (1) The following list of the radio districts gives the address of each field office of the Federal Radio Commission and the territory embraced in each district.

[See QST for December 1932, page 33; *Radio Amateur's Handbook*, page 213; *Radio Amateur's License Manual*, page 20. — Ed.]

(2) The following is a list of the cities where examinations will be held for radio operators' licenses in addition to Washington, D. C., and the radio district offices of the Commission. Other cities may also be designated from time to time for the purpose of conducting commercial operators' examinations only: (See Rules 2, 404, and 408.)

Schenectady, N. Y.	St. Louis, Mo.
Winston-Salem, N. C.	Pittsburgh, Pa.
Nashville, Tenn.	Cleveland, Ohio
San Antonio, Tex.	Cincinnati, Ohio
Oklahoma City, Okla.	Columbus, Ohio
Des Moines, Iowa	

* * *

188. The term "station" means all of the radio-transmitting apparatus used at a particular location for one class of service and operated under a single instrument of authorization. In the case of every station other than broadcast, the location of the station shall be considered as that of the radiating antenna.

* * *

192. (1) The term "portable station" means a station so constructed that it may conveniently be moved about from place to place for communication and that is in fact so moved about from time to time, but not used while in motion.

(2) The term "portable-mobile station" means a station so constructed that it may conveniently be moved from one mobile unit to another for communication, and that is, in fact, so moved about from time to time and ordinarily used while in motion.

* * *

204. Allocations of bands of frequencies to services, such as mobile, fixed, broadcast, amateur, etc., are set forth in Article 5 of the General Regulations annexed to the International Radiotelegraph Convention and in the North American Radio Agreement. These allocations will be adhered to in all assignments to stations capable of causing international interference.

* * *

207. Licensees shall use radio transmitters, the emissions of which do not cause interference, outside the authorized band, that is detrimental to traffic and programs of other authorized stations.

* * *

210. Radio communications or signals relating to ships or aircraft in distress shall be given absolute priority. Upon notice from any station, Government or commercial, all other transmission shall cease on such frequencies and for such time as may, in any way, interfere with the reception of distress signals or related traffic.

* * *

213. One or more licensed operators of the grade specified by the Commission, depending upon the class of station, shall be on duty at the place where the transmitting apparatus of each station is located and whenever it is being operated; provided, however, that for a station licensed for service other than broadcast, if the antenna input power does not exceed 1 kilowatt and remote control is used, the Commission may modify the foregoing requirement so that such operator or operators may be on duty at the control station in lieu of the place where the transmitting apparatus is located. Such modification shall be subject to the following conditions:

(a) The transmitter shall be capable of operation and shall be operated in accordance with the terms of the station license.

(b) The transmitter shall be monitored from the control station with apparatus that will permit placing the transmitter in an inoperative condition in the event there is a deviation from the terms of the license, in which case the radiation of the transmitter shall be suspended immediately until corrective measures are effectively applied to place the transmitter in proper condition for operation in accordance with the terms of the station license.

(c) The separation between the transmitter and the remote control station shall not exceed five miles by airline.

(d) The transmitter shall be so located or housed that it is not accessible to other than duly authorized persons.

214. The person manipulating the transmitting key of a manually operated radiotelegraph mobile or amateur transmitting station shall be a regularly licensed operator. The licensees of other stations operated under the constant supervision of duly licensed operators may permit any person or persons, whether licensed or not, to transmit by voice or otherwise, in accordance with the types of emission specified by the respective licenses.

* * *

220. Licensees of stations other than broadcast stations are authorized to carry on such routine tests as may be required for the proper maintenance of the stations, provided, however, that these tests shall be so conducted as not to cause interference with the service of other stations.

221. (1) The original of each station license, except amateur, portable and portable-mobile stations shall be posted by the licensee in a conspicuous place in the room in which the transmitter is located. In the case of amateur, portable, and portable-mobile stations the original license, or a photostat copy thereof, shall be similarly posted or kept in the personal possession of the operator on duty.

(2) The original license of each station operator, except amateur and aircraft radio station operators, and operators of portable and portable-mobile stations, shall be posted in a conspicuous place in the room occupied by such operator while on duty. In the case of an amateur or aircraft radio operator, and operators of portable or portable-mobile stations, the original operator's license shall be similarly posted or kept in his personal possession and available for inspection at all times while the operator is on duty.

(3) When an operator's license cannot be posted because it has been mailed to an office of the Federal Radio Commission for endorsement or other change, such operator may continue to operate stations in accordance with the class of license held, for a period not to exceed thirty days, but in no case beyond the date of expiration of the license.

* * *

361. The term "amateur service" means a radio service carried on by amateur stations.

362. The term "amateur station" means a station used by an "amateur," that is, a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

363. (Deleted.)

364. The term "amateur radio operator" means a person holding a valid license issued by the Federal Radio Commission who is authorized under the regulations to operate amateur radio stations.

365. The term "amateur radiocommunication" means radiocommunication between amateur radio stations solely with a personal aim and without pecuniary interest.

366. (1) An amateur station license may be issued only to a licensed amateur radio operator who has made a satisfactory showing of ownership or control of proper transmitting apparatus; provided, however, that in the case of a military or naval reserve radio station located in approved public quarters and established for training purposes, but not operated by the United States Government, a station license may be issued to the person in charge of such station who may not possess an amateur operator's license.

(2) An amateur operator's license may be granted to a person who does not desire an amateur station license, provided such applicant waives his right to apply for an amateur station license for ninety days subsequent to the date of application for operator's license.

367. Amateur radio station licenses shall not be issued to corporations, associations, or other organizations; provided, however, that in the case of a bona fide amateur radio society, a station license may be issued to a licensed amateur radio operator as trustee for such society.

368. Licenses for amateur mobile stations and portable-mobile stations will not be granted, except for portable-mobile stations located aboard aircraft (see Rules 384 and 387) and capable of operating in the band of frequencies 58,000-60,000 kilocycles and 400,000-401,000 kilocycles only.

369. (Deleted. Rule 213 applies.)

370. Amateur stations shall be used only for amateur service, except that in emergencies or for testing purposes they may be used also for communication with commercial or Government radio stations. In addition, amateur stations may communicate with any mobile radio station which is licensed by the Commission to communicate with amateur stations, and with stations of expeditions which may also be authorized to communicate with amateur stations.

371. Amateur stations shall not be used for broadcasting any form of entertainment.

372. Amateur stations may be used for the transmission of music for test purposes of short duration in connection with the development of experimental radiotelephone equipment.

373. Amateur radio stations shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.

374. The following bands of frequencies are allocated exclusively for use by amateur stations:

1,715 to 2,000 kc.	28,000 to 30,000 kc.
3,500 to 4,000 "	56,000 to 60,000 "
7,000 to 7,300 "	400,000 to 401,000 "
14,000 to 14,400 "	

375. All bands of frequencies so assigned may be used for radiotelegraphy, type A-1 emission. Type A-2 emission may be used in the following bands of frequencies only:

28,000 to 30,000 kc.
56,000 to 60,000 "
400,000 to 401,000 "

376. The following bands of frequencies are allocated for use by amateur stations using radiotelephony, type A-3 emission:

1,800 to 2,000 kc.	56,000 to 60,000 kc.
28,000 to 28,500 "	400,000 to 401,000 "

377. Provided the stations shall be operated by a person who holds an amateur operator's license endorsed for class A privileges, an amateur radio station may use radiotelephony, type A-3 emission, in the following additional bands of frequencies:

3,900 to 4,000 kc.	14,150 to 14,250 kc.
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378. The following bands of frequencies are allocated for use by amateur stations for television, facsimile, and picture transmission:

1,715 to 2,000 kilocycles
56,000 to 60,000 kilocycles

379. Transmissions by an amateur station may be on any frequency within an amateur band above assigned.

380. An amateur radio station shall not be located upon premises controlled by an alien.

381. The frequency of the waves emitted by amateur radio stations shall be as constant and as free from harmonics as the state of the art permits. For this purpose, amateur transmitters shall employ circuits loosely coupled to the radiating system or devices that will produce equivalent effects to minimize keying impacts and harmonics. Conductive coupling to the radiating antenna, even though loose, is not permitted, but this restriction does not prohibit the use of transmission-line feeder systems.

382. Licensees of amateur stations using frequencies below 14,400 kilocycles, shall use adequately filtered direct-current power supply for the transmitting equipment, to minimize frequency modulation and to prevent the emission of broad signals.

383. Licensees of amateur stations are authorized to use a maximum power input of one kilowatt to the plate circuit of the final amplifier stage of an oscillator-amplifier transmitter or to the plate circuit of an oscillator transmitter.

384. An operator of an amateur station shall transmit its assigned call at least once during each fifteen minutes of operation and at the end of each transmission. In addition, an operator of an amateur portable radiotelegraph station shall transmit immediately after the call of the station, the Break Sign (BT) followed by the number of the amateur call area in which the portable amateur station is operating; as for example:

Example 1. Portable amateur station operating in the third amateur call area calls a fixed amateur station: WIABC WIABC WIABC DE W2DEF W2DEF W2DEF BT3 BT3 BT3 K

Example 2. Fixed amateur station answers the portable amateur station: W2DEF W2DEF W2DEF DE WIABC WIABC WIABC K

Example 3. Portable amateur station calls a portable amateur station: W3GHI W3GHI W3GHI DE W4JKL W4JKL W4JKL BT4 BT4 BT4 K

If telephony is used the call sign of the station shall be followed by an announcement of the amateur call area in which the portable station is operating.

385. In the event that the operation of an amateur radio station causes general interference to the reception of broadcast programs with receivers of modern design, that amateur station shall not operate during the hours from 8 o'clock p.m. to 10:30 p.m., local time, and on Sundays from 10:30 a.m. until 1 p.m., local time, upon such frequency or frequencies as cause such interference.

386. Each licensee of an amateur station shall keep an accurate log of station operation, in which shall be recorded:

(a) The date and time of each transmission.

(b) The name of the person manipulating the transmitting key of a radiotelegraph transmitter or the name of the person operating a transmitter of any other type with statement as to nature of transmission.

(c) The station called.

(d) The input power to the oscillator, or to the final amplifier stage where an oscillator-amplifier transmitter is employed.

(e) The frequency band used.

(f) The location of each transmission by a portable station.

This information shall be made available upon request by authorized Government representatives.

387. The licensee of an amateur station may operate a portable amateur station, or a portable-mobile station located aboard an aircraft in accordance with Rule 388, provided advance notice of all locations in which the station will be operated is given to the Inspector-in-Charge of the district in which the station is to be operated. Such notices shall be made by letter or other means prior to any operation contemplated and shall state the station call, name of licensee, the dates of proposed operation and the approximate locations, as by city, town or county. An amateur station operating under this rule shall not be operated during any period exceeding 30 days without giving further notice to the Inspector-in-Charge of the radio inspection district in which the station will be operated.

* * *

400. An amateur station may be operated only by a person holding a valid amateur operator's license, and then only to the extent provided for by the class of privileges for which the operator's license is endorsed.

401. Amateur operators' licenses are valid only for the operation of licensed amateur stations, provided, however, any person holding a valid radio operator's license of any class may operate stations in the experimental service licensed for, and operating on, frequencies above 30,000 kilocycles.

402. Amateur station licenses and/or amateur operator licenses may, upon proper application, be modified or renewed provided: (1) the applicant has used his station to communicate by radio with at least three other amateur stations during the three-month period prior to the date of submitting the application, or (2) in the case of an applicant possessing only an operator's license, that he has similarly communicated with amateur stations during the same period. Proof of such communication must be included in the application by stating the call letters of the stations with which communication was carried on and the time and date of each communication. Lacking such proof, the applicant will be ineligible for a license for a period of ninety days.

403. There shall be but one main class of amateur operator's license to be known as "amateur class" but each such license shall be limited in scope by the signature of the examining officer opposite the particular class or classes of privileges which apply, as follows:

Class A. Unlimited privileges.

Class B. Unlimited radiotelegraph privileges. Limited in the operation of radiotelephone amateur stations to the following bands of frequencies: 1800 to 2000 kilocycles; 28,000 to 28,500 kilocycles; 56,000 to 60,000 kilocycles; 400,000 to 401,000 kilocycles.

Class C. Same as Class B privileges, except that the Commission may require the licensee to appear at an examining point for a supervisory written examination and practical code test during the license term. Failing to appear for examination when directed to do so, or failing to pass the supervisory examination, the license held will be cancelled and the holder thereof will not be issued another license of the Class C privileges.

404. The scope of examinations for amateur operators' licenses shall be based on the class of privileges the applicant desires, as follows:

Class A. To be eligible for examination for the Class A amateur operator's privileges, the applicant must have been a licensed amateur operator for at least one year and must personally appear at one of the Commission's examining offices, and take the supervisory written examination and code test. (See Rules 2 (2) a, 30 and 408.) Examinations will be conducted at Washington, D. C., on Thursday of each week, and at each radio district office of the Commission on the days designated by the Inspector-in-Charge of such offices. In addition, examinations will be held quarterly in the examining cities listed in Rule 30 on the dates to be designated by the Inspector-in-Charge of the radio district in which the examining city is situated. The examination will include the following:

(a) Applicant's ability to send and receive in plain language messages in the Continental Morse Code (5 characters to the word) at a speed of not less than 10 words per minute.

(b) Technical knowledge of amateur radio apparatus, both telegraph and telephone.

(c) Knowledge of the provisions of the Radio Act of 1927 as amended, subsequent acts, treaties, and rules and regula-

(Continued on page 74)

Ten-Meter Band Still Holding Up

JUST before August *QST* appeared there was a week in which mighty few 28-mc. signals came through and we were starting to get squeamish about our ballyhoo. As this is being written *QST* has been out about a week and W9's are complaining of lack of stations to keep them busy. We hear new signals on the band every night — that is, when the band isn't completely dead. Consequently, we have very few reports of new results this month. Scattering DX records filter through though nothing reliable in the way of solid communication.

Before going into reports we should like to state the guideposts we use to determine whether signals will come through on 28 mc. The signals we refer to now are those which are between 800 and 1100 miles away which come through consistently. This following premise may change when real DX signals bend back to earth on this band. When signals within 500 miles are very strong on 14-mc., signals from 800-1100 miles will be heard on 28 mc. When these same signals on 14 mc. are coming through at just average strength, the signals on 28 mc. will be quite weak and erratic. The weather does not seem to affect the signals on this band in that we hear signals there regardless of local weather at the time. Another excellent time for signals to come through on 28 mc. is when harmonics of 14-mc. signals are heard.

The time of day when signals come through best in Hartford is between 5 and 7 p.m. E.S.T. On occasions signals have been heard between 9 and 11 a.m. but invariably the hours of the afternoon have been absolutely dead. This seems to hold in most cases save that some of the W9's have reported a weak signal or two during the middle of the afternoon.

SCATTERING DX REPORTS

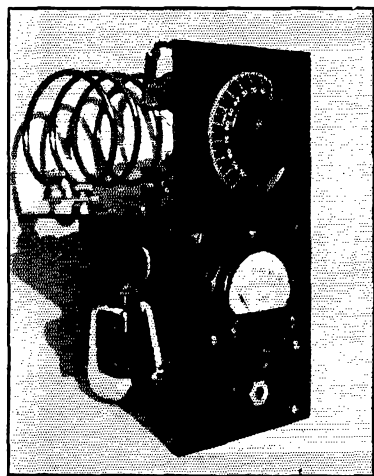
On July 16th W6CAL heard W2TP at two different times which is the first transcon signal we have heard about this year. W8TI was reported by AC2BHH in China on the last of numerous tests but the signal only stayed in for about 4 minutes and has never been heard since. W9DZX has been reported in Germany but confirmation of this work is still lacking. The only international work we have heard of is the QSO K4SA had with W1CCZ during the month. K4SA has heard W2TP and a few of the W9's and has been reported in U. S. by other stations. From NY1AB and G2OA via 14 mc. we learn that the Europeans are having conditions comparable to ours, hearing their signals at the same time of day we do — just before sundown. They are keeping ears open for American stations but still have heard nothing.

Very few 'phones have been heard on 28 mc. And most of those have been self-excited oscillators which would hop to unknown corners of the spectrum when modulation was applied. With superhet receivers a signal of this type will not be heard. Frequency stability is certainly to be encouraged for all concerned. W3MY, W1CCZ and W2TP have dropped their present 14-mc. 'phone sets down to 28 and work the gang.

REPORTED RESULTS THIS MONTH

W1CUN with a pair of 45's in push pull got on the air on July 29th and worked W9CLH and W9GFZ and heard W9CES. The receiver at W1CUN is a 57 detector and 27 audio. W9KEP in Kansas City, Mo., has worked W2TP and W1SZ. W9FFQ has worked W1CCZ, W1DF, W1SZ and W2TP. W4MR in Greensboro, N. C., put a transmitter on the air on July 29th and was heard in the middle west and in Hartford on the 29th and 30th with a steady xtal signal.

VE2AC of Thetford Mines, P. Q. promises to be active once more on the 28-mc. band. Blais is



THE LOW-POWERED 28-MC. SET AT OKIAW

another member of the old 28-mc. gang and spent a great deal of time transmitting and listening when the conditions were very unfavorable (as it turned out) for work on the 10-meter band. In the past VE2AC has tasted the fruits of European DX on this band.

W9EL of Kansas City, Mo., is at present listening on 28-mc. and has heard W2CTO, W2TP and W1SZ.

May we ask once more that any station hearing a signal on 28-mc. band should feel duty bound

(Continued on page 60)

Featherweight Sets for the Ultra-High Frequencies

Planning and Constructing Small Transmitters and Receivers

By Ross A. Hull, Associate Editor

IT IS one thing to build a successful transmitter or receiver on a wide expanse of breadboard when weight and bulk are matters of no earthly consequence. Assembling similar equipment in the least possible space, particularly when there is a weight ogre looking one in the eye, is another problem — particularly if the set is to work well upon completion.

Last month we decided to build some diminutive ultra-high frequency gear to take with us on our vacation at the National Soaring Meet at Elmira, N. Y. We were interested not in new circuits or methods but simply in building some effective transmitters and receivers with the least possible bulk and weight. A recital of the problems encountered and a brief description of the apparatus evolved may be of interest to amateurs anxious to build ultra-light gear for the thousand and one applications within the scope of the 56- and 28-mc. bands.

In the modern soaring plane ("glider," to some folks) there is very little room to spare. One has the impression that the pilot is inserted in his cockpit with the aid of a shoe-horn. At any rate, apparatus to be within his grasp for adjustment must be extremely small. The apparatus not requiring adjustment during flight (power supplies and transmitter) do not require quite such rigorous treatment but even they must be kept down in size and weight. How small, how light, how simple could such gear be made — those were the questions.

A POCKET-SIZE RECEIVER

With no engine noise to overcome in the plane, a single tube, we decided, would be sufficient for the receiver if only it could be made to operate really effectively. This led to a survey and trial of all the known single-tube super-regenerative circuits. Careful comparisons revealed that the circuit of Fig. 2 provided considerably greater

sensitivity and signal volume than any of the simpler circuits that depended on grid blocking for the interruption frequency. It was considered the ideal circuit, notwithstanding the necessity for additional components — particularly the interruption frequency coils. Examination will show that the signal-frequency portion of the circuit is exactly similar to that used in our previous super-regenerative sets. The interruption-frequency coils L_4 and L_6 , instead of being connected to a separate interruption-frequency oscillator tube, are inserted in the plate and grid circuits of the detector tube, so permitting it to do the double job of oscillating at the interruption frequency and super-regenerating at the signal frequency.

The receiver in its final form is illustrated in Figs. 1, 3 and 4. In its planning, consideration was given not only to size but to the accessibility of every component and connection; hence the "U" shaped frame. Measuring $3\frac{1}{4}$ by $4\frac{1}{4}$ by $1\frac{9}{16}$ inches, this frame is bent from a strip of $\frac{1}{16}$ -inch aluminum. Sharp bends at the corners

result from scoring the aluminum deeply at those points. The entire assembly is mounted on the frame, permitting the receiver to be adjusted or serviced after slipping off the "U" shaped cover. In Fig. 3, the Type 30 tube can be seen at the top, its wafer-type socket supported from the frame with machine screws and $\frac{3}{16}$ -inch long bakelite tubing spacers. Immediately below the tube socket are to be seen the inductances L_1 , L_2 , L_3 and the condensers C_1 , C_2 , C_3 .

The tuning condenser, C_1 , is a Cardwell 13-plate "Balancet," cut down to 5 plates by removing plates from the rear. It is therefore a more compact unit than the normal 5-plate midget of this type in which the plates are set back from the frame. A special compact "Balancet" condenser of this type is, we understand, now available from Card-

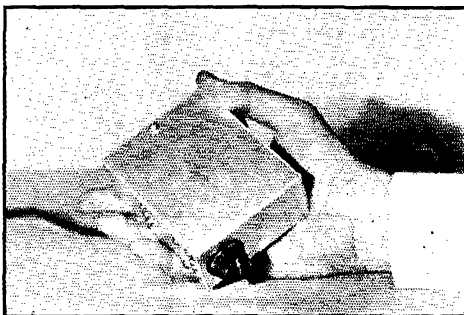


FIG. 1 — ONE OF THE SMALL RECEIVERS USED AT THE NATIONAL SOARING MEET

Containing not ten tubes but one only, the set, nevertheless, is capable of producing strong 'phone signals. Its sensitivity is the equal of any super-regenerative receiver we have operated. The receiver weighs 12 ounces.

well. In the receiver, this tuning condenser is mounted to and insulated from the frame by a small piece of bakelite. It is placed at the end of the set opposite the knob so as to allow space for the essential insulated coupling. Straddling the $\frac{1}{4}$ -inch bakelite shaft is the interruption fre-

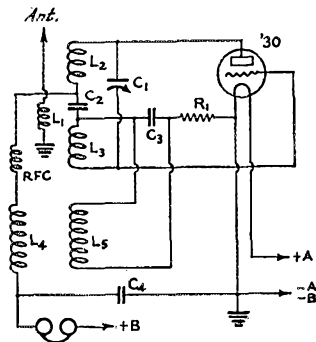


FIG. 2 — THE CIRCUIT OF THE MIDGET RECEIVER

- C₁ — Five-plate Cardwell Special Balancet (see text).
- C₂ — 100- μ fd. midget fixed condenser.
- C₃ — 0.002- μ fd. midget fixed condenser.
- C₄ — 0.004- μ fd. midget fixed condenser (two 0.002's in parallel).
- R₁ — 1-megohm half-watt fixed resistor.
- L₁ — Two turns of No. 22 wire $\frac{1}{8}$ " diameter mounted between L₂ and L₃.
- L₂, L₃ — Five turns each of No. 20 wire $\frac{1}{8}$ " diameter and spaced to occupy $\frac{1}{2}$ " for 56 mc. Ten turns of No. 24 wire same diameter and unspaced for 28 mc. The coils are made solid with "dope" in the latter case.
- L₄, L₅ — Sickles interruption frequency coil unit.
- RFC — No. 30 gauge wire wound unspaced for a length of $\frac{3}{4}$ " on $\frac{1}{16}$ " bakelite rod.

quency coil unit. Under the latter, and under the drive shaft, are the two 0.002- μ fd. midget fixed condensers connected in parallel to form C₄. The two "tip-jacks" for connection of the 'phones can be seen close under the knob. They are mounted in a strip of bakelite bolted to the frame. Remaining items are the gridleak, placed between the interruption frequency coils and the tuning

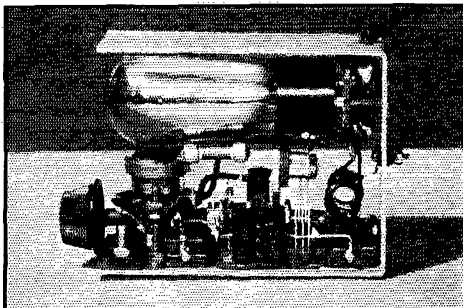


FIG. 3 — UPON SLIPPING THE COVER OFF THE MIDGET RECEIVER, ALL COMPONENTS AND WIRES ARE IMMEDIATELY REVEALED

This type of construction is therefore particularly valuable when service and adjustment become necessary — and when is it that they don't?

condenser, and the insulated antenna terminal in the frame above the tuning coils.

The reverse side of the set, shown in Fig. 4, gives a more accurate idea of the placement of these parts and reveals, in addition, the radio-frequency choke wound on a stub of $\frac{5}{16}$ -inch bakelite rod.

The cover for the set is bent from $\frac{1}{16}$ -inch thick aluminum. It is drilled to accommodate the tuning condenser shaft and is held in place by one long machine screw, the head of which can be seen at the rear of the set in Fig. 1. The inside of the cover is protected against electrical contact with the components of the set by having its surfaces covered with ordinary writing paper and lacquered. All the aluminum, incidentally, was given a bath in strong lye solution, washed in water and then lacquered with clear Duco.

The operation of the receiver should present no problem other than the adjustment of coils to give the desired band coverage. The lack of the characteristic rushing noise which accompanies normal functioning will indicate either a faulty component or incorrect wiring. There are no half measures in these receivers; they either work well or not at all. This particular circuit, unlike the others tried, operates satisfactorily with just 45 volts of plate supply. This is obtained either from a pair of 1-lb. 22 $\frac{1}{2}$ -volt "B" batteries or from a string of the very small No. 700 Eveready flashlight batteries mounted in a revamped cartridge belt and connected in series. For filament supply, two ordinary flashlight cells are used with a 16-ohm fixed resistor in series.

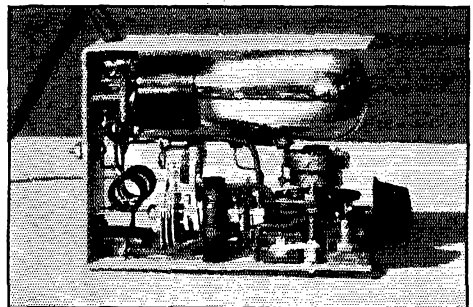


FIG. 4 — THE REVERSE SIDE OF THE SMALL RECEIVER

We do not suggest for a moment that this receiver is the ultimate in small receivers. We have given it a very extended description, though, because we believe it to be a very practical and widely useful gadget for any ultra-high-frequency experimenter to possess. Our experience with it has shown the desirability for at least two minor modifications, both of which we have made since the photographs were taken. Firstly, small bakelite blocks fitted with machine screws and nuts have been provided to serve as terminals for

the two halves of the tuning inductance. In this way, the use of either 56- or 28-mc. coils is made possible. Secondly, a different type of tuning knob has been fitted with its indicating arrow on the rim contacting the receiver frame. This permits accurate setting and re-setting of the tuning control. If we were to build other receivers of the same general type, we would give serious thought to the possible addition of an audio amplifier (making the set twice its present

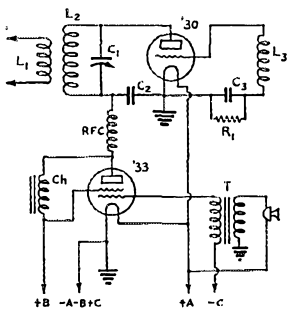


FIG. 5 — WIRING OF THE LIGHTWEIGHT 56-MC. TRANSMITTER ILLUSTRATED IN FIGS. 6 AND 7

- C_1 — Five-plate Cardwell Special Balancer condenser (see text).
- C_2 — 250- μ fd. midget fixed condenser.
- C_3 — 100- μ fd. midget fixed condenser.
- R_1 — 25,000-ohm half-watt fixed resistor.
- L_1 — One turn of No. 16 wire $\frac{3}{4}$ " diameter wound inside L_2 .
- L_2 — Two turns of No. 16 wire spaced $\frac{1}{4}$ " on $1\frac{1}{4}$ " former.
- L_3 — Seven turns of No. 20 wire $\frac{1}{8}$ " diameter. Turns spaced to provide exact adjustment of inductance.
- RFC — Similar to choke in midget receiver.
- Ch., T — Replacement output transformers designed for push-pull Type 46 tubes in midget broadcast receivers. See text.

thickness). Also, we would make an endeavor to use the W.E. "N" or "peanut" tubes, which are much smaller than the 30's.

THE COMPANION TRANSMITTER

The small transmitter, companion for this receiver, need not be described in detail because of its similarity in mechanical respects and because of the routine conventionality of its circuit, which Fig. 5 reveals as a straight TNT with a pentode modulator. There is certainly nothing in it to justify special mention.

The frame on which the components are assembled measures $5\frac{1}{4}$ inches along the axis of the tubes, 5 inches high and $1\frac{7}{8}$ inches wide. As in the receiver, all equipment is mounted to this

frame. In Fig. 6, the oscillator tube is at the top, supported far enough from the closed end of the frame to allow room for the small Cardwell tuning condenser. The modulator tube below it

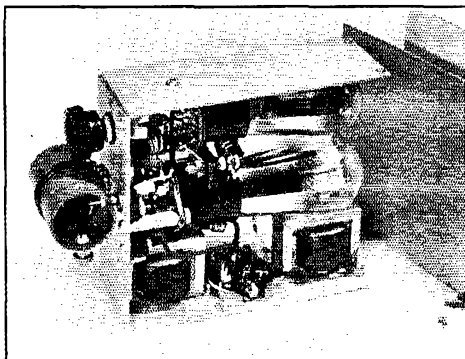


FIG. 6 — THE MIDGET TRANSMITTER

The same "U" frame construction is employed for this unit as for the receiver, all components being readily accessible upon removal of the cover. The weight of the transmitter, incidentally, is 1 lb. 15 oz.

is also mounted away from the frame end to make room for the G. R. sockets for the plate tank coil and the radio frequency choke. Needless to say, both the plate tank sockets and the tuning condenser are well insulated from the metal frame. The plate choke, microphone transformer and battery cable socket (a UY tube socket) occupy the lower side of the frame. Because of their small size and low weight, push-pull output replacement transformers for midget broadcast receivers were used for the microphone transformer and speech choke. The type designed for use between a pair of Type 47 tubes and speaker was found particularly suitable. The speaker

winding serves as the primary of the microphone transformer and is, of course, disregarded in the speech choke. To be seen projecting from the left side of the set is the plate tank and antenna coil (the latter inside the coil form). This unit was arranged externally so that the frame of the set would not have to be expanded unduly and so that a reasonably large and "low-loss" plate tank could be used.

The operation of this transmitter is perfectly straightforward and its adjustment should be well within the capabilities of anyone able to build it. Careful adjustment of the grid coil is essential. The plate current of the unloaded oscil-

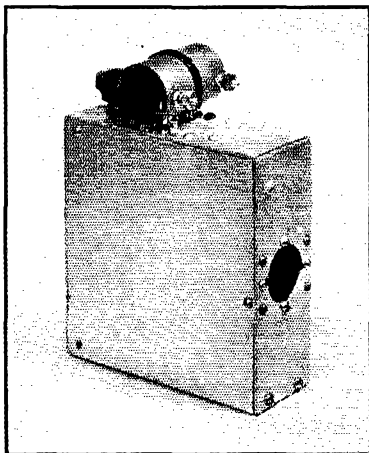


FIG. 7 — WITH THE COVER IN PLACE. ANOTHER VIEW OF THE 56-MC. TRANSMITTER

lator must drop to a sharp minimum at the frequency on which operation is desired. Battery supply for this transmitter consisted of flashlight cells and small "B" batteries similar to those used with the receiver. The microphone and filament switch

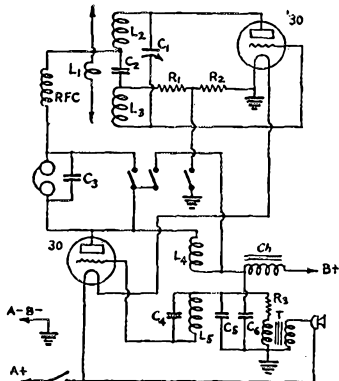


FIG. 8—THE CIRCUIT OF THE TRANSCIEVER ILLUSTRATED IN FIGS. 9 AND 10

- C₁—Five-plate midget variable condenser.
- C₂—100- μ fd. midget fixed condenser.
- C₃—0.002- μ fd. midget fixed condenser.
- C₄—0.002- μ fd. midget fixed condenser.
- R₁—50,000-ohm half-watt fixed resistor.
- R₂—2-megohm half-watt fixed resistor.
- R₃—25,000-ohm half-watt fixed resistor (found necessary to prevent "howling" of the modulator as a result of proximity of Ch. and T).
- L₁—Two turns of No. 16 wire $\frac{1}{2}$ " diameter mounted between L₂ and L₃.
- L₂, L₃—Each 4 turns of No. 16 wire $\frac{1}{8}$ " diameter with turns spaced $\frac{1}{8}$ ".
- L₄, L₅—Sickles interruption frequency coil unit.
- RFC—Similar to choke specified for midget receiver.
- Ch., T—Similar to those specified under Fig. 5.

were wired into the battery unit with flexible leads running from there to the cockpit of the 'plane. Both, of course, could be provided for on the transmitter unit itself.

AND A "PERISCOPE" TRANSCIEVER

The third small unit illustrated is a "transceiver" which, despite its extremely low power, proved thoroughly effective in communication

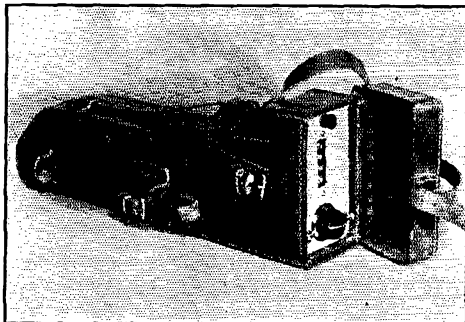


FIG. 9—BUILT INTO AN OLD ARMY PERISCOPE CASE; THE SMALL TRANSCIEVER
The total weight, including batteries is 8 lb. 12 oz.

over distances up to about 8 miles. Because it was designed to fit in an old British Army periscope case (which few amateurs are likely to possess) it would be futile to enter into lengthy discussion of the mechanical features of the set. It is shown just as an example of one convenient type of construction which could be adapted to suit similar "containers" which may be available. In this instance, the transceiver proper occupies the large end of the case, the "A" and "B" batteries being slipped down into the narrow end. The battery leads emerge from the case on the sloping wall, then being plugged into the row of three "tip-jacks" to be seen on the right top side of unit illustrated in Fig. 10.

The circuit, shown in Fig. 8, requires careful consideration. It is an arrangement (devised two years ago) based on the knowledge that the interruption frequency oscillator of a super-regenerative receiver is functioning as a modulator for reception and that it might readily be switched to operate as a modulator for trans-

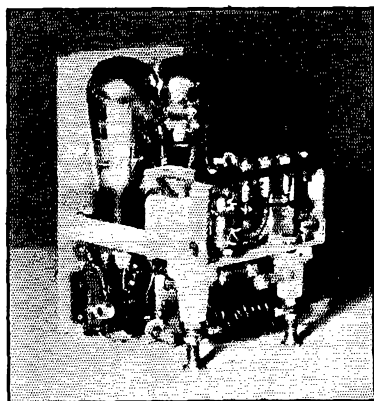


FIG. 10—THE "WORKS" OF THE TRANSCIEVER

On top of the shelf are placed the tubes, microphone transformer, speech choke, and battery connections. Below shelf are located the tuning condenser and high-frequency coils, the interruption frequency coil unit and the switches. The two insulated posts on which the unit is resting carry GR sockets into which the antenna leads are plugged through holes in the case.

mission. Study of the wiring will show that L₄ and Ch. are really two plate chokes in series—one functioning at the interruption frequency, the other at speech frequencies. The grid circuit of the modulator, containing both the tuned circuit L₄, C₄ and the modulation transformer secondary, is also capable of operation at both interruption and speech frequencies. Changing from reception to transmission involves shorting the 'phones, reducing the oscillator gridleak resistance and shorting the interruption oscillator plate coil. In our particular set, this switching is accomplished with a modified miniature toggle switch. Some larger and more readily available

switch might well be used in cases where space is not so strictly limited.

With 90 plate volts, the total plate current is of the order of 7 ma. with the oscillator loaded. This, with only 60 ma. of filament current, permits the rig to be operated very economically.

In closing, we wish to make an earnest plea that amateurs should consider these circuits and illustrations not as something to be rigorously copied but as suggestions of possible use in the development of new and better equipment. There is an enormous field of usefulness for small ultra-high-frequency transmitters and receivers — a field in which the amateur is to make many contributions. The contributions can hardly be made, however, without original and generally constructive work on the part of the amateur himself.

Wholesale copying of the other fellow's gear will never do any good.

World's Fair Exhibit

TRAVEL and transport — and communications . . . keynotes of modern civilization. Visiting the amateur radio exhibit at the Chicago World's Fair one sees them personified, symbolized. At the 35th street entrance loom the famous Royal Scot, peer of British trains, and beside it an American cousin from the Baltimore and Ohio. A cavalcade of the epoch-making trains of history leads one to the Travel and Transport Building, filled with a myriad of examples of modern transportation.

The amateur radio exhibit is on the second floor. One leaves the escalator to pass before a huge sign reading, "Denmark," and another heralding, "Irish Free State," with the exhibits of these countries spread forth beneath them. To the right can be had a balcony view of the main floor. Texaco's trim little low wing monoplane, No. 13, floats in mid-air, with the Canadian exhibit to the left, and a colorful display of safety glass to the right. Just beyond the balcony are the red letters blazoning "Amateur Radio."

The exhibit itself was described in cursory detail last month . . . the color scheme, the exhibitors, the personnel. It is a fitting tribute to amateur radio, and a splendid exposition of what our art actually means. One need only watch the endless parade of persons, obviously not amateurs, yet all obviously intensely interested, passing along the rows of exhibits, peering through the wire screens surrounding the transmitters and operating position, asking questions, filing messages, buying souvenir booklets and Handbooks and seizing on every opportunity to learn more of what it is all about, to realize the significance of the exhibit.

The adjoining lounge room, reserved for the use of amateurs and their friends, is continually oc-

cupied. Cards on the walls indicate a wide attendance from every district; on August first the log showed licensed amateurs to a total of 1457 had witnessed the exhibit. Every district was represented, and many a foreign prefix — including that of OM1CB in late July. . . . The exhibit is not yet finished — despite the more than a year of effort that has been put into it. New things are constantly being added; the latest is a four-stage c.c. 56-mc. transmitter, in beautifully built rack and panel style, a part of the work W9HBX, W9CSB, W9JO and W9FPP are doing on this band. Every amateur who has not yet seen the exhibit should make every effort to do so, for it represents an unmistakable contribution to the amateur radio of this country.

— C. B. D.

Strays

The government's economy program has removed some old friends from their parts in radio administration. In the July "cut" there were lost to us Edwin W. Lovejoy, inspector since 1920 and since late 1928 the supervisor at Seattle; and Wm. E. Downey, since 1918 the second in charge of the field inspection administration, once the old Department of Commerce radio division. We are sorry to see these old friends separated from the service; we wish them well and hope to continue seeing them in radio.

Copies of the "Shure Technical Bulletin," a publication of Shure Brothers Company, 337 West Madison St., Chicago, microphone makers, are available to *QST* readers without charge on request. The first two titles issued are "Condenser vs. Two-button Microphones" and "Field Problems in Microphone Placement," both containing interesting and useful information.

Bulletins 11, 19 and 25 of the Ward Leonard Electric Co., Mt. Vernon, N. Y., describe in detail Vitrohm and Ribflex resistors, their mountings and enclosures. The "Ribflex" resistors are made to a new design which increases the rating of resistors of a given physical size by providing rapid heat radiation.

The new General Radio Type 637-P knob is the "nertz" for receivers like the National FB-series superhets and the Hammarlund Comet Pro. The large diameter, 2 $\frac{3}{8}$ inches, and deep indentations around the circumference make two-finger tuning a reality and the hand does not become fatigued even after a long stretch of DX-hunting. Similar knobs also can be obtained in 1 $\frac{5}{8}$ - and 1 $\frac{1}{8}$ -inch diameters, these types being known as the 637-G and 637-A respectively.

Amateur Radio at the National Soaring Meet

SHOULD anyone wish to spend a vacation immersed in divers amateur radio activities, Elmira, N. Y., during the National Soaring Meet is the right place to do it. This, of course, is no new discovery. Readers of *QST* will recall that, for several years past, amateur radio has played an important part in the annual meet; that last year, 1694 messages were handled by the Elmira Radio Amateur Association operators over their 56-mc. duplex radio telephone net during the two weeks of activity.

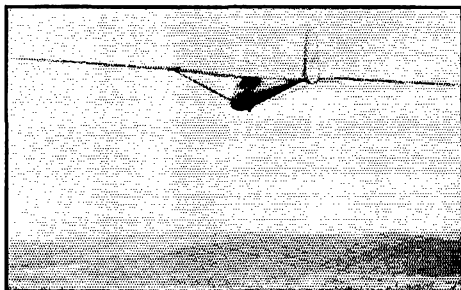
This year, because of unfavorable weather con-

ditions, this communication system proved completely reliable and positively invaluable.

But on this occasion, amateur radio at the meet was not limited to communication between the hills and the airport. As amateurs attending the contest have long thought, radio should not be kept on the ground when there are sailplanes in the air — if for no other reason than that a motorless plane is the ideal location for an ultra-high-frequency station. The Elmira fellows saw, this year, that there was action to suit the thought. Armed with a special aircraft license and much lightweight equipment supplied by Prof. R. E. Franklin of Ypsilanti, Mich., and the writer, they proceeded to demonstrate that duplex radio-telephone communication between a sailplane and ground is not only entirely practical but of genuine value to the sailplane pilot. And did we all have fun!

Most important of the problems faced was that none of the sailplane pilots had radio operators' licenses — a condition which had to be remedied by the inauguration of "The Elmira Outdoor Hay-Wire Radio School." Becalmed on "Hill 6," the interested pilots were drilled in the complexities of radio regulations, operating procedure and elementary technicalities to the point where a third-class commercial ticket was simply a matter of flying to Buffalo and passing the examination. High enough tribute can hardly be paid Mr. Warren Eaton, president of the Soaring Association; Prof. R. E. Franklin and Mr. N. H. MacDowell for their willingness to go through the rigmarole in the interests of amateur radio despite intense preoccupation with the general conduct of the soaring meet.

Unfortunately, only a few pre-



Top: Taking off from "Hill 6"—Richard duPont in a Bowlus Sailplane.

Center: A quiet moment at the 28-mc. 'phone station on "Hill 6".

Below: After the return flight from Buffalo—Prof. R. E. Franklin, Warren Eaton and N. H. MacDowell weeping over their plunder.



ditions for soaring, the meet had a narrow escape from becoming a radio camp instead of a glider contest. Chief activity, of course, was the installation and maintenance of radiophone stations at the Elmira airport and at "Hill 6" — the ridge chosen for the glider encampment and the scene of most of the flying activities. Last year, 56 mc. was used for this link but because of a high intervening ridge, a relay station was found necessary. This year, the newly-opened 28-mc. 'phone band was put to use and highly satisfactory direct contact was made possible. For the two weeks of the contest, the Elmira group sacrificed sleep, eats, vacations and comfort to maintain continuous duplex contact for the convenience of officials and pilots of the Soaring Association. As in past years



vious hours of good soaring weather were to follow. Nevertheless, we were able to show the practicabil-

(Continued on page 64)

New Intermediate-Power Transmitting Tubes

Types RK-18, 800 and 830 Announced by Manufacturers

By George Grammer, Assistant Technical Editor

WHILE tube manufacturers have been vying with one another to be the first to get into production on the whims of this and that set designer, there is one person who has had to take such crumbs as might come his way—Mr. John Q. Ham. Of the multitudinous types that have been announced in the past three years, those that really filled any need in amateur radio can almost be counted on the fingers of one hand—a few receiving tubes of improved characteristics, the 46 with its versatile heater-type companion, the 59, and some low-voltage mercury-vapor rectifiers. Some of the rest have been useful occasionally, especially the battery-operated varieties for portables, but the great majority have made no dent in the consciousness of amateurs in general, nor is there any good reason why they should have.

But now we have some real news: Three new types that fill the gap between the 10 and the 203-A or 852! Not duplicates, but three different designs all having about the same power output rating as oscillators or r.f. power amplifiers. These are the Raytheon RK-18, the RCA-Radiotron 800, and the Sylvania 830. Unfortunately we can give complete data only on the RK-18 in this issue; the last two were announced just at press time and, aside from the usual filament and plate ratings given farther along, our information on them is incomplete. More about them in later issues.

The Raytheon RK-18, the design of which was decided upon after Raytheon representatives had consulted A.R.R.L. Headquarters on the question of what kind of tube amateurs needed, is a double-ender which looks somewhat like a miniature 204-A, as the photograph shows. The grid and filament connections are brought out to a standard 4-prong base—made of Isolantite to keep down losses at high frequencies—on one end, with the plate connection coming out the other end. The photograph shows a binding post on the plate socket, although there is a possibility that this may be changed to a cap, later. The filament is thoriated

tungsten, which means that the RK-18 is really “hard” and which does away with the grid-emission troubles that make the small tubes with oxide-coated filaments so unstable at 400 volts or more. The plate is sand-blasted molybdenum, which shows some color when the dissipation is nearing the rated value—a good feature in a transmitting tube because it gives a sure indication of overloading or inefficiency.

The ratings on the RK-18 are as follows:

Filament voltage	7.5 volts
Filament current	1.4 amperes
Plate voltage, maximum	1000 volts
Safe Plate Dissipation	40 watts
Amplification factor	18
Plate resistance	6000 ohms
Mutual conductance	3000 micromhos

Inter-electrode Capacitances:

Grid to plate	5 μ fd.
Grid to filament	3.8 μ fd.
Plate to filament	2 μ fd.

The operating data on the tube as a Class-A amplifier are given below. Because of the high μ the undistorted power output is not as great as would be obtained from a lower- μ tube operating at the same plate voltage.

Class A Service

Plate voltage	750	1000 maximum
Grid Bias voltage	-30	-40 volts
Plate current	34	36 ma.
Load resistance	9300	13500 ohms
U. P. O.	5.4	8.5 watts

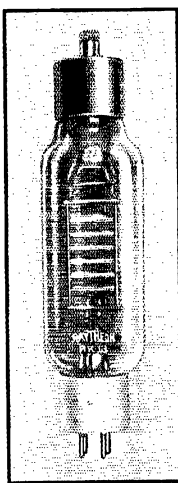
AS AN OSCILLATOR OR R.F. POWER AMPLIFIER

For r.f. use the following nominal ratings have been put on the tube:

Plate voltage	750 modulated
“	1000 unmodulated
Plate current	85 milliamperes
Safe plate dissipation	40 watts
Max. r.f. grid current	5 amperes
Typical operation; $E_b = 1000$, $E_c = -150$	
Power Output	50 watts

The recommended grid-leak resistance is 15,000 ohms. Under operating conditions, with the tube delivering power to a load, a d.c. grid current of 10 milliamperes will provide the necessary bias.

The amount of r.f. power that can be taken from a tube depends to a large extent on how the circuit is handled. If the tube is excited properly and the circuit is well designed, the tube effi-



THE NEW
RAYTHEON RK-18

Designed especially for amateur high-frequency transmitters, the RK-18 is featured by low inter-electrode capacities, wide spacing between plate and other elements, ability to stand high voltages, and power output in the vicinity of 50 watts both in radio-frequency circuits and Class-B audio.

ciency can be made quite high — as high as 80% for a separately excited amplifier, somewhat less for a self-excited oscillator. It should be no trick at all to get 50 watts from the tube without exceeding the conservative plate voltage and plate current ratings given above.

Actual tests show that the RK-18 is an excellent high-frequency tube. A sample tube used as a

plate current of about 100 milliamperes. The same input on 14 mc. lighted up a 60-watt lamp used as a dummy load almost to normal brilliancy, with the tank circuit still plenty "hot." The grid current was 15 milliamperes, bias approximately 200 volts, a combination which works the tube at high efficiency.

CLASS-B MODULATOR CHARACTERISTICS

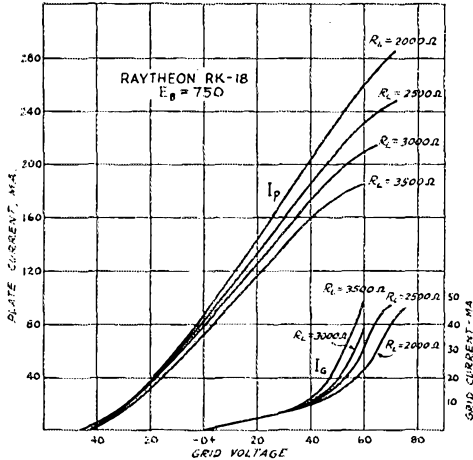


FIG. 1 — TYPICAL LOAD CURVES OF THE RK-18 AS A CLASS-B AUDIO AMPLIFIER WITH 750 VOLTS ON THE PLATE

At this plate voltage an audio output of 70 watts can be obtained from two tubes by proper choice of load conditions.

neutralized doubler on 28 mc. gave an output of more than 30 watts with 700 volts on the plate — all that was available at the moment — at a

performance of the RK-18 as a Class-B audio amplifier at plate voltages of 750 and 1000 with various values of load resistance. A study of the curves shows that the tubes are not hard to excite — the driving power required at the optimum operating conditions is well within the capabilities of a single 2A3 or a pair of 45's in push-pull — and that large outputs can be obtained. This is the natural result of the high plate voltages at which the tube can be used. It is possible to obtain 100 watts of audio power from a pair of tubes while still working within the plate current and plate dissipation ratings. Hardly any 'phone man needs to be told that 100 watts of audio power will fully modulate 200 watts of r.f. input — and 200 watts input on the modulated stage makes a transmitter that will do some business on the air.

The table below gives some suggested operating conditions. In the first column, the tubes are worked at their full plate-current rating at 750 volts, the output power being slightly more than 70 watts. In the second column, an output of 65 watts is obtained at the same plate voltage with a greater step-down ratio in the input transformer, which lessens the grid distortion. This set of conditions is just about right to modulate a pair of RK-18's in an r.f. amplifier drawing maximum plate current at the same plate voltage. The third column is for operation with 1000 volts on the plate.

CLASS-B OPERATION

Plate voltage	750	750	1000 volts
Grid bias voltage	-35	-35	-45 "
Load resistance per tube *	2000	2000	3000 ohms
Power output (two tubes)	71	65	100 watts
Peak grid voltage	+63	+58	+60 volts
Peak grid swing	98	93	105 "
Peak plate current (two tubes)	267	255	258 ma.
Average plate current at full output (two tubes)	170	162	164 "
No-signal plate current (two tubes)	20	20	24 "
Average grid current at full output (two tubes)	11	9	15 "
Driver input transformer turns ratio; pri. to 1/2 sec.:			
With one 2A3	2:1	2.5:1	2:1
With p.p. 45's	4:1	5:1	4:1

The output transformers now available for the smaller Class-B tubes probably are not capable of handling the larger power output of a pair of RK-18's, certainly not at the 1000-volt rating.

(Continued on page 68)

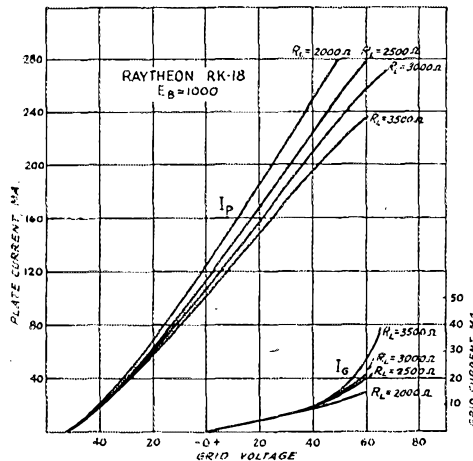


FIG. 2 — CLASS-B LOAD CURVES AT 1000 VOLTS

With a load impedance of 3000 ohms per tube the audio output is 100 watts with a peak grid swing of 105 volts. The maximum instantaneous driving power required is slightly more than 2 watts. No negative kinks in these grid-current curves.

* Multiply by 4 for two tubes.

First Annual Field Day Report

THE first Field Day was pronounced an unqualified success, according to about 50 accounts of station participation received. The gang who took part are looking forward to more similar occasions for the practical testing of portable (potential emergency) equipment, combined with a good time for all.

Portables were operated from all conceivable locations, and on almost all amateur frequency bands. Maximum activity took place on the 7- and 3.5-mc. bands, with about $\frac{1}{2}$ as much activity on 14 mc. and 56 mc., and with some scattered use of the 1.7-mc. band. In addition to power limitations (2 to 50 watts), participants reported insect and weather hazards. Suitcase rigs with but a single watt input were popular though some sets were "portable by truck" instead. Plate power was provided from B-bats, motor-car B-power packs, dynamotors, Diesel driven generators and filtered spark-coil step-up devices. The London Ontario club drove a 1200-volt machine (with fil. winding) from a 2-cylinder gas engine.

W4PAW, kept on the air continuously for the 27 hours of the test at Indian Rocks Beach, Fla. by six operators, ran up the most outstanding score and tops the list. W9ZZAL and operators of the Central Illinois Radio Club (40 watts on p.p. '10s) at Bloomington Ill. used 7 and 14 mc. and placed second. W2BPP, Boyd Phelps and YF, and Phil Jensen at Minneapolis won third honors using both 3.5 and 7 mc. and a 150 watt crystal job on roller castors made to fit a car trailer and constitute a radio central for smaller portables in emergency. The Astoria Amateur Radio League took W7BTT to the summit of Saddle Mountain, 6000 feet high. VE3JT and VE3GT "set up" 50 miles from Toronto between two elm trees using '71A and Utah car-pack. In spite of a sudden gale and YL QRM it was a successful location. W8HSG had a pile of fun from a camp on the Sandusky River. The Pike's Peak Amateur Radio Ass'n had W9LIJ on the peak (m.g. run from wheel of car) but the storage bats went dead. W2ZZDI-BNJ and W2EMQ took time out from the Field Day program to help the canoe regatta races by sending results and starting time over a distance of about $\frac{1}{2}$ mile. A '71-A and 125 v. of B bats took care of the job nicely. DX operation was handicapped by overhanging Palisades cliffs. W1GFM on 56 mc. heard W2DVZ in the Catskills. Radloff, W9AIR, Program Director of the S.M.R.A. arranged a hamfest at a gun club on Heron Lake with the cooperation of W9BNN-CKU-EYS. In commenting Rad says, "The Field Day activities were a real trial for portables. (And some portables are a trial for those who operate them . . . hi.) Too many stations are designed piecemeal, without

coördinating the receiver, transmitter and power supply. Often parts are weak or unwieldy in operation. Field Day activities served a good purpose by bringing out these weaknesses; better design will surely result. Many operators received benefit by observation and inspection of other portable sets, and constructive discussion."

So we believe that a forward looking step has been taken in inaugurating this annual affair. Of course many took part who did not report; nevertheless the results shown in the reports indicate the effort successful, both from the viewpoint that practical building and testing of emergency communication equipment was furthered, and

FIELD-DAY PARTICIPATION

CLUB SCORES		Points for QSOs	Stc't's and Foreign	Score
W9ZZAL	Central Illinois Radio Club	98	15	1470
VE3KC	London Amateur Radio Club	35	22	770
W8GDM	Buckeye Short Wave Radio Ass'n	37	12	444
(Plus W8ZZB 14 mc., W8LMC, and W8BZL 56 mc., 478)				
W5BXY	Abilene Radio Club	24	12	288
(W5RIB 1.7-3.9 mc. and W5AW, 378)				
W1FTS*	Hoosac Valley Radio Club	19	10	190
VE5EZ*	Victoria Short Wave Club	24
W9JGT	Southern Minnesota Radio Ass'n	5	4	20
(W9MKA, W9NKN and W9HXH, 22)				
W7BTT	Astoria Amateur Radio League	5	3	15
W9KWJ	Pikes Peak Radio Ass'n	4
OTHER LEADING SCORES				
W4PAW	W4AIL-W4AZF-W4BOT-W4AWS- W4AJX-W4BOX	62	28	1876
W2BPP	Mr. Boyd Phelps and YF (7 and 3.5 mc.)	63	22	1386
W9LOV	W9HES-BFL-IHW (Pr. 46's on 7 and 14 mc.)	53	26	1378
W9NFV	W9AIW (50 watts on 7032 and 14064 kc.)	52	26	1352
W8IRR	(*10 TNT, 22 watts on 7 mc.)	51	22	1122

W8HUC 819; VE3GT 663; W9MKI 612; W2FDG 482; W5CNX 418; W7AAL 418; W9ZZAP 340; W4PBL 223; W9ZZAO 210; W9BKJ 180; W4PAL 168; W6ZZAC 112; W5GI 102; W9NLC 100; W1EZH 78; W8HSG 68; W1FEH 52; W5CTZ 36; W8ZZCE 36; W1GFM 36; W1FRL 33; W8HTI 32; W6DQD 24; W1GSD 6; W2ZZDI 5; W1CJD 2; W3CVW 2.

* Club stations. The call signal of the leading individual operator is otherwise listed, where several club member-stations were put on the air at a club outing.

from the standpoint that an enjoyable operating activity was made possible. There is hardly space for more than a resumé of the highlights here, but the enthusiasm greeting our first Field Day augurs well for future similar occasions. What shall we call our next Field Day to give it more of a "preparedness for emergency" significance? Suggestions will be welcomed. Bearing in mind that the new amateur station regulations make every licensee a potential operator of portable equipment, every amateur should now take steps to make himself ready to render constructive service in any time of emergency. Many portables will undoubtedly be ready to test before our next Field Day Emergency Test. Is your portable equipment independent of interruptions of power service? Are you ready for the next tests?

— F. E. H.



Sharp Cut-off Low-Pass Filters to Eliminate Broadcast Interference

By Frederick C. Everett, W8CMY*

SOME amateurs, especially those operating in the 1715-kc. band, have been having difficulty with low-pass filters installed on broadcast receivers to prevent interference. Either the cutoff is made so low that it causes a loss of sensitivity at the high-frequency end of the b.c. set, or else it is made so high that it does not properly eliminate the 'phone station. On the

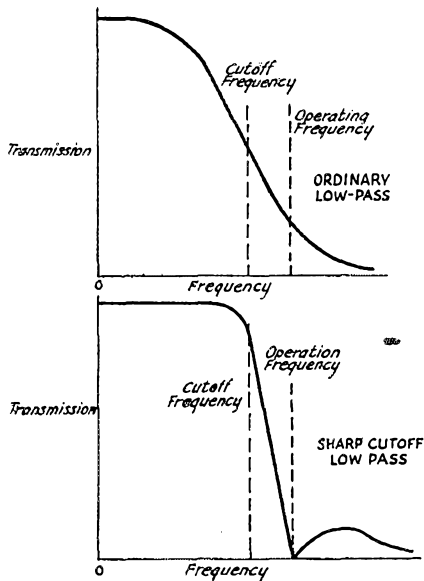


FIG. 1 — COMPARATIVE CURVES OF ORDINARY LOW-PASS FILTER AND SHARP CUTOFF FILTER OF THE TYPE DESCRIBED IN THE TEXT

other hand, wave traps are usually more expensive to build and more prone to get out of adjustment when installed in a neighbor's set, both difficulties being attributable to the variable tuning element.

Because of these facts, the filter presented herewith should be of interest. It has a very sharp cutoff and an attenuation "notch" which resonates at the frequency to be eliminated. Typical

* Electrical Engineer, 411 Palmwood Ave., Delta, Ohio.

characteristic curves of an ordinary low-pass filter and one of this type are shown in Fig. 1. As a further advantage, it uses smaller coils and condensers than the more general type of low-pass filter. The fixed condensers are 250 μfd .

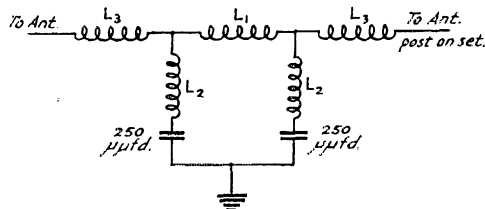


FIG. 2 — CIRCUIT DIAGRAM OF SHARP CUTOFF FILTER

Type	Inductance in Microhenries		
	L ₁	L ₂	L ₃
A	38	28	19
B	40	6	20

Coil Specifications		
Microhenries	Turns	
6	10	No. 28 d.s.c. wire
19	18	" " "
20	19	" " "
28	24	" " "
38	29	" " "
40	30	" " "

each — probably the size most frequently found in the amateur's parts box. The filter is designed for a 400-ohm terminating impedance. The circuit diagram is given in Fig. 2.

Type A is for 1800-kc. 'phone. It has a sharp cutoff beginning at 1670 kc. and greatest attenuation at 1930 kc., but it also has sufficient attenuation for most higher frequency 'phones. If 3900-kc. 'phone is to be used exclusively, type B is recommended. This filter has a computed cutoff at 2470 kc. and greatest attenuation at 3950 kc. Type B is not suitable for 1800-kc. work. For operation in several bands type A is better.

The inductance values may be made up by utilizing charts or formulas, but examples are presented for those not prepared to go to that trouble. The forms are old tube bases — diameter 1 3/8 inches — or tubing the same size.

The coils should be arranged so that there is no coupling between them, or may even be separately shielded. The latter might be advisable when they are close enough to the transmitter to be in a strong field, so as to minimize pickup in the coils. If shielding is used some allowance should be made for the reduction in inductance caused by the proximity of the shielding.

On Twisted-Pair Feeders

When the article on "Twisted-Pair Feeders" was published in our July issue, we rather had a hunch that if any of the gang had been using this type of doublet for transmitting we'd be hearing from them. That is exactly how things have turned out — and as a result we have some more

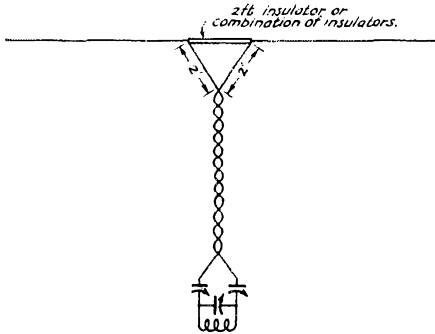


FIG. 3 — A TWISTED-PAIR FEEDER WITH IMPEDANCE-MATCHING TRANSFORMER AT THE ANTENNA END

This drawing also shows the system used by W2VY, W2BJ and others to couple the feeders to the transmitter.

dope on terminating the line at the antenna. Here is a letter from George W. E. Shields, W2VY:

"Noticed your article on twisted feeders in July *QST* and as I have been using this feed system for the past three years I am taking the liberty of offering a suggestion.

"The main problem in using this type feed system is matching the line impedance with that of the radiating system. After a number of tests, I have found that the best impedance match is obtained by the following method. Insulate the center of the radiator for two feet, then open the twisted feeders for two feet, thereby forming a triangle two feet on each side.

"To my knowledge this feed system for transmitters was first used by W2AV and myself on transmitters of 500 watts power on 40 meters. Later on I installed this system at W3BQP, 15 watts power on 80 meters, and at W2BJ, 300 watts power on 40 meters. W2AV has also used this type of feed on 20 meters.

"For tuning I have found that a combination of series parallel tuning (see Fig. 3) gives the best results.

"In conclusion I can say that this type feed system has given better results and service, at W2AV and my own station W2VY, than any Zepp feeders previously used."

In another letter Ray Farwell, W2BJ, describes the same system except that the sides of the triangle at the antenna are each 17 inches instead of two feet. In W2BJ's case the unspread feeders became noticeably hot with an input of one kilowatt to the final stage. The heating stopped after the "V" was installed.

Preventing Oscillation in R. C. Amplifiers

S. J. Preston, B.A., writing in "World-Radio," points out that a resistance-coupled audio amplifier can give trouble from motorboating even when decoupling resistors and condensers are used. This trouble can be eliminated by choosing a grid blocking condenser and grid leak for the following stage such that their time constant is equal to that of the plate resistor and by-pass condenser. If this is not done, there is a chance that the gain at low frequencies will rise to such an extent that regeneration and oscillation can take place.

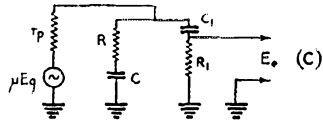
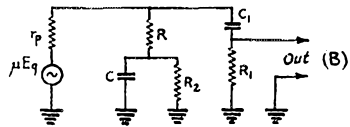
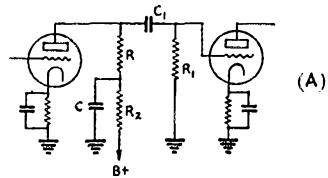


FIG. 4 — RESISTANCE-COUPLED AMPLIFIER EQUIVALENT CIRCUITS

Fig. 4A is the usual resistance-capacity arrangement when a decoupling resistor, R_2 , is used. Now R_2 is usually high enough not to affect the by-passing operation of C . We then have a plate load consisting of R and C in series, the impedance of which combination varies inversely with frequency (see Fig. 4B) so that at low frequencies the gain becomes so great that if there is positive feedback, even though small, the amplifier starts to motorboat. This tendency could be eliminated by making C very large or by reducing R_2 , but doing the latter would affect the decoupling and get one into more feedback trouble.

When R_2 is large enough to be neglected the equivalent circuit will be as in Fig. 4C and E_0 will be equal to

$$\frac{\mu C_1 R_1}{r_p C} \times \frac{1 + j\omega CR}{1 + j\omega C_1 R_1} \times E_{input}$$

so that if $C_1 R_1$ and CR are equal, E_0 will be constant at all frequencies.

(Continued on page 64)



Amateur Radio STATIONS



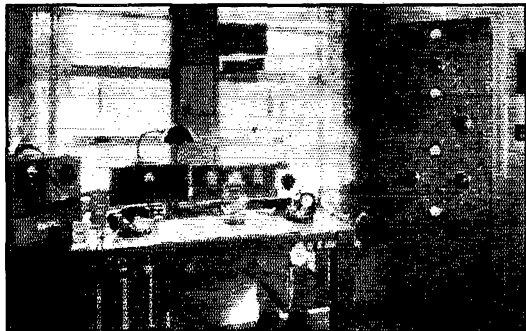
K6GAS, Honolulu, Hawaii

IF the halftone on this page does justice to the original photograph, K6GAS will look like a mighty pleasant station in which to pound brass. The station is located on top of Puunui Hill and overlooks the city of Honolulu, Diamond Head

and Waikiki Beach, so there is plenty of scenery if DX goes bad. The owner of W6GAS is Henry S. Lau, who also operates W6FUC in Los Angeles.

The rack-and-panel transmitter in the corner of the room is a five-stage crystal outfit winding up with a pair of 852's in push-pull. Inputs up to 900 watts are used on c.w. This set is also laid out for 'phone operation in the 3900-kc. band. An auxiliary transmitter with a pair of 10's in the t.p.t.g. circuit is used for local work.

The photo shows a Pilot Super-Wasp receiver and the cabinet housing the speech amplifier on a low shelf above the operating table. Since this picture was taken a National FB-X receiver also has been installed. Just to the left of the table is a portable transmitter and receiver fitted out in a carrying case and operating under the call K6GMQ.



K6GAS, HONOLULU, HAWAII

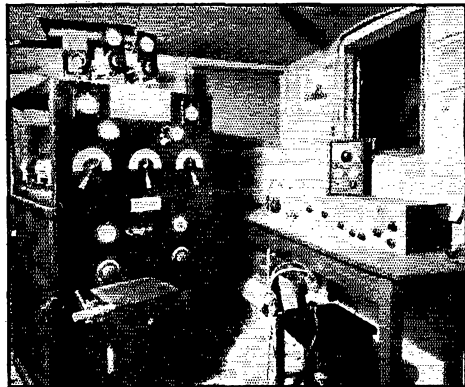
W9GEX, Fond du Lac, Wis.

LIKE many another ham, H. B. Stover of W9GEX has fixed up a radio shack in the basement of his home where, he says, "all the muss from experiments can be dropped on the floor without too much comment from the OW!" None of the muss is visible in the photograph, however — the station looks to be highly practical and up-to-date.

The transmitter starts out with a 47 crystal oscillator, followed by a 47 doubler which has its output tank split to feed the following push-pull amplifier, a pair of 10's. This in turn excites a pair of 852's in push-pull. The power input to the final stage is in the neighborhood of 800 watts. Through the use of plugs and jacks, grid and plate currents can be measured on all stages. The crystals — two on 3.5 and one on 7 mc. — are kept at constant temperature by a home-made oven mounted on the front of the transmitter panel. The oven was described on page 33, June, 1933, *QST*. The transmitter power supplies occupy the lower part of the assembly; a 500-volt supply handles all the small tubes and a 2200-volt job with a mercury-arc rectifier takes care of the 852's.

On the table at the right is a single-signal re-

ceiver built as described in August and September *QST*'s of last year, using a National SW-5 as the basic unit. Toward the back is the monitor,



and on top of the receiver cabinet is a dynatron frequency meter.

W9GEX uses two antennas, one a half-wave 7-mc. Zepp and the other a semi-vertical half-wave 14-mc. Zepp.

• I. A. R. U. NEWS •

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

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society: THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Dienst
Experimenterende Danske Radioamatører
Liga Mexicana de Radio Experimentadores

Nederlandsche Vereeniging voor Internationaal Radioamateurisme
Nederlandsch-Indische Vereeniging Voor Internationaal Radioamateurisme
New Zealand Association of Radio Transmitters
Norsk Radio Relæ Liga
Polski Związek Krotkofalowców
Radio Society of Great Britain
Rede dos Emissores Portugueses

Reseau Belge
Reseau Emetteurs Français
South African Radio Relay League
Suomen Radioamatöörliliitto r.y.
Sveriges Sändareamatörer
Unión de Radioemisoros Españoles
Union Schweiz Kurzwellen Amateur
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

National:

With the expectation being that most of its time will be devoted to consideration of the broadcasting problem the North American Radio Conference opened its sessions on July 10th in Mexico City, Mexico. Preliminary meetings for the formulation of a United States policy at this regional conference were held for several months preceding, with Secretary Warner and General Counsel Segal, of the A.R.R.L., representing United States amateurs. Similar preparatory meetings were also held in Canada, where Canadian General Manager Reid was in touch with proceedings, and in Mexico, where the officials of the L.M.R.E. not only undertook to represent Mexican amateur radio, but were successful in obtaining appointment as governmental advisers to the conference delegation itself.

All during the preparatory sessions in all three countries, Union Headquarters at West Hartford was in close touch with President Julio Prieto and Secretary F. Castro Herrera, it finally being decided that the L.M.R.E. would act as the official accredited representative of the I.A.R.U. at the sessions. The unique position of Senors Prieto and Herrera, who are participating in both the technical and regulatory sessions of the meeting, is especially favorable to adequate representation of amateur rights.

With the United States, Canadian and Mexican delegations all attending the conference with the intention of retaining the present amateur bands and privileges, and with the broadcast wrangle known in advance to be the real point of the conference, it is practically certain that the agreement finally reached will continue in entirety the existing North American agreement so far as amateur matters are concerned.

The Federal Headquarters of the Wireless In-

stitute of Australia has been changed from the state of Victoria (VK3) to that of South Australia. The new official headquarters address for all general correspondence and QSL is W. I. A., Box 284d, G. P. O. Adelaide, South Australia. The new federal officers are: president, R. B. Caldwell, VK5BP; vice president, R. D. Elliott, VK5RD; secretary, A. E. Williams, VK5BO; publicity officer, G. B. Ragless, VK5GR; QSL Manager, R. J. Bruce, VK5BJ; traffic manager, H. Bowman, VK5FM; contest manager, E. A. Barbier, VK5MD.

Among matters discussed at the convention was the general standard of the A.O.P.C. examination paper. It was moved to request that the standard of the technical paper be lowered, and that of the procedure paper increased. The A.R.R.L. Handbook was recommended to the P.M.G.'s Department as the standard; an amendment was then passed to include the Admiralty's Handbook of Wireless Telegraphy. Reduction of the experimental license fee, increase in maximum power, non-consideration by the authorities of complaints by B.C.L.'s without modern receivers, were also urged. We are informed that presentation of these views to the Chief Inspector of Wireless resulted in the acceptance of all but the lowering in standard of the technical paper and the reduction in license fee.

DX:

"Bootleg" stations are bad enough. But when undercover operators go so far as to appropriate calls and intermediates belonging to other amateurs in other continents, their activities become intolerably objectionable. There have been flurries of this sort of thing in the past, but another has arisen, centering in the Bahamas and in South

America, concerning which all DX-anxious amateurs should be warned. We have in mind the operation of certain stations using VP2 calls — a rare creature, legitimately, these days — and one using the call ZC1A — Transjordanian — an equally unusual country to be heard. All of these are false, the operators in many cases being thousands of miles away from the designated country. Such operation is totally unjustifiable, and the



THE HEINRICH HERTZ MEMORIAL STUDIO OF THE NORD DEUTSCHER RUNDFUNK

Dr. A. Kofes, engineer who designed the studio and a leading German amateur, is seated at the left across from his wife, with John C. Strobel, W8ZW, in the center.

operator who engages in it is unworthy of any part of the term amateur.

DX conditions, especially on the 14-mc. band, continue excellent, at least in New England. The band is alive until very late in the evening, while through the day a surprising range in signals is heard. On some afternoons things have gone dead between two and three, but usually the band recovered with plenty of DX as the ionosphere shifted with the day-night effect.

The 7-mc. band is alive with contacts between the United States and the Antipodes, the best times being around the dinner hour in this country, or at breakfast time in Australia. According to Oscar Egenes, ZT5R, radio conditions in South Africa have again provided food for thought and sufficient phenomena to satisfy the most ardent of amateur experimenters. Changes are presented in diurnal sequence and the fact that 3.5 mc. has become an almost useless frequency for communication over short distances came as a complete surprise to many. It has become necessary to exploit the 1750-kc. band, and tests are

now being conducted with no small measure of success.

Just when we have penned these lines comes a letter from Yardley Beers, W3AWH, Trenton, N. J., saying, "I was very much interested and amazed to read your paragraph on 'DX' in the August I.A.R.U. section of *QST*. Had anyone purposely wanted to contradict the 'dope' I had collected here, he could not have improved on your paragraph very much" . . . ! He goes on to outline the absence of DX stations, the fact that Europeans have been coming in less well this year than during the past two years, the blanketing predominance of W8's, and quite general disagreement with the conditions we have been experiencing in New England and which have been confirmed by reports from other sections. He also suggests some interesting results in connection with opposite ways round, and "lop-sided" conditions, which we will hope to discuss next month.

Travel:

That letter from Payson R. Gould, W9DHP, in the correspondence section of the June issue of *QST* aroused not a little interest internationally. The traditional amateur hospitality is well known of course. It has long been a byword in the United States, and it now seems obvious that amateurs abroad are filled with very much the same spirit. Witness this quotation from a letter from J. Fleurbaey, ON4MOK, Kunstraat 124, St. Amandsberg-Ghent, Belgium: ". . . I will appreciate any visit of any W or VE ham, travelling to Belgium. Any amateur is welcome here, and I will do my best to make his stay in Ghent as agreeable as possible, thereby offering him to stay with me for a week or so. . . . Awaiting a fleet of W-VE hams, sincerely yours. . . ."

In these columns in the past we have many times published invitations from headquarters of national societies to visiting foreign amateurs to get in contact with them, with an assurance of full entertainment fare. Many amateurs intending to travel abroad have first written us requesting the names and addresses of the headquarters of such societies as these, as well as suggestions for visits to individual amateur stations en route. We have been glad to do all this, in the interests of more general international amity and association.

But if those of you who are interested in making such personal international gestures will advise us, so that we may pass along the good word to those amateurs making inquiries of us, our coöperation in the matter can be much more complete and satisfactory. We urge that all society headquarters, and all individual amateurs like M. Fleurbaey, who are receptive to arrivals from abroad and desirous of entertaining foreign ama-

(Continued on page 80)

THE COMMUNICATIONS DEPARTMENT



F. E. Handy, Communications Manager
E. L. Battey, Assistant Communications Manager

THE GENERAL TRAFFIC HOUR

The daily period, 6:30-8:00 p.m. (your local time) has been designated the "General Traffic Hour." All Official Relay Station appointees have been requested to keep this period, working general with all amateurs. Trunk Line Station appointees are likewise requested to work general during this period. In this manner operators who are unable to maintain regular schedules or whose operating time is limited may get on the air from 6:30-8:00 p.m. and clear their traffic through O.R.S. and T.L.S., who keep schedules on established traffic routes. Make use of this period so that delivery of traffic and dependability of service may be improved. Give your traffic to stations signing "ORS" or "T.L.S." "CQ TFC" will be the general call for the "traffic hour." Directional CQs will also be found useful during this period.

W2GAG tells us he got his license after just 4 months of copying WIMK's addressed transmissions to members, on regular schedule, for code practice. During this period no other source of code practice was used.

These Sun., Mon., Thurs., Fri., transmissions are sent by automatic transmitter at a rate of approximately 13 w.p.m. If a listener gets so he can copy this, he is easily able to take the 10 per required by examination, even allowing something for nervousness on such a "state occasion." WIMK o.b.c. schedules for September are as follows: Sundays, 8:30 p.m. and midnight E.S.T., 3825 and 7150 kcs.; Mondays, 8:30 and 10:30 p.m. E.S.T., 3575 and 7034 kcs.; Thursdays, 8:30 p.m. and midnight E.S.T., 3825 and 7034 kcs.; Fridays, 8:30 and 10:30 p.m. E.S.T., 3825 and 7150 kcs.

VOQH

The Bartlett Northeastern Greenland Expedition (Morrissey — VOQH) may not be able to enter Hudson Bay this year due to the unusual summer in Labrador, and consequent lateness of the ice floes. Hob Moe (of W2UN) operator of VOQH reported the Morrissey in mid-July anchored to an iceberg near Cape Chidley (northern tip of Labrador) waiting for the wind to change and open up the ice. Skeds were kept with W2NV and VO8Z.

Schooner Ramah, WCEN, arrived at its destination in Mediterranean waters in late July. QRN and electrical storms accompanying the heat wave which swept the U.S.A., handicapped the transmission of traffic to W-hams by WCEN, but Ed Brooks (W1TL), WCEN's operator, copied all personal traffic as sent on daily schedules from WIMK even when unable to make full acknowledgment by two-way QSO.

A Louisiana Ham Convention will be held in Alexandria September 16th and 17th. For further information write S.C.M. W. J. Wilkinson Jr., W5WF, 1624 Allen Ave., Shreveport, La.

Hams in West Virginia and nearby Sections are requested to arrange schedules with W8CAY, U.S.N.R. station at Elkins (3700 and 7100 kcs.) or by writing R. V. Robinson C.P.O. in charge Unit Six Section 3 U.S.N.R. for skeds for the three days of the Mountain State Forest Festival Oct. 5-7. The unit is arranging an amateur radio exhibit. A comfortable "ham Hdq." is being arranged and all amateurs who can visit at Elkins Oct. 5-7 are cordially invited. And please expedite traffic originating at W8CAY and other Elkins stations in early October!

W9USA-W9USB

Activities are still going strong at the World's Fair amateur stations, W9USA-W9USB. An average of 150 to 300 messages are handled daily. For the period June 16-July 15 a total of 3652 messages was handled. W9USA-USB is on the air 22 hours per day, the off period being from 2:00 to 5:00 a.m. On July 24th at 5:50 a.m. E.S.T., W9USA (W9EJC at the key) on 3630-kc. held a 45 minute QSO with VK4JU, Brisbane, Australia, break-in being used effectively; U.S.A. was R6 to 9 in Australia, and VK4JU R5 in Chicago.

A-1 Operator Club

The amateurs listed below have been "elected" to membership in the "A-1 Operator Club." This club has been organized to promote and encourage a high calibre of operating in the amateur bands. For complete data on qualifications and a list of the Charter Members see July QST, page 36. To become a member of the Club you must be nominated by at least two operators who already "belong."

W1BFO	W3ATY	W3GE	W8CPE
W1DKO	W8RAI	"RC"-W3NT	W8DVL
W1EF	W3BND	W3OM	W8HD
W1EVJ	W9BNI	W3QN	W8HGG
"RP"-W1MK	W3BJX	"FX"-W3SN	W8JE
W2AFV	W3CAH	W3WU	W8KD
W2DBQ	W3CFL	W3ZD	W9DHA
"EW"-W2DIU	W3CMI	W4AGR	W9DXY
W2EG	W3COO	W4EG	W9EBA
W3ADE	"BLS"-W3CVN	W4MO	W9FTU
W3ADM		W6DEP	W9HML
W3AKB	"CB"-W3CNL	W6WB	W9VS
W3AKN	W3DEH	W8APC	
W3AMR	W3EJ	W8CFR	

Heard at W1BB: --- W1YU ("Bob" at key) CQ'd and was called by W2DOG. W1YU evidently tuned onto W2DOG just as he was signing — QRZ? de W1YU — whereupon W2DOG called again and communication was established — W1YU says, "I just got the tail end of the DOG, OM," Hi!

The following contribution by Mr. Don C. Wallace, W6AM, wins the C.D. article contest prize for this month. Your articles on any phase of amateur communication activity are likewise solicited and may win you a bound Handbook, or three logs, or message pads (see announcement March 1933 QST). Send yours today. — F. E. H.

Signal Hill Blows Up

By Don C. Wallace, W6AM-W6ZZA*

MY traveling schedule for the Pacific Coast trip called for a stay in San Francisco between May 26 and June 7. On this trip, I chose the Fairmont Hotel, for the Fairmont Hotel is only six stories high, has a flat roof, two nice flagpoles, and is on the top of Nob Hill. Experience has shown that hotels of extreme size are not satisfactory for portable operation, as the antenna is completely lost in the huge towers, elevator shafts, and other equipment on top of the hotel.

All of this is aside from the point, which is namely this: the portable W6ZZA was in San Francisco, and the Associated Radio Amateurs of San Francisco asked me to give a talk before their radio club Friday night, June 2, on the subject: "Emergency Transmitters for Disaster Use."

The evening of the scheduled meeting (June 2) came around, and I started downtown early so I could have a good dinner, then show up at the club meeting in the City Hall in ample time to chew the rag with the San Francisco hams before the meeting began.

As I stepped off the street car, the newsboys were running around flashing the usual evening extra, only I did notice that the extra had "Signal Hill Ablaze." I bought a paper, as oil fires are not uncommon on Signal Hill, which is near our home (Radio W6AM) in Long Beach. As I glanced through the article about Signal Hill, however, I did notice that a large explosion had taken place, and the refinery which had exploded was the nearest refinery to our home, i.e., about a mile and a half away.

According to the paper, homes had been flattened, windows broken at a distance of five miles, and the explosion felt in Pasadena and Los Angeles, distances as far as thirty miles away. Naturally I was very concerned, for our home had just gone through the Long Beach earthquake, the repairs being completed the day before I left on this San Francisco trip.

Instead of eating supper, I jumped the next car which was then going by, and upon arriving at the Fairmont Hotel gave a "CQ LB."

I probably was too excited on the first CQ LB to write

* 4214 Country Club Drive, Long Beach, Calif.

anybody, but then I settled down to business and made a full-fledged four-minute "CQ LB," signing off at frequent intervals, for by past experience and by watching the clock I had usually found that it takes at least four minutes to cover the dial and by giving a four-minute CQ the other fellow has a real chance of hearing you if you really want him.

At the conclusion of this call, W6HCF, Wilmington, California, came back. This certainly was a joyful and welcome sound. I soon asked him to 'phone my home, just a few miles from him, and find out if the family was OK.

In about two minutes he came back with the following: "All OK Don. Ur family and house OK. Wl wat sa."

Needless to say, I was greatly relieved at hearing this. You see, I had learned to put absolute faith in amateur radio and in portable operation, and knew that even if telephones and telegraph lines were down, I could get immediate action out of amateur radio, even though the portable was at that time located about 400 miles from home.

Another interesting thing about this QSO was that W6HCF is one of our very new amateurs. Whereas the old timers are always glad to help out too, there are not always enough old timers on to assure us of an immediate answer to a CQ home. I have found that the newcomers are the ones who usually answer these calls, for although there are almost 200 amateurs in Long Beach, it is quite a problem to find a time when a few of them are on and actually turning their dials. This also shows the extreme value of keeping all types of amateurs on each of the bands, instead of trying to set up barriers so that new amateurs could not show up on, say, the 7 mc. band, where portable operation is extremely valuable and useful.

Following this very welcome QSO, I then returned to the restaurant at which I had almost arrived, had supper, and then went up to the San Francisco radio club meeting. The copy of the extra in my pocket made a very good preface to the talk on: "Emergency Transmitters for Disaster Use."

Shortly thereafter I had the usual W6MA (Mrs. Don C. Wallace) QSO schedule with the following report: "W6ZZA de W6MA R-7 Hello Don. So far as I know nothing around here was hurt. That's remarkable when you think how close we are. I was down town at the time and I certainly was worried so many big windows were broken. We went over to see the ruins and houses nearby were simply shattered, much worse than by the earthquake. Two pairs of French doors blew into our house breaking the locks. The hill absorbed most of the shock for the refinery was just over the top of the other side. The children said it felt like an earthquake at school and they all ran outside and saw huge pieces of tin and tanks flying through the air."

Relative Standings of the Ten Highest Sections—June-July

Messages Per Station (25%)	Stations Reporting Traffic (25%)	Gain or Loss (Traffic Reports) (25%)	Traffic Total (25%)	Standing Based on Average of All Four Ratings %	Section Communications Manager
W. N. Y. 248.	Los Ang. (680)* 92	Ariz. +14	Ill. 7127	Illinois 65.	Conroy, W8DYH
P. I. 234.4	Mich. (624)* 88	Mich. +9	W. N. V. 6449	Michigan 57.5	Farrell, W8DSE
N. N. J. 212.	N. C. (140)* 63	Ill. +9	Los Ang. 6389	W. New York 47.5	Hinds, W9APY-WR
M.-D.-D.C. 195.5	Wash. (374)* 57	Wisc. +9	N. N. J. 4241	Los Angeles 45.	Martin, W4AAN
Hawaii 187.3	Va. (150)* 56	N. C. +7	M.-D.-D.C. 3715	N. New Jersey 37.5	Cobb, W2CO
E. Bay 176.9	Ill. (890)* 55	N. Tex. +6	Mich. 3535	No. Carolina 35.	Wright, W4AVT
S. Tex. 153.8	Ohio (868)* 54	Kans. +6	E. Pa. 3115	M.-D.-D. C. 32.5	Hudson, W3BAK
Ill. 129.5	Mo. (324)* 54	W. Mass. +5	Wisc. 2590	Arizona 30.	Mendoza, W6BJF
Ariz. 119.3	Ind. (329)* 31	B. C. +5	Ohio 2472	Wisconsin 25.	Kurth, W9FSS
San Joa. 114.	E. Pa. (528)* 29	Mo. +4	P. I. 2344	Philippines 25.	Thompson, KA1XA



ILLINOIS claims the Banner this "round," making all four columns, and leading the Traffic Total rating. FBI Attention is called to North Carolina's 63 traffic reports! — a mighty fine figure for a small Section. The entire field organization dropped only 22 traffic reports, and that in mid-summer! The following Sections lead all other Sections in their Divisions, order of listing showing relative standing of their different Divisions: Illinois, Eastern Pennsylvania, Arizona, Washington, Northern New Jersey, So. Texas and No. Texas (Tied), North Carolina, Kansas, Western Massachusetts, British Columbia, Tennessee, Alabama, Northern Minnesota, Colorado. During the June 16th-July 15th month: 7518 stations originated 18,462; delivered 15,509; relayed 51,811; total 85,782 (84% delivery) (65 m.p.s.)

* The Section A.R.R.L. membership (approx.) is shown parenthetically, so that the degree of traffic reporting activity may be indicated by comparison.

Summer Radio

By W. Howard Moffat, W5CWC*

HELLO CQ! W5CWC was located at Boy Scout Camp Binachi, 14 miles east of Meridian, Mississippi, in the pine woods. Our 75 meter 'phone rig used 201-A tubes throughout. Two 201-A's for speech amplifier, two for Class-A modulator, one for the self-excited Hartley oscillator, one for a buffer, two in push-pull in the Class-C output amplifier.

A 3.5/7 mc. T.P.T.G. using two '45s in push-pull was also available. The station was located in the pump house.

Communication with town was sponsored by the Meridian Amateur Radio Club June 19th-July 13th and July 18th-24th. Three operators, W5DEJ, W5DAE, W5CWC, kept three schedules per day (W5AAY, W5CUU, W5DDL). Traffic: W5CWC Orig. 103, D'ld 29; W5CUU Orig. 9, D'ld. 68; W5DDL Orig. 15, D'ld. 35; W5AAY Orig. 4. Worked: on 3.9-mc. 'phone—W4AXU, SN, AP, KB, RS, BXR, LT, LU, MU, W5HR, DAT, CUU, on 7 mc. c.w.—W4BSD, BYJ, EM, MA, ARW, BLC, W5DAM, DCE, FO, CWQ, AAY, ATI, DJL, BEE, W8IHJ, W9AMA, on 3.5 mc. c.w.—W4AAQ, RS, W5DDL, CUU.

Several important messages were handled relative to speakers on campfire programs, the repair of an unexpected water supply pump breakdown, and a relay for Western Union, with the answer back. A telephone can be a nuisance at camp, detracting from the atmosphere of inaccessibility we like to stimulate; but amateur radio service adds stimulation to camp morale, and can be made an integral part of the camp program. W5CUU, who handled the bulk of our traffic schedules, was formerly bugler at Camp Binachi. "Preacher" Ford, a negro employee living near Camp, was permitted to talk on one of the morning schedules, and what did he do but tell W5CUU to bring him out a "Chew a' tabacca"! We claim it is the first "Chew" ever ordered by ham radio-telephone!

* Meridian Amateur Radio Club, Camp Director, Camp Binachi, B.S.A.

NCU--U. S. Coast Guard

THE United States Coast Guard (Washington) is vitally interested in the communication aspects of distress cases, in connection with which it endeavors to coordinate all communication facilities. Delay in reporting distress cases may mean loss of life. Speed is essential. In some instances in the past radio amateurs have heard and reported distress cases. The C.G. operations extend to the Great Lakes and regions where flood relief is required—and the Coast Guard solicits the cooperation of all amateurs in obtaining emergency-information without delay in every case, so that it can proceed immediately to assist, or through its complete knowledge of facilities direct assistance to the scenes of disasters.

Radio equipped vessels requiring assistance may obtain the assistance of the Coast Guard by transmitting a request on the international distress and calling frequency, 500 kilocycles (410 kilocycles on the Great Lakes), to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "Coast Guard." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere. In cases of extreme emergency when an "SOS" is broadcast it is requested that the following procedure be followed by the vessel in distress: Approximately ten minutes after transmission of the original distress message transmit slowly on the distress frequency "MO" and own radio call for three minutes. This will enable Coast Guard vessels and stations in the vicinity to obtain direction finder bearings and accurately plot the position of the distressed vessel. Information should include: (1) name and type vessel; (2) position, course

and speed; (3) nature of trouble; (4) number of persons on board; (5) whether C.G. help is required.

The Coast Guard maintains ten administrative offices, and radio amateurs should report any emergency information at once on receipt to the nearest office addressing telegraphic or radio information to Coast Guard Boston—Coast Guard New York (or similarly, Washington, D.C.; Norfolk, Va.; Fort Lauderdale, Fla.; Mobile, Ala.; Chicago, Ill.; Cleveland, O.; Seattle, Washington; San Francisco, Calif.).

Traffic Briefs

QRX (edited by F. H. Schnell, W9UZ), well known paper of the Volunteer Communication Reserve, 9th Naval District, has ceased publication due to economic conditions. QRX has done much to maintain a high morale among 9th District Reservists and will be missed by its readers.

Here's a new kind of "thrill"—W2ZZGA visited W9USA, and after a fast trip to New York made a call on W2BNJ. He arrived there just in time to copy a message he had filed at W9USA . . . And W2ZZEU while away on a trip through Pennsylvania sent a radiogram to his YL in White Plains, N. Y. Upon returning home several days later he raised a New Jersey station and was asked to take a message for White Plains. He took it with a laugh . . . it was the message he had sent to the YL!! — Hl.

BRASS POUNDERS' LEAGUE

(June 15th-July 16th)

Call	Orig.	Del.	Rel.	Total
W3CXL	118	427	1976	2521
W8AWX	183	233	1893	2309
W2DIU	267	233	1672	2172
W8JE	36	129	1965	2130
W9AET	55	70	1394	1509
W6ETL	263	467	514	1244
W8CDA	6	47	1038	1141
W6PQ	366	154	538	1058
W9AUH	26	101	876	1003
W9KG	3	56	927	986
W8FTW	45	50	839	934
W9ZZAF	151	468	202	821
W6QC	315	425	20	760
W6IJJ	425	325	—	750
W8FDY	20	16	701	737
W4BTQ	11	8	714	733
W6RQY	168	356	179	703
OMITB	122	284	366	672
W6CKO	6	10	606	622
W2EKM	63	47	530	640
W9KEH	44	22	541	607
K6GUA	419	16	170	605
W9AMB	40	48	516	604
W4AIS	120	10	450	580
W9AND	215	37	318	570
W3BWT	103	85	355	543
W6ZZBL	50	76	390	516
W9ERU	7	18	477	502

MORE-THAN-ONE-OPERATOR STATIONS

W9TSA	3128	258	176	3562
W5OW	117	59	1290	1466
KAJHR	242	202	608	1142
K6EWQ	289	95	430	804
W3NT	85	31	636	752
W3BEQ	21	34	500	555
AR8	473	52	18	543

These stations "make" the BPL with totals of 500 or over. Many "rate" extra credit for one hundred or more deliveries. The following one-operator stations make the BPL for delivering 100 or more messages; the number of deliveries are as follows: Deliveries count!

W8CVS, 211	VE5DH, 136	W2BNJ, 103
W8PX, 192	W6EDW, 127	W8GFK, 102
W3ALX, 172	W6CTU, 112	W9JRK, 102
W6BPU, 157	W7BXC, 112	W8IFD, 100
W6NK, 155	VE5AM, 112	More-than-one-opr.
W6ELI, 137	W6NFE, 109	W6BYG, 189
W6ALU, 136	W9NPE, 108	W1MK, 124
W8HGG, 136	W6DKM, 107	

A total of 500 or more, or just 100 or more deliveries will put you in line for a place in the B.P.L. Make more schedules with reliable stations. Take steps to handle the traffic that will qualify you for B.P.L. membership also.

A.R.R.L. Official Broadcasting Stations

CURRENT information on expeditions, special tests and activities, new F.R.C. regulations concerning amateur operators and station licensing, etc., is sent regularly (new information each week) in the different amateur frequency bands by the following A.R.R.L. Official Broadcasting Stations. All stations listed have provided us with latest up-to-the-minute data on their work of sending this information addressed to all amateurs. The list is revised to include only active appointees. The operators of these stations render amateur radio a distinct service. You will find stations in your own district, and neighboring districts in the list. Make a practice of listening regularly for the "QST" sent from one or more of these stations. Report results to these stations when you hear them, so the operators will know their transmissions are successfully received by you and their work appreciated and successful.

W1ABG, W1ADF, W1AKY, W1APK, W1AQL, W1ASI, W1BGT, W1BWW, W1BZI-ZS-II-GOG, W1CCX, W1CDX, W1DMI, W1KH, W1MK, W1VF.

W2ACD, W2AMM, W2AOJ-ADA, W2AZV, W2CHK, W2CZP, W2DPB, W2FF-BBX, W2SC, W2SN, W2UL.

W3AIE, W3ALX, W3ANZ, W3AOJ, W3APV, W3AQI, W3BAK, W3BIG, W3BND, W3BTM, W3BWT, W3CDQ, W3CFA, W3CIS, W3CNY, W3CVN, W3GY, W3SM, W3SN, W3VI, W3ZA, W3ZX.

W4AAD, W4ACB-PCN, W4AIS, W4APU, W4AUW, W4BFD, W4BGA, W4BGL, W4BFC, W4BSJ, W4DS, W4EG, W4KB, W4MR, W4OI, W4RV, W4ZH.

W5APW-CVS, W5ANU, W5ATB, W5AWP, W5BCW, W5BYX, W5CGJ, W5MS, W5NO-W4UW, W5NT, W5ON, W5RH, W5UX, W5VI.

W6AFU, W6AKW, W6AMM, W6AWT, W6BRI-ALU, W6BTZ, W6BYR, W6CIX, W6CLS, W6CVV, W6CVZ, W6CXV, W6DEB-FWG, W6DSP, W6DVD, W6DVE, W6DYQ, W6EDR, W6EDW, W6EXQ, W6FPB, W6FPH-GUF, W6FPU, W6GEG, W6HHM, W6NFCN, W6YI, W6ON, W6TE, W6VO.

W7AAT, W7AVM, W7AVP, W7BVE, W7BZ, W7CCR, W7COH, W7FL-CWF, W7LD, W7US, W7WR.

W8ACZ, W8AES, W8AFM, W8AGS, W8AWX, W8BON, W8BWP, W8CFF, W8CPC, W8CPE, W8CPY-IIP, W8CQW, W8CRA, W8CXG, W8CYT, W8DLG, W8DME, W8DPO, W8DRJ, W8DYG, W8DYE, W8DZY, W8EEQ, W8FGN, W8FZE, W8HD, W8JDP-HYZ, W8JUC-NW, W8UX-ISG, W8WF.

W9ACU, W9AFN, W9AFQ, W9AUH-ZZAO, W9AHQ, W9BAN, W9BRA, W9BTG, W9CRY, W9CSB, W9CTB, W9CWG, W9DBO, W9DFE, W9DMY, W9DOE, W9DUD, W9DXV, W9EDW, W9EL, W9EQX, W9ESL, W9ETD, W9FCW, W9FF, W9FNK-ZZA, W9FYM, W9FZO, W9GDU, W9GFA, W9GQH, W9GTH, W9HOL-AB, W9HPQ, W9HUX, W9HWE, W9IFM, W9IPN, W9JQC, W9JL, W9LW, W9PA, W9RH, W9TF.

CM2WW, CM8YB, VE1CY, VE2CO, VE3AU, VE3HC, VE4EO, KWSC.

Traffic Briefs

The First Annual Vegreville (Alberta) Hamfest held June 24th and 25th under the auspices of the Vegreville Ham Club was a huge success. Those responsible for such a fine affair are VE4EZ, VE4IQ, VE4DG, VE4JO, VE4MO and other club members. License examinations were held under the direction of W. G. Allen, R. I. from Edmonton. About 35 hams attended the 'fest. Among those from Edmonton were VE4HM, GT, JL, EC, EA, BV, BV, FR, BP and AH. Interesting talks were given by the R. L. VE4GT, VE4HM, and VE4AH. New candidates for club membership were put through an initiation that will be long remembered. VE4BV and VE4BW officiated. After the ceremony the "sacred symbols," the Wouff Hong and Rettysnitch were presented to the president of the Vegreville Club, VE4EZ, on behalf of the Edmonton Club. The usual hamfest activities brightened the affair, not least of these being a picnic lunch served by the OW's and YL's. Such an FB time was had by all that next year's 'fest is already being planned.

Through F. G. Williams, Sec'y, and W3AAJ we learn of a Hidden Transmitter Hunt held by the Peninsula Amateur Radio Club of Newport News and Hampton, Virginia. Six cars participated, including the car which held the transmitter. Three hours were given for finding the rig, which was located at an unknown point within a fifteen mile radius. Amateurs participating were W3BAI, AKR, AKN, ATY, AJA, IQ, ADW, NE, MT, CDW. W3BAI and W3AKR found the transmitter in one half hour, thereby winning first place. Second place was taken by the Hilton Village gang, which in one and one half hours located the "treasure"; this gang, using a loop, compass and map as well as National receiver and Jewell test set, plotted the position of the transmitter within 100 yards.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jack Wagenseller, W3GS-BF — Note SCM's new QRA on page 5. W8CVS, W3BKQ and ALX make BPL. W8CMF is going e.e. W8BQ visited W3ADE. W3AZY is DXing. W3AQN moved. W8FLA was camping with W8AXH. W8CVS schedules Camp Rickards. W8EOH is rebuilding. W3DZ reported via land 'phone. W3AMR is reinstated ORS. W3CL was on active duty at Navy Yard. W3ADM and W8TTS are after ORS. W3BPX is on 'phone. W3ABZ joined VCR. A photo was received from W8IWT. W3AAD is back on air. W3DUQ is Quaker Radio Club. The York Road Radio Club was outstanding in M & H hidden transmitter hunt, W3QV taking first, W3BUIG second, prize. The Beacon Radio Club reports: W3BUK on 14 mc., W3BRT rebuilding e.e. job. W3BIJ at new QRA, W3ATR new CW-'phone rig. W3CQP, BZC, DFA, BGD, CCD and VF are preparing for fall traffic. W3QV was in bad auto accident.

Traffic: W3ADE 15 AZY 3 AQN 2 DZ 11 AMR 19 BKQ 555 AAV 87 CL 61 ADM 157 BPX 17 AKB 104 REY 87 ALX 411 ABZ 23 MC 137 DUQ 328 BF 21 AZF 255 AQI 263 AHD-BUK 1 BIJ 6 ATR 4. W8CMF 4 FLA 75 CVS 326 EOH 5 ITS 134 CFF 3.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, E. L. Hudson, W3BAK — W3CJS, W3SN, RMs; W3SM, 'phone RM: W3BWT, Chief RM. Your new SCM greets you. Kindly send future reports direct to W3BAK, D.C.: W3CXL schedules W9USA. W3BWT makes BPL. W3ASO is pounding away. W3NR reports 56 mc. interest high. W3DLG handled Father's Day greetings. W3CPP reports for CJE, Md.: W3BND has e.e. rig. W3CJS is going to camp Ritchie. W3LA has 36 mc. 'phone. W3BGI was heard in Germany. Heat bothers W3CDG. W3CQS has Comet Pro. W3BHE works 3.5 and 7 mc. W3NY is QRL work. W3CIZ is heard often. W3WU has been helping CXJ get DEG on air. Del.: W3DQG gets out FB. W3CPG uses '01A as modulator. W3BAK has FB7.

Traffic: W3CXL 2521 BWT 543 ASO 248 BND 133 CJS 62 DQG 41 BGI 38 WU 25 CIZ 20 CPP 16 CDG 15

William F. McFarland, W9EVT,

1873-1933

With deep regret we must record the passing of Lt. Col. William F. McFarland, K.N.G., W9EVT, of Topeka, Kansas. Colonel McFarland had been connected with amateur radio for many years in numerous capacities and will be greatly missed by Kansas amateurs and his many associates. Prominent in A.R.R.L. organization he also was a former president of K.V.R.C., founder of the Kansas National Guard state radio net, Assistant to Kansas Adjutant General and Executive Officer 130th Field Artillery. His good influence and council will be sorely missed.

BHE 14 DLC-CWE 9 NR 7 CQS 6 LA 4 BAK 3 CPG 1.
SOUTHERN NEW JERSEY—SCM, Gedney M. Rigor, W3QL—The South Jersey Radio Ass'n staged a "hidden transmitter hunt." W3VX, AQC, and XAF manned the transmitter. W3BAY, CES, BJQ, ACD, BWP and QL were "searchers." W3ZI made his annual trip with the Army. W3BWC and BFH are home again. W3APV reports Naval unit in P'ville. W3CLQ is with the WU. W3PC is QRL new Jr. Opr. Write W3BHT for schedules. W3CWL hopes to make BPL. W3ARN got spliced. W3DGF wants ORS. W3BEI has phone-CW schedule with W3SM. W3ATJ drops his OBS. W3AKI is completely rebuilding. W3UT is coming to life.

Traffic: W3AKI 10 AVJ-UT 2 BEI 16 DGF 7 CWL 41 BDO 22 APV 26 AEJ 15 BYM 26 BPT 12 CLQ-AZZ 2 BWC 18 ZI 14 QL 3 BYR 6.

WESTERN NEW YORK—SCM, Don Farrell, W8DSP-GYV—W8CDB is rebuilding. W8GUJ is writing articles for the amateur in a Rochester newspaper. W8JE schedules W9USA. W8AWX had as visitors: W1SZ-W9AHX-W2FW. W8EBK has an '04A final. W8BFG spends his time swimming. W8AFM recuperated from effects of convention. W8AOW has been doing considerable 'phone work. W8QP is c.c. W9AHX visited the section during the month, using portable W6ZZBL. W8EUY keeps a bunch of schedules. W8FYF wants ORS. W8JTT was formerly W2AAK and KA3AA. W8GWY has new QSL cards. Hot WX keeps W8BQJ off. W8FU handled traffic with Y. M. C. A. camp. W8FDY took 59 messages from W8JE in one hour and thirty-five minutes. W8DHU has been trying 28 mc. W8AKX worked 10 countries with gyp type '10s. W8JW reports for first time. W8FFU had antenna and power supply trouble. W8JJJ is handling nice bunch of traffic. W8DMJ spent a week at World's Fair. W8GPT finds traffic slow. W8DHQ reports by radio. W8BAL is back. W8CP is struggling with c.c. rig. W8FOY uses 'phone on 1.75 mc. W8DSP has 56 mc. rig. W8AGS has FB7. W8GWZ had some important news regarding relatives in Minneapolis from W9DGH. W8BHK was in ORS Party. W8DSS handles World's Fair traffic. W8AXC is OBS. The Syracuse clubs have combined under name of Central New York Radio Club. W8BWW closed until September. Following members of Mohawk Valley Brass Pounders attended Convention: W8DT-GQ-DSM-BAI-DSU-HNZ. W8DT lost his position with the Power Co. W8HNZ is experimenting with 'phone. W8BJO attended hamfest at Elmira. W8VJ has portable JSG. W8HKF got new ticket. New hams: W8FYB, EXG, JKQ, JFW, JOZ, JHQ, JUI, JQE. W8LJF is Penn Yan Acad. radio club station. W8GWT has portable KCN. W8BR visited Penn Yan.

Traffic: W8AWX 2309 JE 2130 FDY 737 DSS 286 GWT 30 DSP 27 JV 18 BWY 20 DHQ 19 EUY 52 AOW 95 DHU 49 BQJ 30 FU 23 GWY 7 GWZ 2 EBK 20 AFM 6 GPT 23 DMJ 2 JJJ 22 FFU 1 JIW 12 FYF 10 BAL 3. W6ZZBL 516.

WESTERN PENNSYLVANIA—SCM, C. H. Grosarth, W8CUG—RM W8HGG organized a W. Pa. traffic net. W8BWL handles N. R. traffic. W8GUX pounds brass. W8FPD is active. W8GUB reports by radio. W8DYV is on 3.9 and 1.7 mc. 'phone. "Swell YL," says W8AJE. W8KD reports a new ham, JZJ. W8AQY will soon be spliced. W8GBC reports a new ham, IPL. W8CQA says summer has the boys on the lam. W8CCD is being run by Jr. op. W8AEG is looking for GOK. W8HMJ has 56 mc. rig. W8CMP reports from W8CIK, Northern Mich. W8JSS, JZY and JSU are new hams. W8CDH reports CDG, HUI, JCV and CDH on 56 mc. 'phone. W8AVY went to Canada. W8CFR can be heard on 14 mc. W8CUG was active during July ORS party.

Traffic: W8HGG 426 BWL 315 GUX 132 CUG 119 GSV 56 KD 48 GBC 47 GUB 46 FPD 42 CQA 35 CCD-AEG 15 FKU 7 HMJ 2 AJE 1.

CENTRAL DIVISION

ILLINOIS—SCM, F. J. Hinds, W9APY-WR—RMs W9DDE, W9ERU, W9VS, W9EWW operates WADL on lakes. W9USA worked VK4GU breakin for 45 minutes

at 5:50 a.m., C.S.T. on 3.5 mc. July 24. W9BIN has portable NWD. W9LNV blew '10. W9AND handled 570 messages while ill in bed. W9OQ is building c.c. port. W9JTC has portable NPZ. The Suburban Order of Short Wavers elected W9HZA to attend the World Wide Convention. W9LBL's pole came down. W9LWQ is visiting W1BZI. Power leaks raising havoc at W9KEH. W9FWD and ACR are DXing. W9KIM is experimenting. W9NDO is after traffic. W9KJY has SW3. W9KWP, FGV and KJY solicit traffic, with aid of Glen Elynn C. of C., from World's Fair visitors. W9EJY is on five hours a day. W9HQH has 7 mc. Zepp. W9IYA says FRC regs. excellent. W9NQP handled W9USA traffic. New c.c. rig at W9TUF. W9TEP puts 80 watts on final. W9NNE has station in "Rollaway" bed. W9GPK moved into bigger basement store room. W9GJP has glass topped desk. Storm submerged power supply with W9LXX. The OW baked a cake for W9HUX on his birthday and put his calls on it. W9KOQ is portable NYT. Filter at W9MSG went west. W9LOJ is spending time at USA. W9BSR has new stick. W9MRH has FB7X. W9AMP has portable OBN. W9AFN has worked over 50 countries. W9AVB is trying 28 mc. W9ERU keeps in touch with USA and DNU on 3.5 mc. W9EMN is moving into new shack. W9NJZ is interested in ORS. W9NN promises traffic. W9NTU has been 14 mc. DXing. Nearly all W9MLH traffic was USA work. W9DOU sent A.A.R.S. "Red Hot" certificates to W9FKO, EWN, IVF, CGV, BTT, FCW and DBO. W9DJG wants to "cool off." W9LNI asks "Who are YL ops in Illinois?" W9DZU is handling World's Fair Traffic. W9CUH says "trouble trouble trouble." W9CEO delivered message from Peking, China. W9VS is Traffic Manager of W9USA. W9FGN is new OBS. W9FCW says 4th district Ill. A.A.R.S. plan a get together. W9FGT has new rig. W9FGV has new crystal. W9HMB is rebuilding. W9HMK and BYZ are building new receivers. W9HKC obtained fifty watter. W9JZY says recent blow carried off his sky hook. W9LH beat her OM at traffic game! W1CFU visited W9USA and JUC. W9UZ is Chairman of technical committee at W9USA.

Traffic: W9USA 3562 KEH 607 AND 570 ERU 502 DOU 279 JZY 237 HKC 226 ILH 145 NN 123 HNK 105 FCW 93 KJY 69 HMB 50 ENH 48 RT 44 DZU 40 NDO 39 ICN 34 JUC-MJH 33 CUH 27 CZL 25 ACE 20 FGN 17 AFN-LOJ 15 AMO-ILY 14 BPU 13 SG 12 EMN-FO 10 HQH-LNI 9 BYZ 8 DJG-FGV-VS 7 CEO-NIV 6 AVB-IEP-LIV 5 AYO-KIM 3 BSR-HPK-HUU-LNV-NQP-NJZ 2 APY-DBO-EVJ-IYA 1.

INDIANA—SCM, Arthur L. Braun, W9TE—W9AET stars for the state. W9AXH says c.w. doesn't compare with 'phone. W9FQ turns in good total. W9JQ wants to rebuild. W9AUT's c.c. rig perks FB. W9JRK makes BPL. W9EPT didn't DX this month. W9CKB rebuilt. W9CHA hooked up with World's Fair net. W9EJY reports via radiogram. W9FYB reports for Bloomington gang. W9JQ has SS receiver. W9AEA has new car. W9INV uses B Bats. W9OBL is portable of W9MQQ. W9HSF is signing W9JJW. W9FSG is stationed with C.C.C. Hq. layout at Ft. Harrison. W9CKG is vacationing. W9HKH visited W9AUH, YL op at W9LJH, and Louisville gang. W9HUO wants ORS. W9GGJ is rebuilding to c.c. W9KDD is going to Rose Poly. W9DJU wants a new receiver. W9CRZ has portable NLC. W9HOL has five watt rig. W9HML keeps World's Fair net schedules. W9NCT is looking for '10. W9MIG says "Early to bed and early to rise leaves QRM for other guys." W9LCL raised voltage. W9RS' ORS was renewed. W9LLV has new 43 ft. sky wire. W9HIU wants to QSY to 7 mc. W9DHJ hopes to be on soon. W9DET will increase power. W9HPQ is using '10s. W9GFS has new c.c. rig. W9HUV says traffic scarce. W9MSZ plans new rig. W9MM is leaving for Mich. W9AAI will put in a new transmitter for a South Amer. ham. W9HBK still pounds the old brass. New hams: W9MTM, MYP. A report brings a copy of the Bull. Mail your report every month.

Traffic: W9AET 1509 LCL 2 CKB 11 EUJ 25 CHA 20 CKG 37 HML 42 EPT 24 JRK 110 HKH 121 CRZ 28 RS 16 JOQ 40 FQ 90 HOI, 29 NCI 3 DET 7 HUV 1

AXH 6 GFS 49 HPQ 3 MYP-FYB 10 HSF 6 DJU 1
LLV-MSZ 3 TE 11 MQQ 5 HBK 10 KDD 9.

KENTUCKY—SCM, Carl L. Pflumm, W9OX—
W9AUH smatters all records with total over 1000.
W9DLG worked his 119th country. W9ACN is good OO.
W9OX and BZS have new FBX's. Visitors keep dust off
key at W9JL. W9CNE is avoiding QRN on 14 mc.
W9IFM is converted to c.e. W9ERH is at Camp Knox
with portable KFW. Work keeps W9C1M away from
key. Hot WX forces W9FQU to basement. W9KPT is
rebuilding. Rebuilding reduces W9BWJ's total. W9EKB
is building rack transmitter. W9BAZ is arguing with the
RI. W9ELL lends AUH helping hand with traffic. W9ETT
is visiting state hams. W9BAN makes a perfect goose-
egg. RP of W1MK is pounding brass at W9OX.

Traffic: W9AUH 1003 DLG 181 OX 146 JL 56 CNE
39 IFM 38 ERH 34 HBQ 16 CIM-FQQ 14 KPT 10 BWJ
9 KFW 7 EKB 6.

MICHIGAN—SCM, Kenneth F. Conroy, W8DYH
—RMs: Chief RM, W9HK, Upper Peninsula RM;
W8BMG, Western Mich. RM; W8FX, Detroit RM;
and W8EVC, Eastern Mich. W9IOV bribes KDE into
reporting. W8ARR had JRP on furlough with him.
W8FTW piles up a fine total. W9LXB has a job!
W8JCS, EAI, JDG, AIJ, W9JCN and NPN make 1st
reports. W8CEU says FX isn't looking for a radio
widow. W8AYO reports nothing new on W8CEU's
"Owosso Marion." The W8GDR—W9JH "Abfalter
Trunkline" is Marathoning now! W8CUX has portable
FUL. W9CWR is trying all B.Rands. W9CGP and
W8COW are going 56 meggie. W8AIU is pounding HFB
at camp. W8DFE is getting ready for the struggle.
W8EMC handled one for General Balbo. YL passed
W8GRN up. W8IFO leaves us for E. Pa. W8DM goes to
Ohio. W8FEE perks along. W8FDK, we hear authenti-
cally, has been made Sgt. with H. P. Police—this comes
from an intimate friend—don't be so modest, let all the
boys know! Yes, W8GQS, you have to report each month
for a copy of D.A.R.A. Tfc Bulletin. W8SS is going for
a station record. W8DVC is going to absorb some vitamin
D. W8AIN is traffic manager for Down River Radio Club.
W9CE reports all quiet on the frontier. Fine total.
W8GFK. W9ADV QROs. W8HUD is now BJS. W8BTP
has trouble with Venus. Say, Mrs. W8BMG, Harry has a
beverage hidden in the basement that'll grow hair on a
R.R. track. W8IFE wants one fly-weight flag-pole sitter
to fix AKN's antenna. W8QT blabbs "W8FAV's neighbors
don't know he's a ham—so they don't mind the clicks!"
W9BBP settled down (with a shot-gun on HER doorstep)
because the competitish got too strong! W8DAQ, DLX
and CFM have a fish market! W8DZ lives upstairs at
new DYH QRA.

Traffic: W8FTW 934 FX 246 HFB 208 GFK 153 DYH
137 CFM 102 FIO 86 CUP 61 BJS 61 DVC 58 BTP 46
BHH 34 AIJ 26 DM-EMC 22 GDR 21 HA 20 CPH 18
BGY-CPY-DZ-JRP 16 EHD 14 GQS-IYN 12 ARR-
DED-IFE 11 DUR 10 COW-IFO 9 ETP-JCS 8 AIN-
FEE-GRB 6 GRN-GUN-JDG-NR 5 CEU 4 QT 3 BJ-
FWG-WO-WR 2 AYO-JX-SS 1 EAI 4 IFD 248 BJG 61
HNB 51 ZZB 35 FAV 24 EGI 11 GQB 9 CFZ 6 DSQ-
HSH 3 HZV 1 AEQ 41 ELD 27 JO 20 ABH 10 GBB 4
HKT 3 ZZCB 1 AKN 2. W9JH 93 NPN 65 ADY 57
CE-IOV 39 KDE 25 HXB 14 CGP-JCN 8 ADV 4 EGF
3 CWR-EQQ 1 FSK 61 CSI 43 EEM 7 LLD 1 EVI 8
VL 4.

OHIO—SCM, Harry A. Tummonds, W8BAH—Chief
RM W8DDS—W8FFK leads state. Dist. No. 1 RM
W8DVL: New power supply at W8GUL. W8HGE is
looking for traffic. Electric line QRM at W8FNX.
W8BYD, RN and FJX are operating on lakes. W8BAH is
going on U.S.N.R. Cruise. W8AOA plays chess by radio.
W8EBY visits W9USA. W8EEP gets out FB. W8ZZCC is
rebuilding. W8BRB is in LRC contest. W8ACZ spends
vacation in Mich. 28 mc. 'phone attracts W8EFW.
W8BAC has good report. W8FFK hits state high total.
W8AES is on 1.7 mc. 'phone. Battery transmitter at
W8ZZB. W8AUM visits BON and BAH. New c.c. rig at
W8IAW. W8GKG handles W9USA traffic. W8EEW is

champion hitchhiker. W8BKB reports activity of Northern
Ohio 56 mc. 'Phone Club, which meets at W8HC. Dist.
No. 3 W8CGS RM: W8FSK spent vacation in Ind.
Dist. No. 9 W8DUV RM: We welcome W8DUV as RM
of Dist. No. 9. W8DTD gets ORS blanks. Dist. No. 7
RM W8VP: W8GFA grinds crystals. Dist. No. 2 RM
W8BKM: 100 watts at W8BSP. Ens. Hoffman, Cartoonist
U.S.N.R. Bulletin QRX (W8FRY) will cruise on U.S.S.
Hawk. W8EEZ leads his district. W8BKM reports JWC
on at Conneaut. Dist. No. 6 RM W8BBH: W8GDC is
back from Ft. Thomas, Ky. W8HZR reports for W8EQC,
GGU, ECR, and JMH. W8IZQ takes ORS exam. All
traffic at W8ISK from W9USA. W8GZ reports. W8GSO
is after Com'l ticket. Listen for noon schedule W8ARW
and W9DRS. 3.9 mc. 'phone. Dist. No. 5 RM W8FGV:
All '10s at W8DCU. W8BMK goes camping with portable
HPO. E.C. osc. at W8HCS. W8FDV reports going to
Port Perry. W8CIT is at Dance Hall, Chippewa Lake
Park. W8BSR is working again! W8BLV reports for
QRK Am. Trans. Club. The Buckeye Short Wave Assn.
(W8DKG Secy) held successful fish fry at Akron. Dist.
No. 4 RM W8EEQ: W8KES is new in Bucyrus. MOPA
at W8GXL. W8HMH awaits completion of East Coast-
Chicago Trunk developed by W3BRY. W8ICC leads
district. Dist. No. 3 RM W8APC: W8DIH holds two
schedules. W8ESN sends first traffic report. W8ENJ
reports fine total. Second Com'l ticket at W8FGP.
W8BZL is on the job at Camp Perry. W8ESV reports for
M.V.R. Assn.: W8BZD is on board ship, W8EME and
CKD are at WRDQ. W8EYP sells gear. W8SB works at
auto factory. Club held big indoor baseball game, Plates
VS Grids; about 150 hams out to see game.

Traffic: W8FFK 314 BAH 191 HWV 180 BZL 117
ENJ 116 DUV 114 DTD 110 ZZB 108 AUM 106 EEZ
96 HCS 94 FGV 79 BBH 74 BON 68 ICC 67 BMX 61
EEQ 57 FRY 39 BSP 34 ESN-DVL 28 IZQ 26 BAC 24
BKM 23 HMH 21 EQC 27 HZR 26 GGU 8 ECR 14 JMH
6 ACZ-GDC-EFW 19 ARW 17 GUL-HGE 14 FNX-
GSO-GFA 11 GXL-BYD 9 GZ-DIH 8 AOA-ISK 7 EBY
6 EEP-APC-ZZCC 5 HSG/PO 4 BMK 3 EDY-BRB 2
DCU 1.

WISCONSIN—SCM, H. H. Kurth, W9FSS—
W9AMB leads the state. W9HSK is going strong. W9IQQ
is QRL school. W9DRO is on vacation. W9AZN will
comply with new regs. W9AVM is back in Madison.
W9EEQ has couple 15 watters. W9GAH is life guard at
Waukesha Beach. W9JVT is on at Janesville. W9IQW is
collecting crystals. W9DQY invites SCM to visit him.
W9HKL is going to World's Fair. W9JDP is trying to
work DX. W9GFC had fine trip. W9KPO will have new
set. W9MQA reports 5 hams at Watertown. W9IBY and
HNX visited W9USA. W9NQF is awaiting clock WX.
Following hams joined U.S.N.R.: W9ERS, DJH, HKL,
BCF, ISD, NSX, JCH, DXV, IFF, LEV, CIT and EBD.
W9KJR recommends GPQ for ORS. W9LFK handled
some traffic. W9DIT had good month. W9IQW has both
e.c. and c.c. W9HTZ is QRL. W9HGF took over HGG
schedules. W9HVA handled traffic to a YL in hospital.
W9HMS renewed A.R.R.L. sub. W9ATO-NMY uses bank
of B eliminators for power. W9DNU is working on sup-
pressed carrier 'phone. W9FSS and NLE visited HSK and
AZN. W9NAV is going on 28 mc. W9LAD has 56 mc.
trouble. W9HFT is back from C.C.C. W9JBI is QRL FSS'
sister. W9OT has partner in operating his station. New
stations: W9FVL, NNJ.

Traffic: W9AMB 604 DNU 466 NMY/ATO 374 HSK
267 HRM 252 HMS 110 JWN 69 HVA 64 HGF 60 HTZ
56 DXV 40 IQW 37 DIT 22 GPQ 31 LFK 21 HNX 20
KJR 15 ERS 13 DJH-NQF 9 FGX-IBY-MQA 8 KPO 7
GFC 15 JVT 5.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Wm. A. Langer, W9DGS-
IFW—W9RKE worked ZL. W9EVQ handled traf-
fic with W9USA. W9JZJ, KRS and NMV use Morse.
W9DM is home again. W9JAR awaits op license. W9BTJ
is on at Detroit Lakes, Minn. with portable NOQ.
W9HJC wishes to hear from all who will cooperate in

emergency network for NPRR. W9IFW was on ten days at Valley City.

Traffic: W9HJC 56 KBE 46 DGS 48 EVQ 13 JZJ 6.

SOUTH DAKOTA — SCM, Carroll B. Miller, W9DKL-GIO — W9TY says grasshoppers bad! W9CAU took Extra First Exam. W6APB visited Aberdeen. W9GLK took exam. W9KQB visited GRJ and IQZ. W9DGR is teaching. W9IQD and GYG await Op tickets. W9IDW is in CCC Camp. W9EUH is with WNAX. W9JAA will be football team captain in fall. W9FOQ enjoyed trip to Century of Progress. W9CDW is building all metal rig. W9KDL rebuilt. W9CFU reports plans for State Fair station; call, probably W9MVQ.

Traffic: W9TY 38 IQZ 5 DKL 9.

NORTHERN MINNESOTA — SCM, Robert C. Harshberger, W9JIE — RM, Willard Guimont, W9JID. W9JID is new RM, IPN new OBS. Twin City gang held picnic at Lake Minnetonka, July 9. W9LIP is high diving champ. W9IPN schedules HNS. W9EDN mixes traffic with DX. W9ISA is building c.e. rig. W9AVZ took commercial exam. W9FTJ reports new ham, W9NLS. W9JIE schedules AMB, HSK, KBE and W7BVE. New officers: St. Paul Radio Club: W9IPN, pres.; HRB, vice-pres.; MSW, Y.L. sec.

Traffic: W9JIE 290 IPN 129 HDN 116 HNS 44 GBN 27 AVZ 24 AZJ 22 LEX 14 FNQ 2 ISA 1.

SOUTHERN MINNESOTA — SCM, Norman Beck, W9EPJ-CGR — W9FCS finds lots of traffic. W9BLG worked China. W9DEI has high power. W9HCC handled rush message. W9HGN reports nice total. W9JFH handled important traffic. W9GLE moved across basement. W9EPJ visited Twin City. W9IAE is QRL work. W9ZT has '52 perking. W9DH is rebuilding. W9BNN says storms blew antenna down. W9DMA lost skywire in tornado. W9CSDY is at summer home in Wis. using portable KHS. W9LDQ and BHZ are going to rebuild 100%. W9FNK has portable ZZA. W9KDI awaits ops license. W9AIR is taking it easy. W9CPP visited LFO, AVZ, EGN, HEN. W9DCM had FB time at Century of Progress. W9WY is FCC's brother. W9EGG went north. W9EFW is QRL YLs.

Traffic: W9FCS 217 BN 116 BLG 79 DEI 77 HCC 55 HGN 52 JFH 16 GLE-BKK-EPJ 14 IAE 4 ZT 3 DH 2 BNN-CSY/KHS-LDQ 1.

DELTA DIVISION

ARKANSAS — SCM, Henry E. Velte, W5ABI — The Delta Division Convention will be held Friday and Saturday, Oct. 20th and 21st at Hotel Gayoso, Memphis, Tenn. Registration is \$2.00 in advance or \$2.50 at the meeting. Let's all plan to be there. W5FK reports new club at Camden. W5JK says fine WX for fishing. W5AHP is a motorcycle daredevil. W5BDB is going to 14 mc. 'phone. W5CEO has MOPA trouble. W5AXP and ANZ have gone to N. G. Camp. W5DHN is new station in Siloam Springs. W5BED reports on activity in his territory. W5BMI remains the reliable traffic handler. W5ABL's c.e. rig gets out well.

Traffic: W5BMI 115 RDB 12 JK 9 ABL 8 ABI 10.

LOUISIANA — SCM, W. J. Wilkinson, Jr., W5WF — Don't forget DELTA Division Convention to be held in Memphis Oct. 20th and 21st, nor Louisiana Section Convention to be held September 16th and 17th. W5AOZ is building c.e. rig. W5KE and BID want traffic. W5BFB is selling out. W5ANQ is at KMLB. W5NM wants VE schedules. W5BUK now has a junior op. W5ACA won a liars contest. W5BI keeps schedules. W5AYA is on 'phone. W5AGM joins with former YL. Active: W5BFP, AXU, AXD, AYZ, AKW, ASJ, AFW, CEN.

Traffic: W5ACA 10 AFW 53 BZR 16 KC 6 BI 15 BID 33 AYZ 16 AXU 2 BYX 47 BFB 2 KE 28.

TENNESSEE — SCM, F. F. Purdy, W4AFM — October 20th and 21st (Fri. and Sat.), the Delta Division Convention will be held at Hotel Gayoso, Memphis. Address all correspondence regarding Conv., to J. H. Viser, Jr., 160 Union Ave., Memphis. New officers Chattanooga Amateur Radio Club: Pres, W4PL; V. Pres. W4MU; Secy., W4ARP; Treas., W4AQM; Activities Manager,

W4FR. East Tennessee Amateur Radio Association held July meeting at Utilities Auditorium, Kingsport. W4BTQ has FB BPL total. W4BQK breaks through with nice report. W4RO, BOZ, EX reports are all over hundred mark. W4RO is Chief RM. W4CW is back on the air. W4AKJ-BKI of Tampa, Fla. is in Tenn. this summer. W4BPC is new OBS. W4CBS is new ORS. W4VK is shieling up crystals. First report in a long time from W4ACT. W4AMI is on 28 mc. W4ADX was heard in England on 3.5 mc. W4OV is operating port. PBI at N.G. Camp. W4CBU is operating port. CIA at school in Chattanooga. Ex-W4JU, now ZZAR, is RO's cousin. W4BXP blew an '03A. W4AXO worked K5AA and LU5FV. W4AMD is on 7 mc.

Traffic: W4BTQ 733 RO 268 EX 192 BOZ-BQK 108 BKI 76 AFM 55 OV 52 PL 37 AXO 32 CBS 18 VK 16 ACT-CBU 14 ABQ-LU-BDZ-AQD 10 ADX 7 AYU-BPE-ABX 6 ATW-BUC 5 AMI 4 PBI 2 AOY-BVP 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM, R. E. Haight, W2LU — W2UL and ATM are doing nice traffic work. W2CFU pushes through to W9USA. W2AJD has port. BXS. W2DQT is breaking in YL for 'phone. W2FPH visited BLU and KW. W2EGF is on 3695 kc. W2AN enjoys traffic. W2ESO took a 1000 volt jolt! W2EQD is home from Camp. W2CXX is on 1.7-mc. 'phone. W2FHJ YL at W2CXX. W2EQC is c.c. W2ETV sails for Paris. W2BLL has port. FDW. W2CVL reports for Tri States Radio Club: pres. W2AC, vice-pres. W8ACI, secy. W2CVL, treas. X8GFC. W2CBN applies for port. W2BZZ is perking up. W2AQN's new QRA: Box 294, Pleasantville, N. Y. W2ACD spent vacation rebuilding. W2ACB went to Elmira Hamfest. W2SJJ is Daddy of two YLs and one OB. W2CAZ steps off with a YF. W2DUG visited W9USA. W2ENR is going strong. New calls: W2GCE, FUM, FXK. W2DDW reports for M.H.A.R.C. W2CO, SCM N.N.J. visited W2LU. W2CJP is on 3.5 mc. F8OZ visited W2BJA and CJS.

Traffic: W2LU 384 ATM 188 LU 130 CFU 36 KW 31 BXS 22 EGF 16 FPH-BJA 6 AN-ESO 4 BLL 1 CJP 40.

NEW YORK CITY AND LONG ISLAND — SCM, E. L. Baunach, W2AZV — W2FF sends QSTs on 'phone nightly at 7 p.m. E.S.T. on 14226.4 kc. W2PF just got back from Honeymoon. W2BNJ makes BPL. W2AGL tried 7 mc. W2CYX schedules his brother, W2FNY, at Camp Horseshoe, N. Y. W2DBQ is conducting code class. W2BAS has new boiler. W2FFN is building Jan. QST receiver. W2CCD reports from W2KW. W2DTT is joining U.S.N.R. W2CEB is studying for ORS. W2EYS sends good report. W2BPPJ is QRL YLs. W2API is WAC. W2CLM gets X-D-C from self-excited MOPA. W2EYQ has new receiver. W2BEF, BFG and FIS are rebuilding. W2CEH wants crystal filter for his FB7. W2DBE is 2nd op at W2CEH. W2EGA is trying to improve SW3. W2ASG and AGC were QRL painting shacks. W2BST built 1.7-mc. 'phone. W2VL is trying 28 mc. Open grounds in L. I. Lighting Co. system causes W2AZ's 'phone to be modulated by 60 cycle hum. W2DFS has FB 3.9-mc. 'phone. W2DNW and CJA work for same laundry. The Nassau Club plan trip to W1MK. Some of NYC gang on 3.9 'phone are: W2BOP, QZ, CEL, FST, AIT, BOW. Somebody swiped W2EBO's crystal holder. A Jewell meter is missing from W2BVL. W2FHR has nifty 56 mc. rig. W2CJZ holds down eastern L.I. W2BFG has necessary parts for 50 watt job. W2BXO is op for Nassau Co. Police. W2DBE, EGA, FBP, and EYQ visited crystal studios of W2CHK. Hi. W2EDW puts a terrific hole in 1.7 mc. with 400 watts 'phone. Nassau Collegiate Center offers a comprehensive radio engineering course free. Instructor is P. W. Somers, ex-WIZ, WIK. W2CNR built successful velocity mikes. W2CHK can be heard sending OBS on 3904 kc. W2ELB has BCL trouble. Between heat and YLs W2AZV is in a daze. W2BSR is after DX. W2DOG added a pentode doubler. W2DUP, APE, BSK and EHE have gone to Lake George, N. Y. W2CBB has gone to N. H. W2BMH went to Lake Mahopac. W2CQI is on 1.7-mc. 'phone. W2AQN moved to Pleasantville,

N. Y. W2AWT enjoys DX traffic. W2FLG has Comet Pro. W2ECZ has nice signal on 3.5-mc. 'phone. W2ELK reports. W2AA, AZV, BKP, BIK, BFA, CIT, DJD, GZ, LB, and LR have been very active with U.S.N.R. W2BEG has gone in for all classes of licenses.

Traffic: W2BNJ 133 AGL 55 EYS 49 CYX 47 DBQ 45 FF 43 AWL 35 CHK 15 EYQ 14 BAS 11 FIS 9 BMH 5 AZV 10 FLG-FFN-CLM 3 ELK-BVT-ASG-AGC 1.

NORTHERN NEW JERSEY — Acting SCM, Bob Maloney, W2BPY-W2DIU is a one-man station, Ed Whitnah doing the honors! W2EKM is doing fine as RM. W2EIP would appreciate some teeth to help him pull through VCR physical exam. W2CIZ works seven days a week!! W2ABT is giving 3.5 and 14 mc. a whirl. W2BXM sent a lengthy report! W2JC is kept active by Bloomfield gang. W2EJK comes to Perth Amboy for his beer. W2AMR leaves Canal Zone. W2TP was heard by W6CAL on 28 mc. W2EIC worked eight countries in one night. W2CGG's card looks as if he gave it to the baby before mailing. W2DPB is W3CJQ in Ocean City. W3BGA will drop when he finds who is making out his first report. W2FRF, ex-W1AYO, puts Point Pleasant on the air. W2FNK reports on FJG. W2ZZEP is on vacation. W2CHH claims 3.5 mc. should be entirely c.c. W2ETQ says YF had an accident. With dead batts and no cash, W2CTV is singing "Don't Blame Me." W2EKV's report comes via EKM. W2AKC-AMT will be W4BRO in Miami. W2CTT is hopping back to 3.5 mc. W2CPU is blasé to judge from his unconcerned report. W2BYK puts another Jersey shore resort on — Ocean Grove! Fat of W2ELJ would drink beer if wires could stay up without telegraph poles. W2DGU, re traffic, pipes up with "Twentieth Century Blues." W2CO is traveling for American Airways. W2CC designed a beautiful keying system. W2BPY will be with W3DD at the latter's summer home in Old Lyme, Conn. five weeks of Aug. and Sept.

Traffic: W2DIU 2172 EKM 640 CIZ 5 ABT 41 BXM 8 JC 136 CJX 16 AMR-TP 26 EIC 9 CGG 2 ELJ 9 BPY 12 FNK 5 CHH 2 CTV 1 EKV 81 CTT 3 CPU 17 ETQ 30.

MIDWEST DIVISION

IOWA — SCM, Geo. D. Hansen, W9FFD-JXA — RMs, W9ABE, W9BPG. Send your reports to SCM's new QRA, 3734 Summit St., Sioux City. W9ZZAF has peach of total! W9DUE handles World's Fair traffic. W9LFF has steady schedule. W9ACL is on the job. W9HPA is new RM. W9CWG is going to Chicago convention. W9BWF resigns ORS. W9CYL's shack stands at 95 degrees. W9NTW reports newly organized club in his town. W9DBN worked PK off coast of Java. W9ERY is rebuilding c.c. job.

Traffic: W9ZZAF 821 DUE 73 ABE 59 IFF 52 ACL 26 HPA 10 GXU 13 CWG 8 BWF 5 CYL 4.

KANSAS — SCM, O. J. Spetter, W9FLG — W9KG holds traffic banner. W9FLG is about recuperated. W9GCL is leaving state. W9AHR wants to know why it takes so long for a message to come from Michigan to Kansas; exactly one month. W9AHR is responsible for six new reporters. Southeast Kansas Radio Club has been organized. Meetings are held first and third Sundays in various cities. W9EMM has old job back in Tulsa. W9IGQ is back with c.c. W9BPL had a number of hams call at his shack before the meeting of SKRC in Fredonia, to see his WAC. W9AHR worked LU6DJK. W9IQI is QRL oil station seven days and dance orchestra six nights a week. W9MUY is new ORS. W9CFN is going to attend Convention in Chicago. W9BTG will attend I.R.E. convention. W9FRC has new Super. W9NI will soon be heard as CX7. W9LGV is experimenting. Starting with the convention in September the SCM will get out a bulletin for the clubs of the state. Secretaries please send me dope on your club activity every month for this Bulletin. We will also have a Bulletin containing important and spicy news for all those who report to the SCM each month. If you want this sheet, be sure to report. Don't forget biggest and best convention yet, Topeka, Saturday and Sunday, Sept. 9th and 10th. W9LFN is rebuilding for 'phone. W9BUY visited SCM.

Traffic: W9KG 986 KSY 93 IEL 58 BTG 34 DVQ-EFE 20 KDO 15 FLG-PB 13 MUY 12 AHR 9 GBP 7 BGL-CFN 5 AWW-NOC-MYV 3 IPD-IGQ 2 NSD 1.

MISSOURI — SCM, C. R. Cannady, W9EYG — RMs. W9FTA and W9BMA. W9NP BPLs on deliveries. W9CJR held scaunt lead in CUP race. St. Louis: On 3.5 mc.: W9LLN, CCZ, LTH. W9NNT has 1.9-mc. 'phone. On 14 mc.: W9FAB. On 7 mc.: W9GUQ, W9GTK says too many questions in ORS applications! W9JW stuck to one schedule. W9DOE put up new Zepp. W9HUZ moved. St. L. ARC — W9DUD, "Sure like new s.s. receiver." W9DGI added '52. Too hot for radio at W9GDU, FTA and HW. O.B.P. — W9PW is on 7 mc. W9BGE sends FB OBP report. Kansas City — W9KEP QSO'd W2TP on 28 mc. W9RR is organizing U.S.N.R. nets. W9FHV has new receiver. State News — W9ITY sends first traffic report. W9CRM changed to J. C. Hartley. W9JBV got first VK. W9ENF is QRL hard labor. Robert Henry of ARA sends first report "in years." W9ASV schedules ZL3AR daily. W9ARH comes back with traffic. W9DHN continues traffic work. W9EDK will report regularly. W9AIJ plans good A.A.R.S./U.S.N.R. year. W9JTB has port. NHR. W9JAP applies for ORS. W9LBM visited Monett, Joplin, etc. W9MIR is first timer. W9GQY wants to report via radio. W9NNZ was 9BRU in 1923. W9LLN is a St. Louis traffic man. W9GBC is on vacation. W9HUG is QRL hot wx. W9TJM is getting ready for St. Louis. W9CJR likes new "Comet Pro." W9DUM is working in Rolla. W9FVM was visited by W5BXM, W5MU. W9EYG visited hams in and en route to Kansas City, Jefferson City, West Plains. EVERYONE REPORT NEXT MONTH! LET'S CONTINUE THIS CLIMB!!

Traffic: W9NP 147 FTA 42 CRM 41 CJR-LLN 40 IYT 39 JBV 36 ASV 35 RR 29 ARA 18 ENF 17 ARH 16 BGE-JBZ-CFL 10 HUZ 9 DHN-DUD-DGI 7 EFC-DOE-BC 6 GQY-GDU 5 IJW-EYG 4 LLJ-NHR-AHH-EDK-LQH 3 FEH-EOW-NNZ-AJW-BYN-FZJ-MZD-CTK 2 IGP-JUB-HUG-EWT-LBM-NOY-JAP-HLE-NLR-ENK-ZZ-FVM-CON-JPT-HCP 1.

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9DFR runs local swimming pool. W9BCX reports much QRN on 3.5 mc. W9BQR is going to N.G. Camp. W9EWO is using a '12A. W9IFE has 1.7-mc. c.c. 'phone. W9HTU is experimenting. W9MKG is life guarding at swimming pool. W9FAM hasn't got a thermo big enough to see how hot it gets in the shack. Hi. A real club has been started in Omaha, the "Amateur Radio Operator's Club." First meetings were held at "shack" of W9KJP. For details of A.R.O.C. write W9EW.

Traffic: W9DI 34 DFF 32 BCX 13 BQR 1 IFE 62 HTU 12.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Fred A. Ellis, Jr., W1CTI — W1MK BPLs. W1DCI is on trunk line. W1DOW's schedules look like patchwork quilt. W1BIQ was op. at WIPO, N. G. camp at Niantic. Bristol Radio Club, W1DHT, has gone to 7 mc. W1FGV visited ESO, EJA, CY and AMM. W1DBU and ESD are building rig for N.G. camp. W1GC schedules W3BKQ. W1BQS is on 3575 kc. W1APW says World's Fair traffic coming through good. W1CJD is getting ready to put Conn. net in shape. W1BHM says DX good. Call W1CBA any Thursday between 7:30 and 10:30 for QSP or rag chew. W1UZ was heard in Germany on 3.5 mc. W1AKI is getting ready for fall traffic. W1AMG rebuilt. W1AVB moved. W1DGG went sailing. W1QV is on 3900.5 kc. 'phone. W1EFS is QRL on new bungalow.

Traffic: W1MK 408 DCI 156 DOW 82 FGV 71 DBU 41 EWD 28 GC 25 BQS 24 APW-ERU 23 CTO 21 CTI 17 AFB 26 QV 14 CJD 10 BHM 8 CBA 15 UZ 5 EBY-ETE-AKI-EAO 3 GGX-GUB 2 TD 1.

MAINE — SCM, John W. Singleton. W1CDX — W1BOF is our heavy trafficker. W1GKC has nice total. W1EFA is putting "50" in last stage. W1CRP is a "human fly." W1CDX says married life "great stuff." W1ABQ schedules BOF. W1CPT has a YL. W1AQL is at Camp Keyes. W1VIF has new antenna. W1FJP has rack and panel rig. W1APX has good schedules. W1BNC

worked CIV4. WIBTA has port. HDW. The Island Radio Club held a bang-up hamfest at Bar Harbor. WIDHH visited Calais.

Traffic: W1BOF 107 GKC 66 EFA 63 CRP 38 CDX 26 ABQ 11 CPT 9 AQL-VF 6 FJP 4 APX 13.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullen, W1ASI—W1BX heads the traffickers, with AGA close behind. W1ABG is experimenting with 400 mc. W1KH is all set for 28 mc. W1BVL was heard in 9th dist. on 23 mc. WV is week ending on the Cape. W1ASI and BXB are with WMP, Mass. State Police. W1BBY schedules Canada. W1EVJ keeps emergency circuit open for Nantucket to Falmouth. W1ABF is trying all ships on Atlantic. Hi, W1BMW is president of Cape Cod Radio Club. W1DFS was away on trip. W1JL reports a QSL from Uncle Sam. W1ESK is back on the cape. W1BFR handled traffic for Fort Devens. W1DEY is on 1.7-mc. 'phone. W1BQE is in service business. W1BTO is at camp with signal corps. W1ALP has a new jr. op! Congrats. W1DFE's mast had an argument with a lightning storm and came in second. W1AS uses class "B." W1FGY is out of town working for summer. W1ZK was at Fort Devens. W1GAG has new rig. W1FEU, ECK and IB report for first time. W1BJA is ready for Newburyport traffic. W1DZQ and DDC are on 56 mc. W1CEL is putting 250 watt final. W1BEF is tossing traffic for Lowell. W1EVE is summering in Maine. W1PRO has divulged the fact that she's a YL. W1GEC QSO'ed 8 miles on ½ watt 'phone.

Traffic: W1BZO 239 AGA 232 EVJ 77 ESK 76 JL 63 BEF 56 DFS 52 KH 48 BBY 46 ASI 44 BMW-FRO-RJA 43 CEL 30 ABG 19 FEU 17 ECK-GAG 12 WV 7 DZQ 4 IB 1.

WESTERN MASSACHUSETTS—SCM, Earl G. Hewinson, W1ASY-RB—AR-8, amateur station at Fort Devens, makes BPL. W1FNW, BKG, EOB, EFM, BWY, CWP and BVR worked schedules with AR-8. W1AJD worked K6VG on 3.5 mc. W1OF schedules DLH. W1APL has been "A HAM since 1921." W1COI promises to be in next time the boys call on him. W1BNL is moving. W1EVZ takes traffic from W9USA. W1ADF is OBSing on 3570 kc. W1DCH is 56 mcing. W1CJK QRT for vacation. First traffic report was received from Western Mass. Radio Assn., thanks to W1GBZ. W1FAJ says traffic picking up. W1ASY was heard in ZL on 3.5 mc. The annual field day for Western Mass. Section was held in Springfield July 23. W1BZ has port. HBQ.

Traffic: ARS 543 W1BVR 250 EOB 140 EFM 122 EVZ 108 FNW 63 CVS 83 BWY 62 ADJ-APL 26 DUS 30 GBZ 20 ARH 18 ADF 16 FAJ 15 ASY-CJK 12 AWW-DDK-CWP-DCH 10 RNL 7 BKG 5 OF-CIZ 3 FQA 12 DVW 23.

NEW HAMPSHIRE—SCM, V. W. Hodge, W1ATJ—Pressure of my radio service business forces me to resign as SCM. I wish to thank you for the fine cooperation you have given me and trust you will help the new SCM make this Section one of the best. W1FEX worked Cadillac Mt., Maine on 56 mc. (152 miles). W1BAC is at Lonesome Lake in White Mts., under call EUY. W1UN is pounding out WX and PX. W1CCM says APK got married. W1EES is now HFO. W1GOB and GOC are new hams in Kearsarge. W1FCI has new antenna. W1BGL keeps schedules. W1IP is on vacation. W1ERQ has new bug. W1DMI is 100% 'phone. W1AXL is trailing a YL. Send your next reports to W1APK, Pembroke, gang.

Traffic: W1FEX 148 UN 66 ERQ 28 FCI 7 DMI 5 HFO 4 BMM 3 BGL 2.

RHODE ISLAND—SCM, Stanley W. Atkinson, W1AFO—W1GOG is new ORS. W1EOF vacations at the Cape. W1AXS took his portable outfit to Maine. W1FAH swears by e.c. job. W1EX operates on 3.5 mc. W1FNE sticks to 14 mc. W1GTL reports via radio. W1ALI is running all over state with portable rig. W1AGB uses MOPA. W1GKD, Woonsocket, reports for first time. 1.7-mc. 'phone enthusiasts: W1DIK, GPE, ASZ.

Traffic: W1GOG 38 EOF 35 AFO 30 AXS 26 FAH 21 EX 18 FNE 10 DIK 6 GPE-GTL 4 ASZ-AGB-GKD 2 ALI 1.

VERMONT—SCM, Roy L. Gale, W1BD—W1FPS is new ORS. W1DHX schedules ex-W1BZD, now W8JGE. W1AXN has his outfit at camp. W1CBW and CFN visited SCM. W1AVP and DPO called on ATF. W1CIY has new receiver. W1DAQ has a nice signal. W1EGU is at home. W1CGP is back at Lake Wallis.

Traffic: W1DHX 30 CGV 27 BD 1.

NORTHWESTERN DIVISION

ALASKA—SCM, Richard J. Fox, K7PQ—K7ATD sends last report. K7AHK and FF have new jobs. K7BAQ sends first report. K7BHR and BWQ are active. K7CVI wants a visitor at BNW. K7DWA got unlimited 'phone. K7VEH is home at last. K7COF is off for summer. K7DEV is new ham. K7LW is at Point Hope. K7PQ received two reports from N.Z. on 3.5 mc. K7ACZ has also been heard on 3.5 mc. K7AZS schedules K7AZ.

Traffic: K7TF 6 BAQ 7 VH 13 BNW 31 ATD 37 CF 52 PQ 125 AZS 129 ABK 243 FF 382.

IDAHO—SCM, C. R. Thrapp, W7AYH-CKO-W7BCU is rebuilding. W7CMD is QRL KFXD. Ben Wing, W7DDE, was fatally injured in plane crash July 4th. "Hot wx not much fte" at W7BAA. W7BRU has port. CLB. W7CSP handles lumber for C.C.C. camps. W7CZO is working with new ham and CSP. W7AVP is acting as emergency station for WUBJ which burned out recently. W7BRY sold out.

Traffic: W7BAA 12 AVP 9 BRU 3.

MONTANA—SCM, O. W. Viers, W7AAT-QT—W7FL reports. W7CT, BDZ and BKB are on 3.9-mc. 'phone. W7AQN cancelled schedules. W7DSQ in hospital is kept in touch with home by BZA. W7CCR has new 'phone. W7BGC is building 'phone. W7CTP is awaiting parts. W7BDJ is helping ZZA get going at C.C.C. camp. W7BYR has port. DPS. W7BVE is building velocity mike. W7BSU and CHN are at Conrad. W7CRH has transmitter trouble. W7AHF is op at KGEZ. W7CEG is on again. W7AFS is after more power. W7BFM visited Somers gang. W7AAT and COX made a few changes.

Traffic: W7FL 7 CCR 33 CTP 11 BDJ 2 BVE 42 AAT 40 BZA 7 CRH 13.

OREGON—SCM, Ray Cummins, W7ABZ-CBB—W7CEJ is number one traffic man. W7AJX keeps schedules thru the summer. Visitors to SCM: W7CDI, BLN, LI, LY, AYV, BOO, BUB, CUV, and AJV. Neighbors cut down W7ALM's antenna. W7AOI is 'phone ORS. QRN is getting best of W7AMF. W7BWD is at Blucher Valley, Calif. with port. W7DCP. W7ANX ways A.A.R.S. swells totals. W7HD likes the SCM's "Tin Can Transmitter." W7AIG holds extra first license. W7WR finds no traffic depression. W7AUQ goes back to Elmer, N. J. K7CFQ shoots his report via W7HD. W7AJV has '04As perking. W7CUV and CUJ send first traffic reports. W7APE resigns OBS. W7AEJ is A.A.R.S. NCS. W7AJX has port. ZZI. W7CRK has new QRA. W7BUF's XYL beat him one point in exams. Port. W6GZF is in Oregon for vacation. W7AXO visited Coos Bay. W7ABZ returns to the air. Let's make Oregon the "Banner" Section!!

Traffic: W7CEJ 336 WR 317 AXJ 314 HD 209 AXV 183 CUV 112 CXK 81 AJV 80 AMF 58 COU 52 ANX 33 CUJ 25 DDD 21 AHJ 19 AOI 7 ABZ 6 AUU 5 ALM-ZZI 4 AJX 3 BWD 2 BLN-AIG 1. K7CFQ 101. W6GZF 7.

WASHINGTON—Acting SCM, Stanley J. Belliveau, W7AYO—W7AHQ schedules K7ANQ. W7UE is getting rig in shape for fall. Poor WX knocked W7APR's schedules haywire. W7ALE has been working 'ol' timers on 7 mc. W7RL is busy in Vancouver. W7AWF reports new station, DPU. W7ABU got traffic from Strawberry Festival. W7DGX keeps six schedules. W7DJJ reports via radio and DGX. W7CZY sends dope on Everett. W7AVM has WE242A final. W7DSZ is in Tacoma. W7BFL worked his first ZL. W7APS has port. CDN. W7CQI is new ORS. W7WY leads the Section. W7CHH is building c.c. rig. W7BSX makes BPL. W7CNR wants schedule with Eastern Wash. W7LD would like to see a monthly traffic drive. W7DHR is new reporter. W7KO sends 00 report. W7CND has three stage c.c. rig. W7IG went on

ten day fishing trip. W7AMA is back in Spokane. W7BEV is Treas. of Spokane Club. W7BHH/CLN says nerfs to low power. W7RT is frequent visitor at AYO. W7BKE's antenna is so crooked he can work around corners-hi. W7ACY schedules Alaska. W7AZI is Tacoma reporter. W7AYC handled death message. New ham at Yakima is YL—W7DUC, sister of BCS. W7OYO gets out well on low power. W7CCT will be Principal of Wapato Jr. High. W7AAL, US, AWX and BIW handled Glider Flight traffic. New hams: W7DUH, DUG, DUJ, DLK and DLN. *We want that banner again!*

Traffic: W7WY 305 CQI 260 BSX 241 AEI 123 CDN-BFL 112 DGX 87 BKE 51 LD 49 AAL 46 ABU 43 CCT 42 CNR 34 US 32 AIT 28 BON-DKT 25 IG 23 CND-RL 20 DJJ 15 CZY-AWF 13 BWI 12 ACY 10 AMA-CLN-AHQ 9 CPD 8 AZI-DMM 7 BRC-ALE-AYC-BEV-CFY 6 CAM-BIW-BCS 5 BUQ-AQ-AWX-CGP 4 DNG-KO-CDD-BAZ 3 BUX-AKL-BBY-UE-APR 2 CED-DUJ-DHR 1 CYO-AVM 3.

PACIFIC DIVISION

HAWAII—SCM, C. D. Slaten, K6COG—EX-W6BIH is K6IQL. K6AIU and IQL work same station. K6IQL will lose bachelor's status August fourth. K6IQN is new license. K6BWW is getting FB DX. K6GQF is on 14 mc. K6EST graduated from university. K6EBR worked Egypt. K6GRV has gone to mainland. K6FVL went on visit to Big Island. K6FAB has been pushing traffic. K6EWQ and K6GUA make BPL.

Traffic: K6EWQ 814 GUA 605 FAB 361 BWV 73 HOO 48 COG 39 GGF-AJA 34 CRU 22 EDH 17 CIB 14.

NEVADA—Acting SCM, C. B. Newcombe, W6UO—W6AAx is C.C.C. op at Boise, Idaho. W6AFR moved to Boulder City. W6HGL is spending vacation at Tahoe. W6AJP broke collar bone. W6GGO is in C.C.C. service. Club meetings in Reno still drawing full house.

Traffic: W6UO 33 AJP 34 HGL 26 GYX 13.

LOS ANGELES—SCM, Francis C. Martin, W6AAN—W6DOK handled messages for visiting Governors. Three ops at W6BYG put that station in BPL. W6GNM rebuilt. W6EUV is looking 'em over up Vancouver way. W6AKW reports business trip to same locality. 56 mc. experiments at W6EWY. W6DGH is increasing power. W6SN gets R9 in Japan. C.C.C. Camps keep W6TE off. Feedback blew buffers at W6HXU. W6CLY walked twenty-three blocks to make delivery but found QRA wrong—returned home for correction and then made delivery about same distance! Sam, second op at W6CXW, is in Japan. W6ETX and CTZ returned from vacation. W6DZI reports stations "Called but not Worked"! Matched impedance antennae works FB at W6MK. W6GNZ worked 18th country on 7 mc. Bugs cleared up at W6ESK. W6GHV is recovering from serious illness. W6LNC is laid up with broken leg. W6AHP is pulling his "Chevie" off a phone pole and repairing sundry cuts and bruises on his person. W6EZK has new licenses, Ama. Ex. First and Com'l Radio Telephone First. W6AOR showed AC8GO, W7BD and W7DL, the sights in Hollywood. W6AIF is now in Altadena. W6DYJ is now in Lomita where he will QRM W6CIP. W6AZU can handle eastern schedules FB. W6FZL is getting married this fall. New receiver at W6FKD. Following report with no traffic, but with the good of the Section at heart: W6AAE, ADJ, ALR, BDH, CDM, CPM, CQG, DLN, EBJ, EBK, EQJ, FDM, FJS, FSE, FVW, FVU, FXF, GOX, HAH, HT, ICO, IS, IYI.

Traffic: W6ETL 1244 BYG 496 EDW 402 BPU 394 EII 388 DKM 377 AFO 325 CUU 312 NF 258 BZZ 225 FGT 195 GXM 170 CVF 123 BGN 102 EK 64 BZF 71 ESK 69 AZU 68 FOZ 62 CZZ 60 EQW 56 AOR-DYQ 50 FNG-GNM 43 AAN-DZC 38 BGF 33 AKW 31 CVV 30 DLL 27 EUV-DOK 26 EZK-MK 22 DCJ-DWP-GEX-GFG 21 HXU 20 CYS-FWN 19 BVZ 17 FUT-VR 15 FEW-DJS 14 CLY-TE 13 GJA 12 DQZ 11 CTX-GLZ 10 DEH-DVV-FVD-FZL-GMA 9 AGF-CXW-GHX 7 CIX-EAR-EDZ-ETX-EWY-PD 6 CMK-EMY-FFN 5 DGH-DOZ-FGQ 4 CNO-FNI-GSL-HZU-WT 3 CTZ-EQD-GNZ-LXH-LC 2 BOX-CIP-DRQ-EGC-FXL-GMB-IAJ-IDU-ITA 1.

SANTA CLARA VALLEY—SCM, Bruce Stone, W6AMM—All honors go to W6FQY this month. W6FBW is handling Pacific Coast arrangements of Transcontinental net. W6HCQ handled 59 with an '01A. W6DDB is new OBS. W6DSE can't work through local broad signals. W6QR carried 7 schedules on 1.75-mc. 'phone. W6CSI says 14 mc. FB. W6CDX takes traffic on 14 mc. and relays it on 3.5 mc. W6AOD worked Belgium on 14 mc. W6HJT is new reporter. W6EEH finished 50 watt transmitter. W6DHV plays checkers over the air. W6BSO will be in S.F. Section until September. W6BMW has been fighting forest fires. W6DSZ, GOZ, UC, HTP, and CUZ reported.

Traffic: W6FQY 703 FBW 118 HCQ 59 DDB 25 QR 19 DSZ 13 GOZ 9 CSI-CDX 8 DSE 19 AOB-HJT 3 EEH-DHV 2 BSO 1.

EAST BAY—Acting SCM, J. H. MacLafferty, Jr., W6RJ—RM, W6AUT. W6CDA sends in a fine "one op" report. W6ZM went to C.C.C. for six months. W6BNB uses flea power. W6CAN is on 56 mc. W6RJ wants your report on the 16th, PLEASE. W6IT rebuilt. W6AQW has a nice 'phone. W6A0J was appointed Alt. D.N.C. for A.A.R.S. W6AN presides at Section meetings FB. W6CUG is back from second honeymoon (Same OW). W6HHM handles Trunk F like a vet. W6IY is NBC technician. W6BMZ uses remote control. W6DUA is back from gold fields. W6AIS is C.C.C. op at Redding. W6BPC is rebuilding. W6DHS is active A.A.R.S. W6HH has 1.7-mc. 'phone. W6FII reports by radio. W6ABE sends first report. W6CIZ does good work as OO. W6FAC is Alt. S.N.C. for A.A.R.S. W6EJA sends nice report. The Oakland Radio Club beer bust last month was a "howling success." All amateurs are cordially invited to attend meetings of East Bay Section held second and fourth Fridays at Central Trades School, Oakland.

Traffic: W6CDA 1141 HHM 287 RJ 258 JBF 99 FII 60 FAC 34 EJA 24 IY 14 CIZ 13 HH 11 ABE 5.

SAN FRANCISCO—SCM, Byron Goodman, W6CAL—W6PQ and NK BPL as usual. W6ABB worked ZL4FW on 3.5 mc. W6EKC runs up nice total. TL W6CIS is heard on 23 mc. New ORS: W6ATP. Art Holmes is on with W6JAL. W6ARG promises reports from Eureka gang. W6GIS has bad power leak. W6CAL is on 23 mc. W6EKQ inherited? some '81s. W6HTI is looking for K6s on 1.7 mc. W6IU has final whose mile go down when keyed! W6WF was on U.S.S. *Oklahoma* with W6NN for two week trip. First reporters: W6ERF, GNV, and IVN. W6FCX is pounding away. W6BIP has big stick trouble. W6ZS is emulating Isaac Walton. W6DO is building port. W6BVL is building Lamb 5 tube super. W6AVX's '81s went bye-bye. New table at W6GWW. W6CBN is on 1.7-mc. 'phone. W6AZX and ENM vacationed in Santa Cruz Mts. W6AAR has too much room for antenna. W6GQA is finishing TRF. W6EID was up Alaska way. W6CYU completely rebuilt. W6BCA—vacation and rebuilding. W6AZK, GKO, and WU enjoyed vacation.

Traffic: W6PQ 1058 ABB 221 NK 217 EKC 181 CIS 51 ATP 42 JAL 38 ARG 27 GIS 25 CAL 20 EKQ 13 HTI 11 IU-WF 8 ERF-GNV 7 BIP 6 ZS 5 IVN-FCX 4 DO-BVL 3 AVX 1 AZK 3 GXV 12 EID 6.

SACRAMENTO VALLEY—SCM, Geo. L. Woodington, W6DVE—W6CKO leads in traffic. New stations: W6HVM, IOB, ICX. W6DFT and EUH are associate editors of dope sheet. W6GL and ATQ are combining. W6BDX is YL bound. W6BSV and DNA are ops at WUBB, C.C.C. station in Redding. W6CKV has trouble with e.c. osc. W6FND listens on long waves most of time. W6DZW schedules a YL. W6FOD has gone P. P. Hartley. W6CNC expects to take regular exams. W6GVM visited IQM. Old timers active: W6GR, FH, GX, IC. W6FLR and EAG took FLR's portable to Scout Camp at Audrain. W6ADS is home from Weimar. New traffickers: W6CBZ, GHP. W6BYP handled rush traffic direct from NY2AB. W6CIR is on the job. W6COV and HMB are on 1.7-mc. 'phone. W6CDC returned from around the world tour. W6HLQ is after port. lic. W6NT changed his 'phone to P. P. throughout. W6BSQ is moving his rig to the armory. W6AIM, HQs station of U.S.N.R., says the boys can't

take it with a smile. W6GSS joined U.S.N.R. W6FY7 keeps himself supplied with work. W6BDW is doing book-keeping. W6GSP sent in a fine poem he composed. W6GDD has a port. at his summer cottage at Magalia. W6FKM is changing final to inductive coupling. W6DGS is coming on 56 and 1.7-mc. 'phone. W6CUM is on again. W6ICR is on 7 mc. W6CQM and ENA (ops at WUBA, C.C.C. station at Sac.) called on DVE. W6AHN, BYB, UM, EWB and DVE plan to go to convention at San Jose. W6FRP is temporarily located in Sebastopol. W6GKK is going east to school. W6SK worked W9ZZFA.

Traffic: W6CKO 666 GAC 25 CGJ 22 DVE 18 FRP 13 BYB 10 CKK-SK 5 GHP-CBZ 2.

ARIZONA — SCM, Ernest Mendoza, W6BJF — The A.S.W.R.C. meets at Phoenix every other Wed. at 8 p.m. Officers: W6ALU pres., BRI secy.-treas., and GGS vice-pres. W6QC, ALU and IJQ make BPL DXers hard at it: W6DRE, HEU, HGD, DSQ, W6FZQ's YL is Mrs. Spitz now! W6GZU while in L. B. kept in touch with his YF from CYS; GZ operated GZU. W6HBF uses 1000 volts on '10s. Passed licenses: W6CVR, CAP. W6CVW is studying for com'l. W6IQY says ex-6EVM is now IZU. W6IIG is youngest A.S.W.R.C. member. W6HXX is at regimental HQs, N.G. field station GN4. W6FGG received long-wanted '03A! W6HBQ is teaching dad the code. New stations: W6IMQ, IJR, ILL, JCE, IZV, IGC. W6BVP uses PP TPTG. W6DNE took 4000 volts and still lives. W6BRG, BQW, and FGG visited Phoenix. W6BGW visited injured brother in Phoenix hospital. W6FIP is back. W6GFK is at Indio, Calif. W6BYD is visiting W6FAL. On 14-mc. 'phone: W6EGI, AND. W6AWH built S.S. super. W6CKF schedules HBF. W6AYW has home built motorboat! W6IEY is master sgt. 89th brigade EQ Co. W6JDO and JFO are in Phoenix. W6CTI is proud owner of a Jr. op! W6DIE took unto himself a YF. W6BCD pushes '10s with '71As. W6IIF has home-made TRF SW4. W6DCQ added a large wing to his home. W6HJX won prize for most collegiate model T that would still run! W6FEA has separate transmitters on 1.7, 3.9, 7 and 14 mc. W6GCU finds 7 mc. most popular band. W6DJH is sgt. at police KGZJ. W6FKX and EBP have started a radio store in Phoenix. W6DDZ was formerly with McKay radio. W6DKF wants an '03A. W6GGW is going to Yuma. W6ZZBC is pleased with SW3. W6EKU is on 3.9-mc. 'phone. W6EFC changed QTH. W6GHC is experimenting. W6GDD is almost ready to send his first CQ! W6IUY is YF of DSQ. W6CEW and YL have gone in for cycling.

Traffic: W6QC 760 IJQ 750 ALU 489 FZQ 89 BLP 48 DRE 34 GZU 25 HBF 20 BRI 12 CQF-CVW 10 CVR 6 IQY 5 IIG-HKX-HEU 2 FGG-EGI-HBQ 1.

PHILIPPINES — Acting SCM, N. E. Thompson, KA1XA — KAILY has been transferred to Shanghai, China.

Traffic: KA1HR 1142 LG 197 NA 121 TS 42 CO-JR 39 PS 37 XA 33 MR 22. OMITB 672.

SAN DIEGO — SCM, Harry Ambler, W6EOP — W6CSQ ('phone) leads the section! W6FWJ was close second. W6IQX handled his on 'phone. W6FQU has new QTH. W6EFK holds down southern terminus of trunk line F. W6AXN is on 14 mc. W6BHV has gone to Seattle. W6CTP was heard in Poland. W6AKY reports new ham, ITY. W6GWY and BLZ are now ORS. W6DLR and BOW are rebuilding. W6BAS says DX good. W6HWH is new reporter. W6BAM reports BVX back from Fair. W6GVU resumed schedules with P. I. W6EOP and GOG have portables. W6CAV, IZW and HVT are on 'phone.

Traffic: W6CSQ 248 FWJ 237 IQX 146 FQU 28 BLZ 19 EFK 16 BOW 17 AXN 11 BHV 10 CTP 7 AKY-GWY 5 DLR 4 BAS-HWH 2 BAM 1.

SAN JOAQUIN VALLEY — SCM, G. H. Lavender, W6DZN — No report from SCM. This compiled at HQs. W6EXH reports for himself and W6GQZ.

Traffic: W6EXH 227 GQZ 1.

ROANOKE DIVISION

NORTH CAROLINA — SCM, G. H. Wright, Jr., W4AVT — Total number reports keeps climbing. Thanks, fellows! Please get your report to the SCM each

month NOT LATER than the 20th. W4CP has new Zepp. W4BC and MI are at N. C. N. G. Camp. W4QI is pushing the mike. W4BHR wants NC schedules. W4TR is working 'phone DX. W4RE has new '60. W4TP has new "FB-3" (Ford). W4AWU is building portable. W4JR and BXB are QRL work. W4CQ is QRL new Charlotte BC station. W4ALD is awaiting new supply of crystals. W4MB is away from home most of time. W4BWV cleared up transmitter trouble. W4ANZ wants good traffic schedules. W4BX is erecting new antenna tower. W4BTC and CDD have consolidated. W4ANU blew transformer. W4BXX's plate transformer is shot. W4AOA and JB are on 56 mc. W4BTR has '01-A on 14 mc. W4BUE, PFA, AHF, AYH, and BVE are rebuilding. W4HV has PFA trouble. A group of radio engineers, W4DW, EG and JB recently rebuilt SCM's transmitter. W4CGL's antenna mast fell. W4PGL, new ham in Winston-Salem, is getting out FB with pair '45s. W4OG, CKJ, PA, VB and CDD visited World's Fair. W4AYH and ANZ get ORS. W4IF got his renewed. W4BRJ sticks to 'Phone. W4CAY is doing FB with '46. W4BYA is NC's 320 pound "Ham." W4IY is QRL moving. W4BIU is QRL fire-fighting. W4RA completed new rig. W4NC took part in ORS contest. W4CFR used to work old 4NV in the "good old days." Every month W4ABT reports — "QRL YL"! W4SB is operating at Greensboro Airway Station. W4BJZ and BRT have new rigs. W4AI, OLD call of OLD ham who was LUCKY enough to get same call after a lapse of about 6 years. Welcome back, Beaudry. W4BCG has new c.c. rig. The "floating" Central Carolina Amateur Radio Club is celebrating its 1st birthday this month with Winston-Salem Club. All the gang is urged to participate in ROANOKE DIVISION CONTEST to be held in September. W4AIS MAKES BPL! W4TO will move to St. Petersburg, Fla., on September 1st; will use port. CHZ. Motor boats are R-9 with W4HX and TH. W4AL and BMW are BC servicing. W4LY is on lots. W4HJN is resting. W4PEY is putting in 14-mc. 'phone. W4ABN is on occasionally.

Traffic: W4AIS 580 BRK 29 MI 28 TR 27 RE 20 BRJ-BHR 16 AWU 13 BV-AEH-QI 12 VB-AGD 11 CMJ-CDD-BXK-IF-NC 10 PW-BEP 9 CP 8 BWE-BVD-BX-JB 7 BCG-TO-AZD 6 ANZ 5 EG-CQ-DW-CAY-ANN 4 TP-BRT-PGL-OG-VN 3 MB-CS-BPO-BKT-AOA-AVT-BYA-ABT-CCF-CJ 2 JR-MR-ANX-ZH-AOE-BVA-AIT-BHA-LD-ZZD-PFC-PCG-BML-CJA 1.

VIRGINIA — SCM, R. N. Eubank, W3AAJ — W3NT leads state. W3BNH-BWA-BPA-UVA have new Nat'l receivers. New traffic reporters: W3CUR-BYQ-AKN-AHW-BZE-CWS-MQ-DOG-DFS-DVO. New stations reporting: W3DTS-CUR-DOG-DON-DRK-CWS-DXO-DXH-DQT-DUG-DQD-DVP-DWO-DCK-DUS-DXF-DSH-DDY-DVO. Plenty schedules and traffic: W3BYA-NT-CVN-CYK. On vacation: W3DCU-CMJ-CSI-FE-ACN-DRK-CYU. QRL: W3AAJ-CLV-BPI-CLH-AJA-AGY-ZA-BEP. New monitor: W3AKN-NE. New transmitter: W3CVF-BRY-APU-BJX - BIW - AOT - AAF - BAD-BPA-CYM-DDY-GT-CHE-BKS. On 'phone and CW: W3ADJ. At Va. Beach N. G. Camp: Port. W3CLZ-FJ-CMJ-DEH-DAO-FE-CKM. W3AWU is at Boy Scout Camp. Back on: W3ATY-MQ(RI)-CLV-AWY-AAF-BAD-CYM-CVU-ZU-BFQ-BRA-BEB. Now c.c.: W3AZU-BIW - DOG - AOT - UVA - CKM - AVR - AG. W3BAN helped 108 stations into band. W3WM has used same '10 eight years. W3CPN-WW blew '81 on anniversary. In C.C.C. camps: W3BXP-BHC-BFW. W3BFW loaned CSI rig. W3CNY is working in Lynchburg. Want Va. schedules: W3AOT-BJX-BWA-BAD-CUR. New '50 foot towers at W3BTR. W3BAD had death in family. W3BRQ is experimenting. W3TN is back on 3.5 mc. W3QN, "Dot," was married July 10. W3CZJ is building 'phone. W3CFV and BAI send lots of dope. W3BEB is on 1.7 mc. W3BLE blew power transformer. W3APU has new FB receiver. W3CNY has port. DME. W3CXM will be in Va. another year. FB. W3AG is working DX. Virginia contest now on Aug. 16-Nov. 15 inc. Equal chance to every station. See Va. Bulls.

Traffic: W3NT 752 CVN 92 BJX 29 BEB 24 BIW 17 AUG 13 HV 6 BAN-BPI-WM 5 BYQ-COO-CPN 3 CDW-CLH-DOG-NE 2 BSB 1 CHE 10 CZJ 2 QN 1 AG 4 BNH 160 BYA 58 DCU 53 CFV 48 AAJ 23 CMJ 51 BAI 15 BRA 12 AKN 7 BRY 6 CVF 7 ADJ-BZE-CLD-CST-CUR-FE 4 CGR 3 AHW-CWS 2 AZU-MQ-CLV 1 APT 68 CYU-CFL 2 BRE 1 CXM 211 FJ 80 AHQ 18 COJ 12 DVO 3 DFS 1 CNY 20.

WEST VIRGINIA—SCM, C. S. Hoffman, Jr., W8HD—Congratulations to W8EIK for winning crystal given by GB to station having highest total. W8EIK and CMJ continue schedules. W8JM-LXD is new ORS. W8FQB is building S.S. Super. W8ELO is going to World's Fair Convention. W8BOW built new osc. W8GOQ is moving to Charleston. W8CDE is on 3909 kc. 'phone. W8DFC is building 50 watt rig. W8EL and BOW plan on going to College. W8DPO works EARs. W8IPH is Bluefield Radio Club station. W8EWM is rebuilding. W8AYK applied for ORS. The SCM appreciates vote given him for reelection. Please note SCM's new QRA on page 5. New stations: W8JWL, KBU, JBU.

Traffic: W8EIK 192 EL 34 BOW 32 ELO 48 HD 30 FQB 16 IPH-JM/LXD 14 CMJ 12 DFC 2 JBU 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, T. R. Becker, W9BTO—The Denver Radio Club had a field day July 23; a good time was had by all. QRN finally "got" W9ESA. W9BYY is making new super. W9GVN returned from cruise to Hawaii. W9JU is busy making dollars—W9LYE is increasing power—W9CJ uses a Vertical. W9BTO has FBXA. W9RJ is swapping parts. W9BJN has new crystal grinding rig. W9AAB has new rig finished. W9FA is farming—W9BYK has SW3—W9CBU is in Cleveland, Ohio—W9CWK was away on trip—W9MKN has new 'phone. W9IPN and BYC are on 14 mc. W9EMU changed his layout around. W9CND lost his father. Our sympathies, OM. W9FYY and EHC are YLing. W9IJM is installing sound systems. Colorado Springs: The Convention will be held at Acacia Hotel. Registration at 9:00 a.m. Cost of tickets \$2.00; \$1.00 for YLs. W9HDI handled a delivery. W9NRZ, NJW, IQS, and NHI are on quite a bit. W9NKI is on trip east. W9LFE changed QTH. W9JQC's portable is LIJ. W9KNZ has new antenna poles. W9KI and LJS are old timers. W9EYN handles plenty of traffic. W9MKG has portable W9OAR. W9DNP has been on his vacation so DYP had extra work at KVOR. W9ECY applies for ORS. W9HR has FB7. W9FYL has new receiver. W9LLP is putting 50 on the air. W9YL has charge of University Camp at Netherlands. W9CKO is active in Boulder. W9GNK and KKY are rebuilding. W9APZ uses '01A. W9GLG was visited by W9AUJ. W9CDE reports W9NUP a new station. W9JFD is QRL work. W9IFD is working DX. W9NIT claims tube blowing championship. W9NZJ is new ham. W9MVI has a job at Ft. Logan.

Traffic: W9KKY 3 JFD 34 IFD 44 CDE-GLG 3 GNK 45 ECV 11 JCQ 4 JNV 1.

UTAH-WYOMING—SCM, C. R. Miller, W6DPJ—W7COH schedules shot to pieces. W1ZZA is with us again. W6DAM and AHD comprise the Utah A.A.R.S. W9ZZP is exW9GUW of Denver. W7CYK and AOU are active. W2CFH is in Utah for few months.

Traffic: W7COH 23 W6GQR 17 GQC-IDM 123.

SOUTHEASTERN DIVISION

ALABAMA—SCM, L. D. Elwell, W4KP—High traffic man is W4BSN. W4AAQ says new receiver cannot be phased under towers of WAPI. W4DS says the Bulletin FB. W4BJA gets out FB with '45. W4APU is to be new OBS. W4CJG is new reporter. W4BOU says a W5 friend wants the Bulletin. W4BRA is a new ham. W4AYK and BAI are experimenting on skip effects. W4JX is traveling. W4PDR has gone to Miss. W4AKX sends some FB dope. W4BZG has new c.c. rig. W4LT and BWG are active on 3.9 mc. 'phone. W4BPY hears plenty of DX. W4BTU had a bit of traffic. The call W4CIQ has been issued the Mobile Club. W4OA is building receiver

for Mobile Club. W4GL is new ORS. W4CIU sends report on his section. W4CCP is the call from Gorgas. W4BSL reports one TNT, OW and a dynamic YL jr. W4BMM is anxious to handle traffic. W4AP uses 3.9 and 14.2 mc. 'phone. W4AUS finds WX hot in shack. W4PFU is back in Anniston. W4BBO is building higher power. W4BTT is changing to high level mod. W4KP got an '03A. W4AWQ won an "X" cut crystal at Birmingham Club. W4BFA has gone to Texas.

Traffic: W4BSN 75 APU 43 BJA 40 DS 37 BOU 29 AP 24 KP 10 BPY-BTT 6 BSL-AAQ 4 AYK-BTU 2.

EASTERN FLORIDA—SCM, Ray Atkinson, W4NN—W4VP reports W4ASR, BDM, BQD, BUM and BWZ active at Daytona Beach. W4GR is building c.c. rig. W6FAH is now W4CJR. W4BIN plans low power 'phone. W4CAM is new traffic man. W4AI is operating KIPJ, "S.S. West Chataha." W4BRI applies for ORS. W4BGL says "WX slows up traffic." W4DT and AGP have 56 mc. jobs. W4AGB, NN and ANY are building 28 mc. 'phones. W4PBL and ZU visited Sarasota. W4AZB has S.S. receiver. W4LS (phone) is doing nice traffic work. W4BAM (phone) worked all but 2nd district in five hours on 3.9 mc. Heard "Dixie" on the music box from W4DU's 'phone. The gang at Camp Foster included: W4GS, ASQ, QN, ACB, CEA, JZ, CBF, CBW, BGG and NF.

Traffic: W4NN 104 UX 18 CAM 15 VP-AGB 14 AZB-BRI 12 BAM-BDM 5 DU-WS-ACZ 4 BFR-CJR-BIN 3.

WESTERN FLORIDA—SCM, Eddie Collins, W4MS-ZZP—R. M. W4ACB-PCN. W4BSJ was on vacation. W4BGA's crystal perks FB. W4BFD reports progress with c.c. W4QK is getting SW3. W4ASV has antenna trouble. W4CGQ is our newest ham. W4CFF is getting hum out of receiver. W4ZZAO is QRL NAS. W4UW will soon have W5NO perking. W4BPI raises K8 on CQ. W4AQY may move to South Fla. W4QR was a visitor to Pensy. W4ACB is QRL FNG Camp. W4AUW says 14 mc. is the stuff. W4AUV is on 3.5 mc. W4BOW's op license expired. W4BKD is in Chicago. W4CDE has FB MOPA. W4KB rules the 'phone roost. W4AQa wants higher power. W4VR is QRL ducoing panels. W4BKV is playing in orchestra regularly. W4AUA schedules W4PCN. W4MS is trying to get P.A. to perk. Mrs. W4MS takes a turn at key regularly.

Traffic: W4MS 9 AXP 3 BFD 5 AQY 8 KB 18.
GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS—SCM, Chas. V. Davis, W4PM—W4CFQ handled his traffic from Savannah Boy Scout camp at Parris Island, S. C. with W4ACQ in Savannah.

Traffic: W4CFQ 286 BWN 22 ATZ 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, Glen E. Talbutt, W5AUL—W5BII, C.R.M. W5BII leads in traffic. W5CCD runs close second. W5ARS has 8 schedules. W5AAD has nice traffic. W5ANU wants 7 mc. schedules. New ORS: W5IT, IA and ARV. W5CJ QSO'd a K6. W5AHC has QRM. W5BXY is c.c. W5AMK reports traffic. W5BCW notified 60 off-freq. stations this month. W5AJG is summing on 14 mc. W5CYU has '45 TNT. W5JA, DO and BEI report by radio. W5CPT has portable DNL. W5CPB's portable is DNT. W5BVF visited W9USA. W5BBQ has new commercial licenses. W5AUT had his appendix manicured. W5CDG reports for Sparks. W5PJ is OO'ing. W5QA worked 250 miles on 3.9 'phone with .8 watt. W5CAV wants ORS. W5BZT will have portable at C.C.C. Camp. W5AW will be on at T.N.G. camp. W5CHJ is building 14 mc. 'phone. W5AID has been to Canada. W5BKJ reports for Ennis. W5CBK, CCQ, DMQ, BKC, CTU and DAA are new reporters. New section bulletin is the "Nipper." Report each month and it will be mailed to you. Let's hear from more 'phone men.

Traffic: W5BII 262 CCD 258 AU 182 ARS 70 ANU 49 AAD 46 AVF 44 IA 39 CIJ 35 AHC 25 BXY 24 BKH 14 DAA 17 AMK-BCW-AJG 6 CYU 5 IT-JA 4 CPT 2 CTU-CPB 1.

OKLAHOMA — SCM, Emil Gisel, W5VQ — W5CEZ is Oklahoma's star trafficker. W5BDX is pluggin' away. W5CJZ rebuilt. W5CUX sends first report. W5BKK's license expired. W5CCA wants Panhandle traffic. W5AND worked VKs. W5BMT and AMC are active. W5BJV is c.c. W5BAR and DET have c.c. rigs. W5BOE changed QRA. W5AKX is new ORS. W5ATJ is on 7 mc. W5PP finds 14 mc. FB. W5AUA has 1st class radiotelephone ticket.

Traffic: W5CEZ 187 BDX 62 BMU 50 AMC 38 DET 33 CJZ 16 BKK 15 CUX 10 VQ 4 CCA 3 AND 2.

SOUTHERN TEXAS — SCM, D. H. Calk, W5BHO — W5OW schedules K5AA, W5BII and AUL. W5AUC bought AAI's transmitter. W5DEE and DAC are new calls. W5ABQ is going in for raising chickens. W5BNK has FB7-X, W3AWX and W5CHO are Cadets at Randolph Field. W5CQE worked a K6. W5CHM worked a ZL and 2 VKs. W5CNX works VKs. W5CAZ operates ABH. W5BZO has new receiver. W5BKE reports W8HHQ as visitor. W5MN schedules AUL and BII. W5YL schedules W9USA. W5ADZ reports from Monroe, La. W5BNJ reports traffic lag. W5BVG has 44 ft. towers. W5CWW sends first report. W5AFQ was on vacation. W5CTW reports for Austin. W5BB is in Maine. W5BXH is QRL BCLs. W5ATQ is trying 7 mc. W5BDA is c.c. W5DGG has new ticket. W5DCV is visiting hams. W5ACQ teaches Physics. W5KA is QRL. W5ARC is in school. W5AXY is "nertz" on 'phone. W5CT is "BLONDE Crazy." W5CTW is DXing. W5AFV is proud owner of WAC ticket. W5ANW will soon be on at new QTH. W5CVN and BWQ are rebuilding. W5CSV has new c.c. rig. W5BUB moved again. W5HTD is QRL new Op. The Houston Amateur Radio Club has a new home and call, W5DPA. W5QW is back. W5ON reports. W5BKW is building transmitter. W5RK and ARW are on 'phone. Applications wanted for appointment as Route Manager.

Traffic: W5OW 1466 YL 170 MN 41 BKE 11 ADZ 9 BNJ 6 CWW 5 ATQ 10 BDA 6 CTW 92 DAC 27 AFQ 3.

NEW MEXICO — SCM, Jerry Quinn, W5AUW — W5BNT is coming on with '03A. W5MP wants traffic. W5CGJ has SW3. W5AVE is new ORS. W5AAX has a new QRA. W5AUW and YF, W5CVG, have a new junior op.

Traffic: W5BNT 26 MP 9 CGJ 18 AUW 19 ZZQ 4 AVE 21.

CANADA

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — 1ER has three schedules. 1EX got O.O. card. 1CY wants to hear from N.B. gang interested in R.S.G.B. 1CW visited 'CV, 'BW and 'EA. 1AG has new 'phone. 1AX took unto himself a YF. The M.A.R.A. has been re-organized; regular monthly meetings at 1DH-DI, 21 Parker St., Halifax. Dope from Secy.-Treas., 1DH.

Traffic: VE1ER 43 Ex 7 CY 5 DQ 5.

ONTARIO DIVISION

ONTARIO — SCM, H. W. Bishop, VE3HB — 3LI, RK, PP have Port. at camp On-Da-Da-Waks. Weston boys held a hamfest at home of 3MN on his 21st birthday. 3LN, IB, OO and RL are at Mud Turtle Lake. 3JT is ORS applicant. 3MB and IM get out well. 9AL is fixing 3.5-mc. 'phone. 3DJ is finishing c.c. rig. 3NX worked W6 on 3.5 mc. 3MX is going on 28-mc. 'phone. 3GI is new ORS. 3GT is swinging back. 3AU put up new antenna. 3JI and Ottawa gang had FB picnic with Montreal outfit. 3JB got married. 3IR is installing c.c. 3.5-mc. 'phone. 3WJ is operating 3TJ, schooner, Ft. Hope, Hudsons Bay, with University of Michigan expedition. 3EP is in bed with bad knee. 3SH is playing with '46 osc. 3JV and SZ work DX. 3QY has had 338 QSOs since April. 3QB wants Toronto schedules. 3EA got SWL card from VK. 3JN moved to Midland. 3GX is working overtime at P.A. 3HN wishes to see YL at home. 3DD is relieved by 3CV at 9DY on account of sickness. 56 mc. enthusiasts: 3NO, YY, ZO, Vacationing: 3GL, KC, WX.

New hams: 3TB, SE, TD, OL. Fighting fires for OFB: 3LY, DX, RA, HA. 3KH's Dad operates 3GG. 3PD operates CHY for Hydro. 3RX is out of town with his rig. 3KN is QRL orchestra. 3XB has offered some fine prizes for winners of VE contest. 3AD and DW have been QRL fruit. 3DU is pounding away on VE contest. 3LW is rebuilding port. 3HB is QRMed by electric fan. 3QC pounds away in AM.

Traffic: VE3NO 55 AD 33 WX 36 GT 29 HB 25 MX 10 LI 16 JI-QB 13 IB 9 QY 8 HP-QC-RK 3 JI 2 SH-FA-TB-GI-LY-DJ 1. VE9AL 21.

QUEBEC DIVISION

QUEBEC — SCM, John C. Stadler, VE2AP — 2FG is trying traffic. 2GV has gone to Arctic. 2EE has new YL op. 2EA and HL are new hams. 2BB is building receivers. 2CO finally got that VK. 2DX is on 14-mc. 'phone. 2DM has c.c. 2BC is on from Rapide Blanc. Forty hams and YLs from Montreal and Ottawa attended picnic at Lacute. Congrats to 2GH for handling it so well. 2BO is building another boat. 2EH is on 1.7-mc. 'phone. 2EM has an understudy station at the country place. 2GC is trying to QRO. 2BE is getting new mast. 2AX has taken up 'phone.

Traffic: VE2CO 4 CA 5 FG 14 BB 36 CX 4 AP 3.

VANALTA DIVISION

ALBERTA — SCM, C. H. Harris, VE4HM — Ed-monton gang took part in FB hamfest at Vegreville. Leth-bridge boys also had real hamfest. 4AH and 4EA are experimenting plane to ground 56 mc. transmission. 4FR is remodeling superhet. 4BW is c.c. 4EC has gone north operating 4HL. 4EX is a YL! YF at 4HM, on vacation, left the OM to handle schedules. 4NB gets d.c. reports. 4FJ is moving to B.C. 4LX has good outfit. 4DQ is trying in 3XB contest. 4EO puts out dandy signal. 4BA is rebuilding c.c.

Traffic: VE4LX 43 MG 10 EO 8 FJ 5 HM 4 NB 3 BA-DQ 2.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — B.C.A.R.A. is talking of staging convention. 5BI worked Europe. 5BR did emergency work when Government Cables between Savary Island and Mainland went out. With assistance of 5BL daily schedules were kept on 1.7 mc. assisting government officials and police for period of a month while cable was replaced. Heard that 5HP fell in a bees nest! 5AL visited 5CT. 5IA is new station. 5FY is enjoying DX. 5HS is using 1920 receiver.

Traffic: VE5HJ 12 HU 11 EU 20 CH 45 BR 54 GS 61 AL 6 GI 41 AM 142 DH 368 EE 19 FF 43 AC 45.

PRAIRIE DIVISION

MANITOBA — SCM, Reg Strong, VE4GC — 4DJ worked 3 VK, 3 ZL, and 2 K6. MWEA welcomed a visit from 5JQ. 4IP heard K6 on 3.5 mc. 4HP is reducing power. 4FU is still vigilant. 4CP sticks to 7 mc. 4VC starts with FB signal. 4CS is working on '45s. 4NT is interested in 'phone. 4KU has fifty perking. 4NF is on vacation. 4BG, LT, FT, and KX are thinking of 1.7 mc. 4MY is at the Beach. 4CD will be on 'phone soon. 4FP, CI, MV and GC comprise local 1.7-mc. 'phone merry-go-round. 4LH is looking for higher power. 4DK holds out on 3.5 mc.

Traffic: VE4DJ 10 FP 7 IP 2 CI 14 GC 10.

SASKATCHEWAN — SCM, Wilfred Skafie, VE4EL — 4ND and BR have MOPAs. 4IL's station is IL. HI. 4CV comes through FB. 4DI gets out on 'phone. 4EM is preparing for fall. 4BF has an Assis. Op. 4EJ worked Chi. and Pacific with portable on 180v. 4MA is building 1.7-mc. 'phone. 4MB has nice sig. 4GR looks for traffic. 4CC helps 4IH, new ham, and had visit from 4KV. 4KR has ladder mast. 4EJ visited KB, BK, KV. 4AU reports reception poor. 4BB has trouble with c.c. osc. 4KA worked a ZL. 4EL and Regina gang QRL hamfest. 4MA and 4MN turn in first reports.

Traffic: VE4GR 36 BB 31 AT-MN 20 EL 17 AU 12 CC 5 FF 4 MA 1.



CORRESPONDENCE

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1933 Sweepstakes Contest

Bridgeport, Conn.

Editor, QST:

Every amateur operator on this continent has his own particular time for operating at his greatest enjoyment. Some can operate their stations whenever they please, others must reserve a certain time each week or month to do their operating. The latter must do their operating within these periods or go without.

The Sweepstakes Contest this year surpassed all former Sweepstakes in size and accomplishments.

Let us suppose that W9— is a busy business man who just loves to push the key but can do so only once a month, and this for only a week at a time, because of pressing matters of business. He would like the Sweepstakes to take place during "his" week so that he could shoot at the prize for his section.

If a vote were taken by all the expectant participants in the coming Sweepstakes Contest as to the time they would prefer it held, might we not strike a period of time wherein the majority of operators will be satisfied as to the date of the contest?

I don't think a vote has ever been taken in this respect for former Sweepstakes. I think that this idea would benefit hundreds of amateurs and it would certainly provide the date when the greatest number of operators could enter the All-Section Sweepstakes Contest of 1933.

— Chas. Alvin Taylor, W1DOY

Fellows who have preferences on this subject are invited to express them on QSL cards addressed to A.R.R.L. Communications Department, 38 LaSalle Road, West Hartford, Conn.

— Editor

Use the QSL Bureaus

Vatley, N.S.W., Australia

Editor, QST:

In the last American mail, I received a number of QSL cards. On two of these were added messages asking me to write local hams who had neglected to QSL, while another complained, "What's wrong with you chaps, don't you ever QSL?" In regard to the first, I happen to know two out of the three chaps mentioned have been off the air for two years. It costs us 30/- (about

\$7.50) a year for our amateur license and a lot of the boys have had to do without their hobby owing to present conditions, but that does not stop those parasites who use a fellow's call as soon as they know he is off the air. I have received cards from numerous hams whom I have never worked, some of them complaining bitterly about the time it takes me to QSL! . . .

In regard to cards, I have sent to W's, when they have not been sent direct they have always been sent to the District QSL Managers*, so perhaps a stamped, addressed envelope sent to the local QSL Manager would clear up a lot of the misunderstanding. . . .

On looking up my log I find I have worked 72 W stations in the last three months and so far I have 12 cards to prove it. So it is easily seen that the QSL problem is an international one.

Had I sent all my W cards away separately it would have cost me roughly \$3.50 in stamps alone — quite an item — but by making use of the QSL Bureaus it only amounts to a fraction of that cost.

The regular publication of the addresses of QSL Bureaus is the only solution applicable to all countries. . . . If local radio publications could be induced to publish or reprint this information it would be a great help to the ham who is willing to QSL but cannot, owing to lack of information.

— A. P. Reynolds, VK2AP

Rotten Relaying

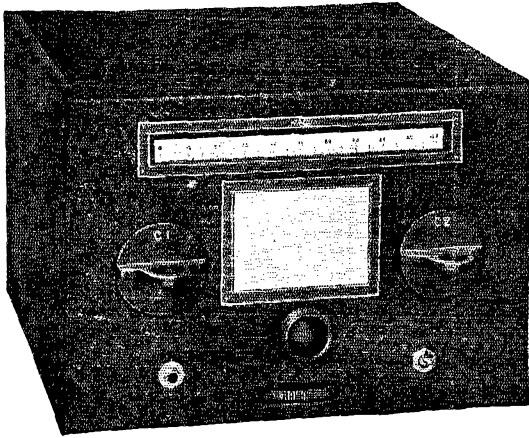
Highland Park, Mich.

Editor, QST:

Some time ago one of my family left for a visit to the west coast. Upon her departure, I thought of sending a radiogram to her friend telling of her leaving; thinking, of course, the message would arrive in plenty of time. So that night, I sat at the key determined to get that message off. First station raised was a W6 who, when asked to QSP said, "sorry but QRM too bad." Next was a W6 who said he was leaving the air. Soon after I raised three 9's who gave various excuses. . . . About that time, I began to get disgusted, so quit for the night.

(Continued on page 58)

* See page 34, August, 1933, QST, for complete list. Incidentally, amateurs outside the United States need not send their cards direct to District QSL Managers, but can send them direct to A.R.R.L. Headquarters for regular distribution. — Editor.



THE FB-7 AMATEUR RECEIVER

It is not merely to save room on the operating desk that the FB-7 has an external power supply, nor is it an accident that the FB-7 chassis is designed to accommodate a Single-Signal Unit. Many an amateur now operates his FB-7 with the same power supply he purchased for his first National Receiver, and many an FB-7 in use today will become an FB-X later.

For it is basic in National's policy to offer the amateur not only superlative products, but also a flexibility in design and a wholehearted cooperation in merchandising that will enable him to keep abreast of a rapidly developing art with the minimum of equipment obsolescence and expense.

NATIONAL COMPANY, INC., MALDEN, MASS.



NEW . . .

A complete line of Graphite Anode Tubes by

Sylvania

REG. U.S. PAT. OFF.

Hygrade Sylvania Corporation, through its newly established Electronics Department, is now in production on a complete new line of transmitting tubes which are revolutionary in design. They employ the new graphite anode structure conceived and perfected by the engineering organization of Hygrade Sylvania Corp. To the many inherent good features of the Sylvania line, the graphite anode adds the following major advantages:

1. High plate dissipation without overheating. This is a direct result of the high thermal emissivity of graphite.
2. Lower operating temperature at the anode. This results in a lower operating temperature of the other electrodes, thereby preventing secondary and primary emission from the grid.
3. Uniformity of characteristics. The physical properties of graphite permit exact processing. Graphite does not warp under high temperatures and the mechanical dimensions of the anode remain constant. Proper relation between tube elements retained in this manner, preserve the normal electrical characteristics of the tube.
4. Long life. Comparative freedom from gas is another important effect of the graphite anode and the high vacuum obtainable results in longer tube life.

A process developed in the Electronics Laboratory of Hygrade Sylvania Corporation enables us to treat carbon in such a manner that it is reduced to pure graphite with all amorphous carbon and other impurities removed.

Early this year Hygrade Sylvania Corp. established a separate new plant in Clifton, N. J., for the design and production of radio transmitters, transmitting tubes, industrial power tubes, and custom-built electronic devices. This plant contains most modern research and manufacturing facilities. Unhampered by obsolete dies, processes and routine, Hygrade Sylvania has been able to go exclusively now to this revolutionary new design.



Hygrade Sylvania Corporation



Hygrade Lamps

ELECTRONICS DEPARTMENT

Sylvania Tubes

CLIFTON

NEW JERSEY

SALEM, MASS.

EMPORIUM, PA.

FACTORIES

ST. MARYS, PA.

CLIFTON, N. J.

NEW . . .

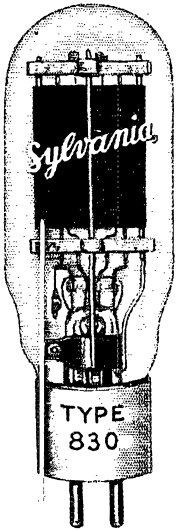
A 40-Watter — the 830 — by

Sylvania

REG. U.S. PAT OFF

With Graphite Anode Structure **\$12.50**

Just the tube for that new 40, 20 or 10 meter transmitter. This is the tube, in between the 210 and the 50-watter, that you've been waiting for all the years. And it goes in a standard UX socket.



CHARACTERISTICS of the TYPE 830

Filament Voltage.....10.0 V rms
 Filament Current..... 2.15 Amps.
 Maximum Overall Length.....5 7/8"

Maximum Diameter.....2 1/16"
 Bulb.....T16-26X
 Base.....Medium 4 pin Isolantite

CLASS "A" SERVICE

Maximum Operating Plate Voltage 450 V
 Maximum Plate Dissipation..... 17 Watts

OPERATING CONDITIONS

Plate Voltage.....	250	350	425
Grid Voltage.....	-15.0	-26	-35
Load Resistance.....	9300	8800	8000
Amplification Factor...	8.0	8.0	8.0
Plate Resistance.....	4600	4250	4000
Mutual Conductance...	1750	1900	2000
Plate Current.....	15.0	17.5	20.0
Undistorted Power Output, Watts.....	.35	1.1	2.0

CLASS "B" R. F. SERVICE

Maximum Operating Plate Voltage.....750 V
 Maximum D.C. Plate Current..... 60 Ma.
 Maximum R.F. Grid Current..... 6 Amps.

OPERATING CONDITIONS

Plate Voltage..... 600 V
 Grid Voltage, Neg..... 70 V
 Power Output (Peak at 100% Mod.) 12 Watts

CLASS "C" SERVICE

Maximum Operating Plate Voltage (Modulated).....750 V
 Maximum D.C. Plate Current.....110 Ma.
 Maximum D.C. Grid Current..... 18 Ma.
 Maximum R.F. Grid Current..... 6 Amps.

OPERATING CONDITIONS

Plate Voltage..... 750 V
 Grid Voltage, Neg. 180 V
 Power Output..... 55 Watts

DIRECT INTERELECTRODE CAPACITANCES

C_{gP}.....9.9 mmf
 C_{gk}.....4.9 mmf
 C_{pk}.....2.2 mmf

See your dealer. If he cannot supply you send your order direct to us



Hygrade Sylvania Corporation



Hygrade Lamps

ELECTRONICS DEPARTMENT

Sylvania Tubes

CLIFTON

FACTORIES

NEW JERSEY

SALEM, MASS.

EMPORIUM, PA.

ST. MARYS, PA.

CLIFTON, N. J.

Q S T BINDERS KEEP THEM SAFE

For seventeen years, *QST* has published the current history of Amateur Radio. A file of *QSTs* is the world's most complete record of the development of short-wave radio communication. *QSTs* of several years ago are fascinating reading today. *QSTs* of today will be fascinating reading in years to come. Don't let your files get scattered. As time goes on they will acquire more and more sentimental and intrinsic value. It is easy to keep your current files of *QST* complete — to replace lost copies in the future may be impossible. Many old issues of *QST* bring high prices today. This will be just as true of today's issues in future years. In order that devotees to the art may keep their *QSTs* — protect them against loss or damage — the League buys special binders. They are offered to readers of *QST* at a modest cost. Each binder accommodates twelve issues of *QST* and the index. The binders are sturdy, cloth covered, deep maroon in color, excellent in appearance and cleverly designed to take each issue as it is received and hold it firmly without mutilation. Don't delay. Order today a binder for your 1933 copies — and enough binders to accommodate the file of *QSTs* which you have already accumulated.

\$1.50 Each — Postpaid Anywhere

**THE AMERICAN RADIO
RELAY LEAGUE, INC.**
WEST HARTFORD CONNECTICUT

58 Wir bitten darum, sich auf *QST* zu berufen — Sie weisen sich dadurch aus und unterstützen dadurch gleichzeitig *QST*

Rotten Relaying

(Continued from page 54)

Next day I gave the message to a friend near by who was working 14 mc. He tried for two days to get it off and got two of the best replies I ever heard. One was, "sorry oh but never have handled a msg and don't want to break my record of four years standing." The other, after hearing the message was important said, "Why don't you send it by wire where important messages belong"? The fourth day we gave it to a high-powered local but don't know yet what sort of luck he had. At any rate, the party arrived over a month ago and the message will probably get there next month, if at all.

Now what kind of a game is this, fellows? Are we just playing like kids or are we trying to make something of ham radio? At times this traffic handling seems to be a joke but it doesn't have to be if we take it seriously enough.

— C. R. Funk, W8GWA

Strays

W6HG with his 210 on 40 meters was heard by PL-423 in Poland on the same morning that he received an R8 report from J2CL. It is interesting to speculate on the possible paths taken by the signal to reach Poland, especially considering the time of day. A globe shows a whole lot more than a map.

If that two-year-old 7-mc. crystal hasn't the sock it once had, borrow a reading glass and examine the edges for nicks. The output of some 7-mc. plates is considerably reduced by nicks too small to be observed without magnification unless you have unusually sharp eyes. This effect is noticeable to a lesser extent on 3.5-mc. plates if X cut; rough edges have no apparent effect on the operation of Y-cut plates. However, the majority of 7-mc. crystals are X cut and the 7-mc plates are the ones affected the most. Refinishing the edges is a simple job and oftentimes will double the output.

— W6BCX

Fond Memories Dept.

An author in the 'steemed *Satevepost* describes a dentist making an X-ray: "He put the plate in her mouth and focused the cone. The rich, salty smell of static filled the office."

Rich and salty, eh? Well, you can have your salted static as likes it that way. For us nothing will ever take the place of good old fried electrons, with.

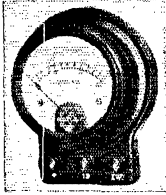
Results of the Fifth International Relay Competition will appear in October *QST*. Final check-ups have been made and the material is being prepared for the printer as this issue goes to press. The scores of approximately 1000 stations will be listed in the results!

Fall and the New Deal are with Us

Offers a wide variety of apparatus at Special Prices. Buy NOW and Save



Jewell Meters



Brand new, of course, with regular factory guarantee. At these sensational prices, quick action is imperative, as the quantity is limited. Portable models.

Pat. 57 — 0-12 v. — 0-120v. D.C.	} \$2.95
Pat. 57 — 0-7.5 v. — 0-150v. D.C.	
List price \$12.50. Special	
Pat. 57 Dual range 40 amp. 50v.	} \$4.50
List \$15. Special	
Pat. 77 — 0-150v. A.C.	} \$12 list Special
Pat. 77 — 0-5 amp. A.C.	
Pat. 77 — 3 range 0-3v. — 0-15v. — 0-150v. List \$15. Spec. . . .	\$5.50
Pat. 77 — 0-50v. List \$10. Spec. . . .	\$2.50
Pat. 140 — D.C. flush mount; flange 2 5/8" dia. case 2" dia. 7.5v. — 150v. 75 ohm per v. List \$9.50. Spec. . . .	\$1.95

GORDOS TRANSMITTING TUBES

Regular guarantee

203-A Carbon plate. \$13.50
852 Carbon plate. \$17.50
866 Heavy duty. \$2.45

COLLINS TRANSMITTERS

Another popular line added to our stock. Write us for information and bulletin.

DEFOREST

503-A 511 and 545 tubes, now manufactured under R.C.A. supervision; each. \$15

Navy Type Telegraph Key

List \$3.60 Navy knob — 3/8" tungsten contacts. The balance. \$1.25
with Regular Knob. \$1.10

FEDERAL F-108-A — 175 watt tube, ideal for ultra high frequency use. \$34.50

Bulletin on request

Why risk a suspension for a poor note, or off frequency operation? Go modern with a Grammer Crystal Unit. The cost is low and you are sure of having a 1933 signal.

Oscillator or doubler kit. \$12.75
Power Amplifier kit. 7.50
Power supply kit. 6.00

KENYON SPECIALS

Quality mounted uncased units.

Double button mike trans. \$.85
Push pull input. \$.75
Push pull output 245 or 250 plates to 500 ohm line and 15 ohm voice coil. \$.85
Power transformers 750 v. c.t. at 100 M.A. 2 1/2 v. 4 amp. — 2 1/2 v. 12 amp. 5v. 2 amp. \$1.75
KR-5. 1100v. c.t. — 150 M.A. 2-7 1/2 v. 2 1/2 v. 12 amp; 1 1/2 v. 6 amp. \$3.75

We can still supply filament transformers as advertised in previous issues. Everything in Kenyon always on hand.

Western Electric Tubes

Limited quantity brand new, in original cartons. — 20S-D; 205-E; \$2.45
102-G; Special each.

Universal Microphones

and stands at lowest prices.

Model W lapel single button. \$1.75
Model X double button. 5.88
Model X single button. 4.41
Model BB. 14.70
Model X desk stand. 2.05
Special floor stand nickel plated 5.88
Suspension Springs. 8 for. 25c
All other Universal products reduced to above proportions

LEEDS Hard Drawn Solid Copper Enamel Antenna Wire

No. 14 — 100 ft. \$.40
No. 12 — 100 ft. \$.55
No. 10 — 100 ft. \$.95
No. 8 — 100 ft. \$1.40
in lengths 10 to 1000' — size and quantity guar.

Soft Drawn Copper Tubing

3/8" per foot. \$.02 1/4 3/4" per foot. \$.04
3/16" per foot. \$.03 any length

Bruno Velocity Microphone Kit

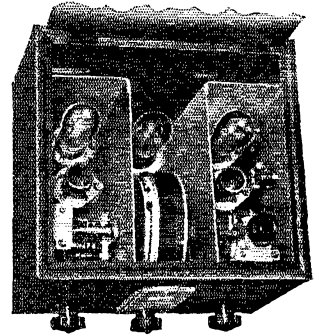
Frequency response 30 to 14000 cycles. Substantially free from resonance peak. Easy to assemble, not critical in \$5.88 adjustments. Special.
Condenser Microphone Kit. \$2.94

TUNE IN ON TEN!

with the

NATIONAL HFC

28 MC CONVERTER 56 MC



Band spread, single dial control, may be used with any good BCL receiver. W2AOE recommends this combination for best results above 14 MC. NATIONAL HFC with 28 & 56 MC amateur band coils. \$23.70

LEEDS SPECIAL TRF 6 tube BCL receiver designed especially for use with the HFC; with beat oscillator for CW. Complete in cabinet with tubes, phone jack, dy- \$16.50 namic speaker.

The SW-3, T R F ham receiver available in three models. 2 1/2 v. A.C. tubes } \$14.42
6v. A.C. — D.C. }
2v. dry cell

Amateur band spread coils. \$2.79
National FB 7A. \$31.16
National FB XA. \$42.92
All coil ranges. \$5.88

Leeds 5 and 10 M. Super Regenerator, described in Aug. issue. Without cabinet, \$9.85. With cabinet. \$10.85

GENERAL RADIO SPECIALS

247-K — .00025 var. condenser. \$.75
247-M — .00025 var. condenser with vernier. \$.95
374-N — S. L. F. .00035 metal end plates. \$1.25
277 coil forms \$.25 each; 3 for. \$.65

We can still supply the chokes, filters, condensers and bleeder resistors as advertised last month.

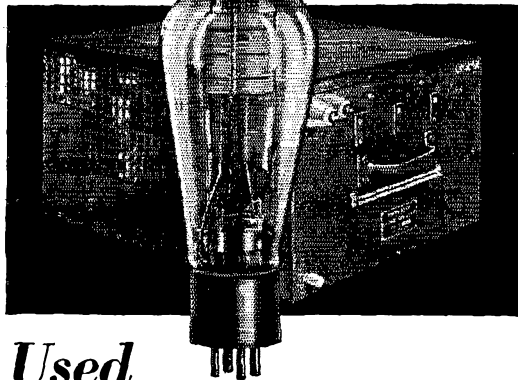
The New Deal applies to business too. We always sell at the lowest prices consistent with good business practice. We cannot guarantee to maintain these prices in the face of rapidly increasing costs of basic and manufactured products. Order Early and SAVE.



45 Vesey Street, New York City
New York Headquarters for Transmitting Apparatus

We do not publish a catalog; quotations on all short wave equipment furnished by return mail. 10% deposit required with all C O D orders.

Three 282A's are used in the 13A Airplane Radio Telephone Transmitter shown below



Used with the flying telephone

Western Electric's new 282A screen grid transmitting tube was designed to meet rigid specifications of flying equipment: compactness, mechanical strength, operating dependability under varying conditions of atmospheric pressure and power supply. It is ideal for amateurs' use — covering their entire frequency range.

Hard glass is used so that high energy dissipation and wide frequency range operation may be had without sacrifice of life. Terminal arrangement insures adequate insulation under all conditions. Low internal impedance and adequate emission from thoriated tungsten filament make possible higher power output at comparatively low plate voltages.

The screen grid eliminates delicate adjustments in changing operating frequencies. Complete modulation may be accomplished with relatively low audio power by varying screen grid bias.

Filament Voltage.....	10
Filament Current, Amperes.....	.3
Average Plate Resistance, Ohms.....	70,000
Average Mutual Conductance, micromhos.....	1,430
Average Amplification Factor.....	100
Approximate Direct Interelectrode Capacities:	
Plate to Control Grid.....	0.2 Mmf.
Plate to Filament and Screen Grid.....	6.8 Mmf.
Control Grid to Filament and Screen Grid.....	12.2 Mmf.
Maximum Plate Voltage, D. C.....	1,000
Maximum Plate Current, D. C., Amperes.....	0.100
Maximum Plate Dissipation, Watts.....	.70
Maximum Screen Grid Potential, Volts.....	250
Maximum Screen Grid Dissipation, Watts.....	.5
Maximum Overall Length.....	6-15/16"
Maximum Diameter.....	2-7/16"

For booklet describing this and 25 other Western Electric tubes for amateur use, write to Graybar Electric Co., Graybar Building, New York, N. Y.

Western Electric

RADIO TELEPHONE BROADCASTING EQUIPMENT

Distributed by **GRAYBAR Electric Co.**

I. A. R. U. News

(Continued from page 40)

teurs, write us giving any other information which might prove useful.

Special:

We give mention this month to "QSO," the official organ of the Reseau Belge. Appearing monthly, each issue contains sixteen large pages, well printed, with an attractive cream-colored cover. The subjects treated range from quite advanced technical information on current amateur practice to personal items, cartoons, and district notes. The President's Corner usually contains items of interest to international amateurs. The magazine is printed in French. The annual foreign membership of the Reseau Belge, which includes a subscription to "QSO," is 10 belgas, or about \$2.00 at current rates of exchange. The address is 33 rue Alphonse Renard, Bruxelles, Belgium.

Ten-Meter Band Still Holding Up

(Continued from page 32)

to send a QSL card to the station heard, as well as reporting this reception to the Experimenters' Section, QST.

And still no signals have been reported from the west coast to any part of the U. S., and we are not certain that many stations are active in that part of the country. If this is the case we should certainly like to suggest that this is ideal experimental stamping ground for the W6 or W7 who has tired of fleetly QSOs on our popular bands for he will find 28 mc. to hold charm that other bands do not possess.

A report from W9FFQ just received mentions reception of W6CBQ with strength of R7 at 1:15 p.m. C.S.T. on July 26th.

NEW HIGH FREQUENCY TUBES

Tubes which are between the "50-watter" and the 10 are being developed by several manufacturers. These tubes are essentially high-frequency tubes and will undoubtedly be about on the market when this issue of QST hits the field. The RK-18 which is the Raytheon addition is described elsewhere in QST and samples have been used at W1DF and W1SZ.

— C.C.R.

Plate Supplies to Conform to the New Regulations

(Continued from page 13)

should all have equal capacities so the voltage will divide evenly across all units in the string. A further safety precaution is to shunt each one with a 500,000-ohm resistor, as shown in Fig. 3, to help out on equalizing voltages. The 1-watt



As Fixed as the NORTH STAR

is the unswerving
dependability of

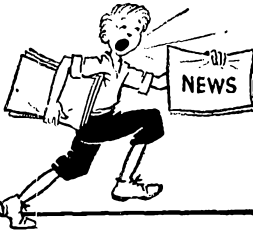
CARDWELLS

PUT the same faith in Cardwell Condensers that the navigator has in the North Star, for that faith will always be well founded.

The name **CARDWELL** never has stood, and never will stand, for anything less than the Finest.

The roll of **CARDWELL** users contains many names inseparably associated with notable achievements—famous Amateurs, scientists, explorers, communication companies, noted manufacturers, the Army, Navy, Signal Corps and Coast Guard—a distinguished company, by whose example you may profitably be guided.

*Any reliable supplier should cooperate with you to enable you to get what you want. He can get **CARDWELLS** for you if he does not keep them in stock. Get what you want—insist on **CARDWELLS**. Order direct from us if your dealer will not supply you, or let us tell you where you may buy.*



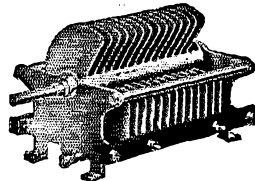
Is it News to you that **CARDWELL**

satisfactorily completed one of the largest peace-time contracts awarded by the U.S. Government for radio equipment? A Manufacturing Service known for its thoroughness* and attention to detail insured successful and on-time completion of this work.

Have you a designing or manufacturing problem? Put it up to **CARDWELL**—

*Expert welders of aluminum and duralumin, sheet metal specialists and a fine sandblasting equipment—all at your service—contributed in no small measure to meeting the exacting standards of the Government.

CARDWELL MIDWAY "FEATHERWEIGHT" CONDENSERS, RECEIVING and TRANSMITTING
CARDWELL "STANDARD" MODELS FOR RECEIVERS and MEDIUM POWER TRANSMITTERS
CARDWELL 16-B TRANSMITTING CONDENSERS FOR LARGER TRANSMITTERS
CARDWELL HIGH VOLTAGE CONDENSERS FOR COMMERCIAL RADIO-TELEGRAPH and BROADCASTING STATIONS
CARDWELL S-2944 OIL DIELECTRIC FIXED CONDENSERS FOR HIGH FREQUENCY FURNACES and TUBE BOMBARDERS
THERE'S A CARDWELL FOR EVERY TUBE, PURPOSE and POCKETBOOK



The **ALLEN D. CARDWELL MFG. CORP'N.**
 83 Prospect Street, Brooklyn, N. Y.

"THE STANDARD OF COMPARISON"

HIRAM PERCY MAXIM

(President of A.R.R.L.)

HAS WRITTEN a fascinating new book that every radio amateur ought to have. It's called "Life's Place in the Cosmos" but don't let that worry you—it's right down the ham's alley. First you're interested in it because H. P. M. wrote it and you'd like to know what he thinks about. He does think, and he can write most entertainingly about it. But primarily you want this book because its contents will immensely intrigue any radio amateur. It deals, in simple understandable English, with those cosmic facts which are the raw stuff behind radio communication. Anybody has the right to run away from this book if he suspects it is some fanciful rubbish on the cosmic significance of life, or something of that sort. But it isn't—it's about the cosmos and what makes it tick. It isn't a textbook, either—it's a lively readable human narrative of the facts and fancies of man's newer knowledge, in the sort of philosophizing that all of us like to do. H. P. M. gives you the newer science in a way you'll like and understand; he takes up the case of our different planets in turn and analyzes the possibility of life's existence there and the chances for QSO by ham radio; with the new astronomy he takes you to distant star clusters and spiral nebulae and explains the unbelievable workings of the cosmos of island universes—where we came from, why we're here, what's going on around us—and all of it in the language of a practical amateur. With the interest you have, as a radio amateur, in the world of physics, we know that you'll never regret the purchase of Mr. Maxim's new book.

Profusely illustrated with some of the best astronomical photographs ever taken

\$2.50

POSTPAID ANYWHERE

EDWIN VALENTINE MITCHELL, Inc.
AUTHORIZED DISTRIBUTOR to the RADIO AMATEUR
29 Lewis Street Hartford, Conn.

pigtail resistors should be big enough. Those who prefer to wind their own chokes will find plenty of data in *The Radio Amateur's Handbook*.

It doesn't look like such a tough proposition to get an adequate filter. The fellows whose transmitters now comply with the old regulations will not find the new regs a very great hardship, because they already have a low-power end that can go on the air if rectifiers and filters for the high-power stages cannot be installed immediately. The ones that need to be toned down a bit are those birds with very raw a.c. and so-called r.a.c. on self-excited transmitters that wander all over the map, in defiance of regulations that have been in existence a long time.

Southeastern Division Convention

(Continued from page 10)

of the Birmingham Amateur Radio Club. The best of cooperation is being given to make this convention one of the outstanding affairs and your support by attending is asked. Good talks, entertainment and good fellowship are guaranteed. The fee is \$3.00 with special rates for the ladies. Write S. Jeff Bayne, RFD 9, Box 124, Birmingham, Ala.

Standard Frequency Transmissions

Date	Schedule	Station	Date	Schedule	Station
Sept. 1	B	W9XAN		A	W6XX
	A	W6XX	Oct. 4	B	W1XP
Sept. 6	B	W1XP		BB	W9XAN
	BB	W9XAN	Oct. 6	BB	W6XX
Sept. 8	BB	W6XX		A	W9XAN
	A	W9XAN	Oct. 7	HX	W6XX
Sept. 9	BX	W6XX	Oct. 8	C	W6XX
Sept. 10	C	W6XX	Oct. 13	A	W6XX
Sept. 15	A	W6XX	Oct. 15	C	W1XP
Sept. 17	C	W1XP	Oct. 18	A	W1XP
Sept. 20	A	W1XP	Oct. 20	B	W9XAN
Sept. 22	B	W9XAN		B	W6XX
	B	W6XX	Oct. 25	BB	W1XP
Sept. 27	BB	W1XP		C	W9XAN
	C	W9XAN	Oct. 27	B	W9XAN
Sept. 29	B	W9XAN		A	W6XX

STANDARD FREQUENCY SCHEDULES

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

Time (a.m.) Sched. & Freq. (kc.)
BX

6:00	7000
6:08	7100
6:16	7200
6:24	7300

The time specified in the schedules is local standard time at the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XX, Pacific Standard Time.

TRANSMITTING PROCEDURE

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

PURE DC



EVERY INCH A BATTERY

NATIONAL CARBON COMPANY, INC.

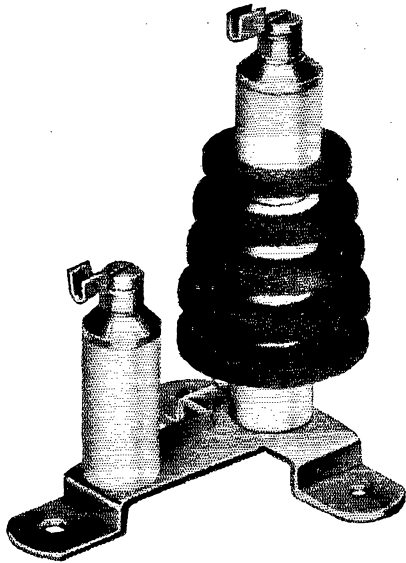
GENERAL OFFICES: NEW YORK, N. Y.

UNIT OF UNION CARBIDE **UCC** AND CARBON CORPORATION

Say You Saw It in QST — It Identifies You and Helps QST



RADIO FREQUENCY CHOKES

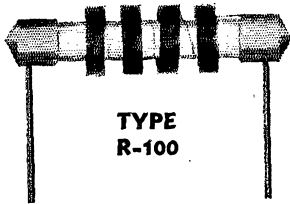


TYPE R-152

An Isolantite-mounted choke for medium- and high-power transmitters, with a continuous universal winding divided in five tapered sections. Metal base for mounting, insulated for 10,000 volts.

Inductance.....	4 m.h.
Distributed Capacity.....	1 mmf.
D.C. Resistance.....	10 ohms
Continuous Current Rating.....	.6 amps.
Intermittent Current Rating.....	.8 amps.
List Price.....	\$.25

(Less usual Trade Discount)



TYPE R-100

An Isolantite-mounted choke for H.F. receivers and low-power transmitters, with a continuous winding divided in four universal-wound sections. For pigtail connection or standard resistor mountings.

Inductance.....	2½ m.h.
Distributed Capacity.....	1 mmf.
D.C. Resistance.....	50 ohms
Current Rating.....	125 mils.
List Price.....	\$.75

(Less usual Trade Discount)

NATIONAL COMPANY INC.

61 Sherman Street

Malden, Mass.



2 minutes — QST QST QST de (station call letters).
 3 minutes — Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of WIXP is "G"; that of W9XAN is "O"; and that of W6XK is "M."
 1 minute — Statement of frequency in kilocycles and announcement of next frequency.
 2 minutes — Time allowed to change to next frequency.
 WIXP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Henry G. Houghton in charge.
 W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.
 W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

WWV 5000-Kc. Transmission

The 5000-kc. transmissions of the Bureau of Standards' station, WWV, are given every Tuesday continuously from 12:00 noon to 2:00 p.m., and from 10:00 p.m. to midnight, E.S.T. The accuracy of these transmissions is to better than 1 cycle (one in five million).

— J. J. L.

West Gulf Division Convention

Hotel Hilton, San Angelo, Texas, October 13th and 14th

THE San Angelo Radio Club extends a cordial invitation to all amateurs to attend the Seventh Annual West Gulf Division Convention. A fine program is being prepared with plenty of entertainment for every one.

Further information may be obtained from Ray M. Samberson, Chairman, P.O. Box 153, San Angelo, Tex.

Amateur Radio at the National Soaring Meet

(Continued from page 32)

ity of flea-powered ultra-high-frequency sets for communication of this type (by directing sailplanes flying in formation, for instance). The lack of any prolonged or long-distance soaring prevented full exploitation of the sailplane as the ideal ultra-high frequency station location for DX work. We had to content ourselves with duplex communication over distances up to 8 miles — the greatest DX flown by one of the radio-equipped ships. At the next meet, though, we amateurs will be there with a bunch of distance records all ready to be pegged up.

— R. A. H.

Experimenters' Section

(Continued from page 37)

Now, the trick is to make them equal. If R is 250,000 ohms and C is 0.5 μ d., CR is .125, and if C_1 is .06 μ d. and R_1 2 megohms, C_1R_1 is also about .125, and you can use as big a decoupling resistance as other considerations will allow, without getting boominess or motorboating.

Decoupling circuits are likely to cause undue low-frequency gain in choke- or transformer-coupled circuits unless something else causes a loss of low-frequency gain at the same time.

— H. S. Gowan, VE3MQ, Stratford, Ont.

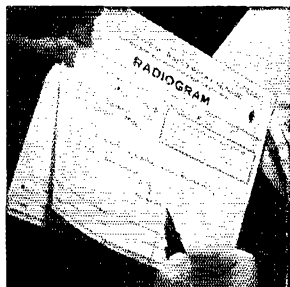
SIGNS of an EFFICIENT STATION

LOG BOOK



Log Books. Bound with heavy paper covers. $8\frac{1}{2} \times 10\frac{3}{4}$. Contains 39 log pages, and same number of blank pages for miscellaneous notes. Also list of Q sigs, message number sheet and sheet of cross-section paper. 40c each or 3 for \$1.00. Postpaid.

MESSAGE BLANKS



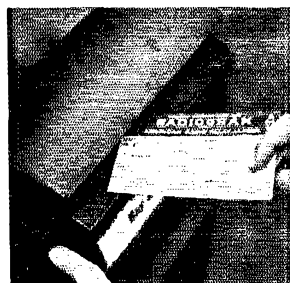
Message Blanks. Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size $8\frac{1}{2} \times 7\frac{1}{4}$. Put up in pads of 100 sheets. One pad postpaid for 35c or 3 pads for \$1.00.

STATIONERY



A.R.R.L. Letterheads. Write your radio letters on League stationery — it identifies you. Lithographed on $8\frac{1}{2} \times 11$ heavy bond paper. Postpaid. 100 sheets, 50c; 250 sheets, \$1.00; 500 sheets, \$1.75.

MESSAGE DELIVERY CARDS



Message Delivery Cards. Neatest, simplest way to deliver a message to a near-by town. On U. S. stamped postals 2c each. On plain cards (for Canada, etc.) 1c each postpaid.

THE AMERICAN RADIO RELAY LEAGUE—WEST HARTFORD, CONN.

To Our Readers who are not A.R.R.L. members

YOU should become a member of the League! That you are interested in amateur radio is shown by your reading of *QST*. From it 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 the page opposite the editorial page of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have *QST* delivered at your door each month. A convenient application form is printed below — clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership

AMERICAN RADIO RELAY LEAGUE
West Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose \$2.50 (\$3.00 outside of the United States and its Possessions, and Canada) in payment of one year's dues, \$1.25 of which is for a subscription to *QST* for the same period. Please begin my subscription with the issue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....

.....

.....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST*?

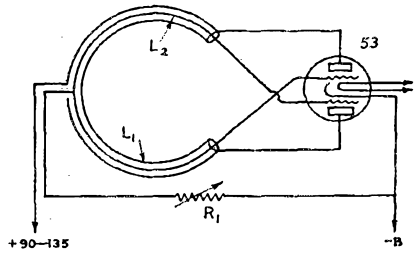
.....

Thanks

Super-Regeneration?

The inveterate experimenter of experimenters, John L. Reinartz, has been working recently with an unusual type of receiver which might be called for the moment "super-regenerative" but which uses a "squegging" or squealing ultra-high frequency oscillator to supply the interruption frequency. The feature of particular interest in the receiver is its apparent ability to give well-defined amplification of c.w. signals in marked contrast to the usual super-regenerator which operates satisfactorily only on modulated signals.

The Reinartz lay-out consists of a normal autodyne receiver fitted, as it happens, with a screen-grid detector and pentode audio amplifier. The interruption frequency unit comprises a Type 53 tube arranged as a unity-coupled ultra-high frequency oscillator operating in the vicinity



THE ULTRA-HIGH FREQUENCY OSCILLATOR
CIRCUIT USED BY REINARTZ

L_1 — 2 turns 2" diameter of $\frac{1}{8}$ " copper tubing.
 L_2 — Grid coil threaded inside L_1 .
 R_1 — 500,000-ohm variable resistor.
No tank tuning condenser is used.

of 56 mc. The grid-leak of this oscillator is made variable and, in operation, is increased in value to the point where the oscillator "squeals." This condition can be checked by listening to the oscillator with a normal 56-mc. super-regenerative receiver, in which case the output is revealed as a conglomeration of audio beats and "hash."

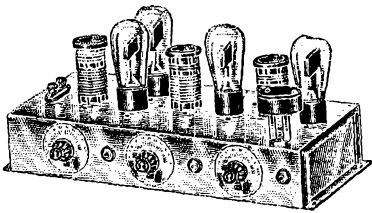
Coupling between this "squegging" oscillator and the receiver is obtained in Reinartz's experimental rig merely by feeding oscillator and receiver from the same power supplies and by placing the oscillator on the table in the immediate vicinity of the receiver. Careful orientation of the oscillator tank coil with respect to the receiver grid coil usually is necessary.

The regenerative receiver is adjusted so that "quiet" oscillation is obtained at maximum setting of the regeneration control. Upon application of the output of the ultra-high frequency oscillator, regeneration in the receiver appears to be increased, full-throated squealing then being possible at maximum regeneration setting. Below this squealing point is where Reinartz then operates the set, obtaining, in the process, considerable amplification of c.w. signals. To date, experiment on the receiver has not been carried to the point where its operation is fully understood. We suggest the idea, however, as one of undoubted interest to the advanced worker.

— R. A. H.

TYPICAL GROSS VALUES!!

THE NEW "20-W JR." Crystal Controlled Transmitter Kit, \$10.95



This efficient little transmitter is very low priced, making it possible for anyone to use crystal control at less than it would cost you to get the parts together for a self excited rig of this type. The "20-W Jr." is simple to wire and get on the air and the most inexperienced operator will have success with it. The size of the transmitter is only 6" x 17" and is therefore suitable for portable use. Only one millimeter is required for tuning the transmitter and jacks are provided for this purpose, for each stage. The plug-in crystal holder is supplied with the kit at no additional cost. The "20-W Jr." uses one '47 as crystal oscillator, one '46 as buffer or doubler and two '46's in the amplifier. One set of three coils is supplied with the kit for either 20, 40, or 80 meters, 50 cents extra for the set of 160 meter coils. When ordering mention your choice of coils.

80 or 160 meter X cut crystals supplied for only \$2.75 if purchased with the "20-W Jr." kit. Hoyt millimeter if purchased with the kit, only \$1.25.

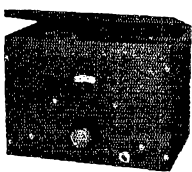
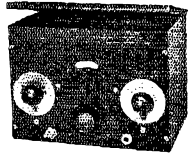
Power Supply Kit, \$6.95.

The "EAGLE" Three-Tube Short Wave Receiver

Only finest material used thruout — employs one '32 R.F., one '32 Detector and one '33 Pentode Audio — 15 to 200 meters — four coils supplied. The "Eagle" is economical — two dry cells will operate the filaments. See March or April QST for full description on this most excellent value in short wave receivers.

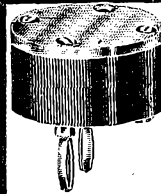
"Eagle" Completely Wired and Tested... **\$10.95**

Three Tubes Tested in Your Receiver.... **\$3.00**



MONITOR USES FULL SIZE DRY CELLS

A real advantage for continuous monitoring. Again Jerry must say this is SOME job. Has back of panel vernier dial shielded in black crystalline finish cabinet with hinged cover, complete with three plug-in coils for 20, 40 and 80 meters, all batteries and tube, wired and tested... **\$9.95**



The Perfect Crystal Holder only \$1.00

A commercial type crystal holder for half the price you have to pay for ordinary holders. New type pressure spring, square inside to prevent movement of crystal, one piece molded body — dustproof — will take crystals up to 1 1/4" square or round. Plugs standard 3/8" spacing. This holder must be seen to be appreciated for the extraordinary value offered.

Gross Special Power Transformer
for use with '33 tube will give an output of 500 volts D.C. at 350 MA with choke input. Run your entire R.F. and Class B off this transformer. The regulation for the Class B is about 5%, filaments are two 7 1/2 v. and one 5 v. **Special... \$5.75**
A transformer having the same filament windings as above — at 300 MA having 750 volts each side of C. T. **Special... \$6.00**
750-1000 V. each side of C.T. 300 watts. **Extraspecial... \$6.80**
1000-1500 V. each side C.T. 300 MA **8.50**
2.5 V. 6 amp. C. T. (midget) **.80**
5 V. 3 amp. C. T. for '33 (midget) **.40**
2 1/2 — 2 1/2 and 5 Volt C.T. **1.25**
2 1/2 — 7 1/2 and 7 1/2 Volt C.T. **1.45**
2 1/2 — 5 and 7 1/2 Volt C.T. **1.45**
5 — 3 and 5 Volt C.T. **1.45**
5 — 7 1/2 and 7 1/2 Volt C.T. **1.45**
Thord. 30 H 7.5 MA. **.60**
Thord. 15 H 250 MA. **2.95**
Thord. No. T-2458 double 18 H 250 MA. **6.50**
500 H. plate chokes for Screen Grid detectors (cased). **.95**
Gross case 30 H 200 MA choke. **1.95**

High Grade filament transformers shielded in metal cases, center tapped secondaries.
2.5 volt 10 amperes for 866's... **\$2.50**
10 to 12 volts at 8 amperes... **2.50**
Special 10-12 Volt 7.5 ampere filament transformer, extra special... **1.10**
Oil Impregnated cased condensers 1400 Volt D.C. 2-2mfd... **1.85**

Ward Leonard Vitreous Resistors 200-Watt 8 1/2" Long with Variable Sliders.
1000 ohms... **\$9.99**
2500 ohms... **1.05**
5000 ohms... **1.05**
10000 ohms... **1.11**
15000 ohms... **1.20**
25000 ohms... **1.29**
35000 ohms... **1.35**
50000 ohms... **1.44**
60000 ohms... **1.44**
80000 ohms... **1.44**
100000 ohms... **1.44**

SOLID ENAMELED ANTENNA WIRE

No. 14 (any length) per 100 ft. **\$.35**
No. 12 (any length) per 100 ft. **.50**
No. 10 (any length) per 100 ft. **.90**
No. 8 (any length) per 100 ft. **1.30**
Polymet cased cond. 8 mfd 1000 V. DC. **\$1.65**
Polymet uncased cond. 2 mfd 1200 V. DC. **.75**
Pyrex 4 prong shell type sockets for 800's **.30**
Bakelite 7" spreaders with set screws **.16**

EXTRA SPECIAL

Sangamo 5000 Volt .002 condensers **\$.90**
Baldwin Type "C" Mica Dia. Phones **3.75**
Acme featherweight 4000 ohm Phones **1.45**
R.C. 3 section S.W. chokes, only **.25**
E-5 Bradleystats 50,000 ohm for C bias — only **.69**
Flexible Shielded No. 18 stranded wire single — per 100 ft. **\$1.45**
double — per 100 ft. **.55**
5 wire cable, any length, per ft. **2.03**
Barrell type porcelain antenna insulators. 3 for **.10**
Franklin Transmitting keys. **.65**
W.L. Adjustata for fil. transf. primary control—20, 50, 75, 100 ohm. **1.80**

Tiny-mite 1/2" and 1" stand-off Ins. **\$.05**
Egg Strain Insulators. **.25**
Beehive stand-off ins. Per doz. **.50**
3" Isolantite spreaders. **1.10**
Low Pilot lights, red, green. **.20**
Double-button mike transformer. **.95**
5-meter oscillator coils. **.65**
Frost 500,000 ohm Potent. **.35**
5-olt wood choke forms. **.06**
1 1/2 volt keying relays. Special. **.55**
8 mfd. paper case 450 v. electrolytic cond. **.40**
Bakelite dials 5" diam. **.15**
Bakelite knobs 2" or 2 1/2" diam. **.10**
1/4, 1/2 and 1 watt neon bulbs. **.40**

Hoyt 0.1 M.A. moving coil meters 3" type **\$3.95**, 2" type **\$3.50** (limited quantity)

GUARANTEED TUBES

Heavy Duty Isolantite top 866. **\$2.15**
888 or 871. **1.15**
83 and 47's. **.70**
281 Plain. **.90**
210's. **1.30**
DeForest 46's. **.60**
DeForest 250's. **1.35**

NEW SYLVANIA CARBON PLATE TUBES

203A's. **\$16.50** 852's. **\$22.50**

BLACK SHRIVEL SHIELD BOXES

Length	Height	Width	Price
6"	5"	5"	\$3.65
10"	7"	9"	1.60
10"	8"	8"	1.60
14"	8"	10"	1.90
18 1/2"	9"	9"	2.85

(for 20W-JR)

HOYT ANTENNA METERS

Hot wire antenna meters, 1 1/4, 3 and 5 ampere ranges. Why do without antenna meters when you can buy them at this Special price? **\$2.85**

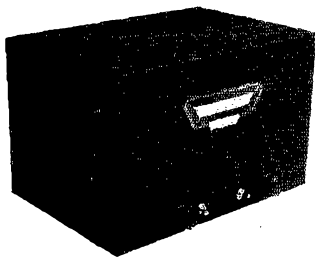
Hoyt perfectly damped meters at a price. These are not to be confused with the usual meter "bargains." 2" mounting hole, flange 2 3/8" diameter, supplied in the following sizes: 10 m.a., 50 m.a., 100 m.a., 150 m.a., 250 m.a., 300 m.a., 4 volt A.C., 10 volt A.C., 15 volt A.C., 10 v. D.C. Price each, **\$1.50**, 3 for **\$4.00**.



20% deposit with all C. O. D. orders. Remit by M. O. Include Postage.

GROSS RADIO INC. 51 VESEY ST., N. Y. C. TEL. BARCLAY 7-0161

A. H. ROSS & COMPANY



announces

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SUPERHETERODYNES

EMBODYING FEATURES DESIGNED TO MEET THE APPROVAL OF THE MOST CRITICAL

NINE tuned circuits providing UNUSUAL SELECTIVITY, IMAGE RESPONSE reduced to a minimum by the use of a pre-selector circuit. SENSITIVITY that is a revelation, making it a pleasure to work even the most distant stations. PENTAGRID TUBES used setting a new standard of efficiency—6 tubes do the work of 8. BAND SWITCHING—Instant changeover from one band to another. BUILT-IN POWER SUPPLY making the receiver complete in every respect. DYNAMIC SPEAKER introducing a new criterion for quality on 'phone work. HEADPHONE PROVISION for those early morning QSO's. CW RECEPTION electron coupled beat oscillator. BAND SPREAD for perfect ease in tuning. See August QST for complete description. MODEL 2B Superheterodyne for operation on \$70.00 any two amateur bands. List price complete, but less tubes. Less usual trade discounts. Prices subject to change without notice.

Inquiries cordially invited

A. H. ROSS & COMPANY

5839 Germantown Avenue

Philadelphia, Pa.

New Intermediate-Power Transmitting Tubes

(Continued from page 34)

Transformers can be made at home by following the procedure outlined in December, 1931, QST,¹ the turns ratio being determined by the load into which the transformer is to work. The input transformers have to handle only a few watts and will present no particular difficulty. The design given in December, 1931, QST for a pair of 45 drivers can be used by reducing the secondary turns to conform to the ratios given above.

The Sylvania 830

The 830 is a husky tube which looks a good deal like a 203-A but has a standard four-prong base, the pin connections being the same as those of the 10. The characteristics are in fact a good deal like those of the 10—but the tube is built to stand higher voltages and higher plate currents. To make this possible the 830 has a heavy thoriated filament and an Isolantite base. The plate is graphite—the same type of construction that is a feature of the newer 203-A—211—845 group of tubes. Here are the ratings:

Filament voltage	10.0 volts	Amplification factor	8
Filament current	2.15 amps	Plate resistance	4000 ohms
Plate voltage	750 volts	Mutual conductance	2000 micromhos

Interelectrode capacitances:

Grid to plate	9.9 $\mu\text{fd.}$	Plate to filament	2.2 $\mu\text{fd.}$
Grid to filament	4.9 $\mu\text{fd.}$		

As a Class-C r.f. power amplifier or oscillator the following ratings have been placed on the 830:

Plate voltage (max. modulated)	750 volts	Maximum r.f. grid current	6 amps.
Maximum plate current	110 ma.	Typical operation: $E_b=750$;	
Maximum d.c. grid current	18 ma.	$E_a=-150$;	Power output 35 watts

The RCA-800

The RCA-800 is a smaller edition of the 852. Although it has an ordinary pear-shaped bulb, only the filament connections are brought out to the standard 4-prong base. The plate and grid leads go to a pair of caps set like horns on the top of the bulb. As a result of this construction the interelectrode capacities are very low and the tube can stand fairly high voltages. The filament is thoriated tungsten. The following tentative ratings have been placed on the 800:

Filament voltage	7.5 volts	Max. plate dissipation	35 watts
Filament current	3.25 amps.	Amplification factor	15
Max. plate voltage	1000 volts	Mutual conductance	2300 micromhos
Max. plate current	75 ma.	Plate resistance	6800 ohms

Interelectrode capacitances:

Grid to plate	2.5 $\mu\text{fd.}$	Plate to filament	1.0 $\mu\text{fd.}$
Grid to filament	2.7 $\mu\text{fd.}$		

The tube has been rated conservatively at 35 watts output on frequencies up to 60 megacycles. It will oscillate at 200 mc. (1.5 meters) in regular circuits. From the characteristics it appears that the 800 also will be well suited to Class-B audio; no curves are available at this writing, however, so definite design information will have to be left for a later issue.

¹ "High-Power Performance from the Small 'Phone Transmitter," QST, December, 1931.

A GREAT PERFORMER!

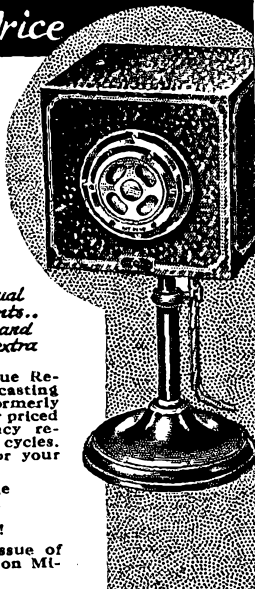
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SHURE CONDENSER MICROPHONE

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by Shure Engineers

\$50

less usual
discounts...
stand and
tubes extra



Very High Sensitivity! True Reproduction!... for Broadcasting and P.A. Installations. Formerly found only in much higher priced makes! Excellent frequency response from 40 to 10,000 cycles. Satisfaction Guaranteed or your money back!

Complete with 2 stage Amplifier and Cable

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Full size view of
BC3 HOLDER

SEE YOUR DEALER

Type BC3, supplied within 5 Kcs, \$5.75; or your choice from dealer's stock, \$4.95.

BCX type, unmounted X-cut crystals — your choice from dealer's stock, \$4.50.

Quartz crystals manufactured to your frequency and tolerance from 20 Kcs to 15 Mcs.

Member NRA — We Do Our Part

The NEW
BILLEY CRYSTAL
gives accurate frequency control

HERE is a new shaped X-cut quartz crystal with greater power output;

Mounted in the new BC3 molded bakelite holder, with polished chromium electrodes;

Incorporating tube-pin plug-in arrangement for any 5-prong socket;

Giving increased efficiency, lightness, compactness, and featuring the exposed heat 'radiating' electrode.

It is mountable in any direction

... such as panel, sub-panel or base board.

The BC3 unit oscillates on a single frequency ... no wide frequency changes peculiar to Y-cuts.

Supplied to your exact specified frequency (in Kcs) and temperature in the 40, 80 and 160 meter bands.

Maximum frequency tolerance, mounted in your transmitter, now only 0.03%.

Guaranteed fully satisfactory

— and yet the \$ **6.85**
price is only **Complete**

BILLEY PIEZO-ELECTRIC CO.

227 Union Station Building

ERIE, PA.

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To take advantage of the special offer of membership-subscription and a copy of the tenth edition of the "Handbook" for

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Prepare for the new Government Radio Operating license examinations; Radio Operator, Marine and Broadcasting. Also Radio Amateur Telegraph and Telephone. Resident courses. Write for booklet "Opportunities in Radio."



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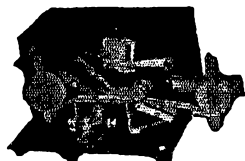
ALUMINUM BOX SHIELDS Genuine "ALCOA" stock, silverdip finish, 5 x 9 x 6, \$1.65, 10 x 6 x 7, \$2.65. Any Size to Order. SOMETHING NEW! Your call letters, or any marking for your panel, on BLACK aluminum ribbon. Looks like engraving on bakelite. 5c. each, sample, 8c.

Foil for condenser or velocity mike 1/2 mil., 25c. ft. 2 1/2 MH 4 section r.f. choke, 55c. 1/2 watt Neon lamp, 35c. New Master Teleplex on demonstration.

W 2GT.

BLAN, the Radio Man, Inc. 177 Greenwich St. New York City

**Do You Want to Be a
Good
Fast
Radio
Operator?**



It's Easy

with
The NEW MASTER

Teleplex

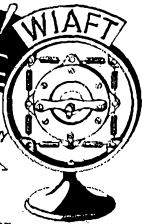
Code Teaching Machine

Instead of struggling along for months in a hit-or-miss fashion, you can now become a GOOD FAST OPERATOR in half the time and with half the effort. We furnish Complete Code Course and lend you the New Master Teleplex. We pick you up at your present speed. Guide you step by step. TELEPLEX has instructed more students in code in the past ten years, than all other systems combined. . . . It is the only instrument ever produced that will record your own sending in visible dots and dashes, and then repeat it to you audibly on headphones. . . . Enables you to make your own records. Provides unlimited practice material at whatever speed required. . . . Used by U. S. Army and Navy; R. C. A., A. T. & T. Co. and principal schools. Get started now! Only a few minutes' practice each day is necessary.

Write for folder Q-21 giving full particulars

TELEPLEX COMPANY
76 Cortlandt Street New York, N. Y.

**AMERICA'S
OUTSTANDING
MICROPHONE VALUE**



**OUR
Special
INTRODUCTORY
OFFER**

A \$16.25 Outfit at \$4.95

Postpaid on receipt of remittance or sent C.O.D. plus charges

Here is what you get in the most amazing value ever offered to Amateurs, Public Address and Sound Equipment organizations.

- 1 Lifetime Model 6 D. B. Mike, List \$10.00. Sold separately at \$2.50.
- 1 Lifetime Model 6 Stand, List \$3.50. Sold separately at \$1.75.
- 1 Shielded Matching Transformer, \$2.75. Sold separately at \$1.45.
- 1 — 8 Foot — 3 Conductor Cable, \$.45.

LIFETIME MODEL No. 6 Double Button Microphone is ruggedly constructed — beautifully finished in bright polished aluminum. Is 3 1/4" in diameter and 1 1/4" thick overall. Has a gold plated stretch diaphragm of special construction, gold plated contact buttons, 200 ohms each, the very finest carbon granules, and has a frequency of between 40 and 3500 C.p.s. within 4 Db.

From all over the land hams tell us that this mike "is the best regardless of price," "exceeds all expectations," "you're doing a great thing for the hams," "delighted with its performance," etc.

ORDER THIS OUTFIT TODAY — with complete assurance that if you do not consider it the greatest value you have ever received — send it back immediately and your money will be promptly refunded.

Send for our literature of other outstanding values in Microphones and Electro-dynamic Sound Equipment

The LIFETIME CORP. 1302 DORR ST. TOLEDO, OHIO

If you want to be a High Speed, Expert Operator write CANDLER for Free Advice

GET YOUR SPEED where the

If you want to copy press — send perfectly at 35 wpm or more with bug or key — copy 3 to 5 words behind — O. K. instantly — write Candler for free advice. **THE CANDLER SYSTEM** of High Speed Telegraphing trains your Brain, Muscles and Nerves to COORDINATE in doing fast, accurate work. It gives you CONFIDENCE, natural CONCENTRATION and banishes Nerve Strain. Original CANDLER METHODS have developed over 45,000 of world's fastest Morse and Radio operators including the champion.

TELEGRAPH-TOUCH-TYPE-WRITING — only method for operators. Shows how to use "mill" in receiving.

FREE advice. If you are a beginner and want to learn code the scientific way, or if you want to become a real EXPERT, write Candler and receive the benefit of his 20 years' experience in developing EXPERTS. Your questions will be answered promptly and personally. No obligation.

Candler System Co., Dept. 5-c
6343 South Kedzie Ave. Chicago, Illinois

**Champions got theirs
CANDLER
Scientific Method, High
Speed Telegraphing**

3 Times World Champion Operator Candler Trained

"By applying Candler System methods I won the Radio Telegraphic Championship of the World 3 consecutive years at 50, 55 1/10 and 56 3/4 wpm."

THEODORE R. McELROY,
Official Radio Champion of the World, Retired, Boston.

Join C. S. Code Guild, Regular Daily Practice Schedules on Short Waves. « Get Details

WALTER H. CANDLER
World's Only Code Specialist, Instructor, You Personally



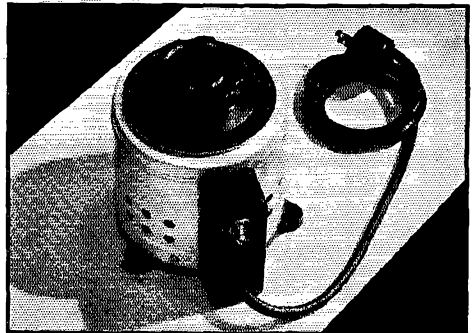
Delta Division Convention

Hotel Gayoso, Memphis, Tenn., Oct. 20-21
THE Memphis Amateur Radio Club is sponsoring the Third Delta Division Convention and extends a cordial invitation to all radio amateurs. Fee now, \$2.00 — at the desk \$2.50. For reservations and further information address Mr. E. C. Frase, Jr., 2901 Felix Ave., Memphis, Tenn.

A New Continuously-Variable Auto-Transformer

HERETOFORE, the problem of compensating for line-voltage changes has been met by the use of rheostats or tapped transformers. Both have their disadvantages; a rheostat can only regulate voltage downward and introduces a power loss which is sometimes appreciable, while a tapped transformer does not give smooth voltage control and necessitates an interruption of the current when taps are changed. These inconvenient features have been overcome in the design of a continuously-variable auto-transformer recently introduced under the name of "Variac."

The Variac has a toroidal core wound with a single layer of wire over which a brush contact slides. Although the brush short-circuits adjacent



turns in its travel, the circulating current is not great because the potential difference between turns is only of the order of one-half volt and the material of which the contact brush is made, carbon, introduces enough resistance to limit the current flow. The heat generated is quickly radiated by the metal brush holder. The output voltage can be regulated closely because of the small potential difference between turns.

Output voltages from zero to 130 volts can be obtained from a 115-volt source simply by turning the dial on the Variac. The dial scale is calibrated in 5-volt steps and the output voltage can be set to within 2.5 volts without metering provided the input voltage is 115 and the rated load current, 5 amperes, is not exceeded. The instrument will obviously be useful as a primary regulator for filament transformers, as a line-voltage compensator, or as a primary plate-power control for transmitters.

The Variac is made by the General Radio Company, Cambridge, Mass. It can be obtained in either table- or panel-mounting styles.



McMURDO~SILVER

The Silver Single-Signal Super

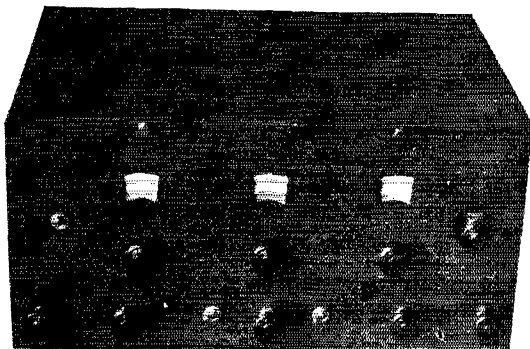
For the advanced, serious amateur and discriminating professional, the type 5A S-S. Super has been developed — with improvements.

It uses no plug-in coils, but with individually shielded r.f., detector and electron-coupled oscillator coils selected by a good switch, tunes from 1500 to 25000 kc. It has band spread . . . at any desired point in its range. It has a variable-selectivity crystal filter . . . not a makeshift addition but built right into the circuit. It has an electron-coupled beat oscillator, and it uses the new 2A7 detector—electron-coupled signal oscillator tube. It has manual and automatic volume control. It is fully A.C. operated, has its own dynamic speaker, and headphone jack, of course. Yet it is only 17½" long, 10½" deep and 7" high, in its rugged steel cabinet.

And it's priced low . . . lower than non-crystal types.

If you didn't hear and see Mac Silver describe and demonstrate it at the convention, send for all the dope on the most advanced receiver made today, and, of course, all details of the

McMurdo Silver, Inc., 1739 Belmont Ave., Chicago



3A Ham Super, electron-coupled frequency meter and other amateur specialties.

McMURDO SILVER, Inc., 1739 Belmont Ave., Chicago
Enclosed is 3¢ stamp. Send all amateur dope to

Name

Street

City State

EASTERN RADIO INSTITUTE, INC.

Founded 1913

Offers courses in Marine Operating, Broadcasting, Aviation Radio, Servicing, Advance Service, Television and Public Address.

899 BOYLSTON STREET

BOSTON, MASS.

CONDENSERS FOR EVERY PURPOSE

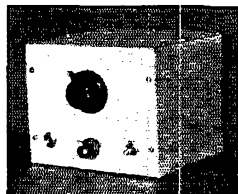


A complete line of oil and electrolytic transmitting condensers described in our new 1933 Catalog. Sent free on request. Write for your copy now.

CORNELL-DUBILIER CORP.

4377 Bronx Blvd. New York City

TRANS-RECEIVERS!



A small compact 5-meter radio-telephone unit that becomes a transmitter or a receiver at the turn of a switch. Dimensions 4½ x 5½ x 6 inches. Uses one type '30 and one type '33 tube, and is completely enclosed in an attractive aluminum case. Has worked over 50 miles with but 90 volts of plate battery.

Trans-receiver, less tubes\$17.75

Transmitter only, without receiving feature 14.50

Receiver only, without transmitting feature 16.00

Radio equipment for all frequencies custom built to QST or your own specifications

HARVEY RADIO LABORATORIES

BROOKLINE 12 BOYLSTON STREET MASSACHUSETTS

\$10 MAKES YOU \$1,000,000

A simple, sure way to make your station look like a million dollars — invest in a broadcast type relay rack and panels. And we have what it takes to make your station sound like \$1,000,000. Five-watt power crystals, non-stretching hard drawn enameled aerial wire, Edison storage B batteries, QST design reactors, power and pie wound class B transformers, silicon steel, the old reliable mercury arc. Complete transmitters you'll be proud to own. Our list tells the story.

RECTIFIER ENGINEERING SERVICE

4837 ROCKWOOD RD.

CLEVELAND, OHIO

RADIO ENGINEERING

RCA Institutes offers a combined course of high standard embracing all phases of Radio. Practical training with modern equipment at New York and Chicago schools. Also specialized courses and Home Study Courses under new "No obligation" plan.

Illustrated catalog on request

RCA INSTITUTES, INC. Dept. ST-9

75 Varick St., New York 1154 Merchandise Mart, Chicago
Recognized Standard in Radio Instruction Since 1909



AMATEURS West of Rocky Mountains

We can supply all parts for the new circuits

Send for your Catalog of Nationally Advertised Transmitting and Receiving Parts at LOWEST PRICES

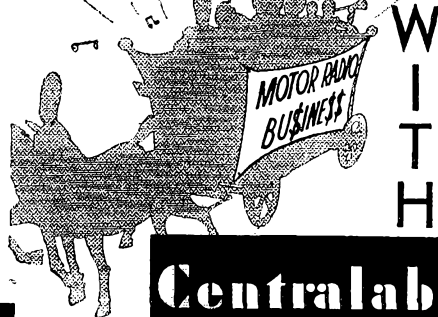
Amateurs' Headquarters of the West

RADIO SUPPLY CO.

H. A. Demarest, President

912-914 So. Broadway Los Angeles, California
(W6FBI located in Building)

RIDE *the* BAND WAGON



Centralab
MOTOR RADIO
SUPPRESSORS

Auto radio is playing the "center ring" these days. Wise dealers and service men are using CENTRALAB suppressors because they do not (like some suppressors) take heavy toll of gas consumption.

Central Radio Laboratories — Milwaukee

Election Notices

(Continued from page 18)

duties and authority of the Canadian General Manager; and By-Laws 23, 24, 25 and 28, providing for his nomination and election. Copy of the constitution and by-laws will be mailed any member upon request.

2. Voting will take place between November 1 and December 20, 1933, on ballots which will be mailed from the headquarters office in the first week of November. The ballot will list the names of all eligible candidates nominated for the position by League members residing in Canada.

3. Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in the Dominion of Canada have the privilege of nominating any Canadian member of the League as a candidate for Canadian General Manager. The following form for nomination is suggested:

(Place and date)

Executive Committee,
American Radio Relay League,
West Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the Dominion of Canada, hereby nominate of as a candidate for A.R.R.L. Canadian General Manager for the 1934-1935 term.

(Signatures and addresses)

The signers must be Canadian members of the League in good standing. The nominee must be a Canadian member of the League in good standing, and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1933. There is no limit on the number of petitions that may be filed, but no member shall append his signature to more than one petition.

4. Mr. Alex Reid, VE2BE, of St. Lambert, P. Q., is the present Canadian General Manager.

5. This election is the constitutional opportunity for members to put the man of their choice in office as the Canadian member of the A.R.R.L. Board of Directors. Members are urged to take the initiative and file nominating petitions immediately.

For the Board of Directors:

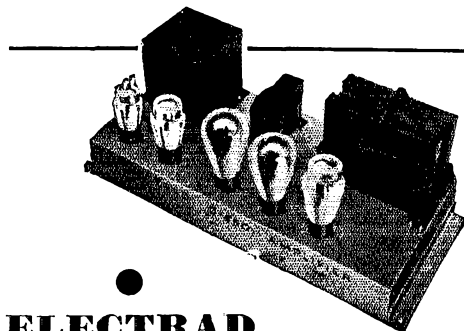
K. B. WARNER, Secretary.

West Hartford, Conn., August 1, 1933.

Strays

The Tool-Box Transceiver

In connection with the 56-mc. transceiver described in August *QST*, WICTW informs us that failure to secure oscillation may result with the grid-leak connections shown in Fig. 1 of the article. The two resistors, *R1* and *R2*, should be connected from the lower end of *L2* to ground (through the switch), instead of directly from grid to ground as shown in the diagram.



ELECTRAD AMPLIFIERS Have Tone Fidelity

FIVE models, using an improved direct-coupled circuit, the newest-type tubes, and ranging from 1.6 watts to 21.9 watts of undistorted power output.

Electrad Amplifiers are exceptionally efficient, economical in operation, and have a marvelous, lifelike tone.

List prices are from \$32.50 to \$195.00, without tubes.

Write Dept. Q-9 for
Complete Catalog

175 Varotch St., New York, N.Y.
ELECTRAD

It's another of those League publications you simply can't do without—

Information—ideas—suggestions. Practical tips, brainstorming that worked, money-saving dodges, time-saving thoughts. . . . A whole book full of them!

HINTS AND KINKS FOR THE RADIO AMATEUR

(No. 10 in the A.R.R.L. series entitled The Radio Amateur's Library)

FOR years hams have told us that one of the most practical and valuable features of *QST* is the Experimenter's Section. But—try to recall when it was you saw that swell (but, alas, only dimly remembered) suggestion for band-spreading, or a click filter, or break-in. What was needed, we were told, was a compilation of all the best ideas, brought under one cover, segregated by subjects, and indexed. And here it is—an intensely practical book, filled out with selected additional ma-

terial, with dozens of valuable and workable ideas gleaned from the practical station experience of successful amateurs. Chapters on workshop ideas, receivers, transmitters, amateur, phone QRM elimination, keying, power supply, and so on.

An ever-present help in time of trouble, and worth its weight in crystals when you are desperate for an idea.

80 pages in attractive paper covers. Price: 50 cents (no stamps, please), postpaid anywhere

THE AMERICAN RADIO RELAY LEAGUE, INC., West Hartford, Conn., U.S.A.

LOW RANGE FUSES

- LITTELFUSES WILL PROTECT YOUR GALVANOMETERS, METERS, ETC., MADE IN 1/100, 1/32, 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1-1/2, 2 AMPS CAPACITY. ALSO MADE IN 1,000, 5,000, AND 10,000 VOLT RANGES FOR BROADCAST EQUIPMENT. \$100 PROTECTION GUARANTY. Get New Cat. *5.
- LITTELFUSE LABS. 1784 Wilson Ave., Chicago

"Quicker than a Short circuit"

LITTELFUSES

GULF RADIO SCHOOL

Radiotelegraphy Radiotelephony

Radio Servicing

SECOND PORT } 1007 Carondelet Street
U. S. A. } NEW ORLEANS, LA.

Amateur Headquarters

Everything for the "Ham"

This Month's Special
WESTINGHOUSE \$ 3
1.5 Mil Meters

While They Last

Can be made into Voltmeters or higher range milliammeters. Body, 2 3/4 inches diameter. Panel mounting. Flange, 3 1/2 inches in diameter.

M. & H. SPORTING GOODS CO.

512 MARKET ST., PHILADELPHIA

WESTON METERS AT REAL BARGAINS

Send for Bulletin and Test Set Data

UNIVERSAL METER WORKS

2208 W. Kinzie St.

Chicago, Ill.

PANELS—BAKELITE—RUBBER—ALUMINUM

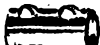
All Sizes Cut to Order
Drilling, Engraving & Special Work
ALUMINUM CANS—6 x 5 x 9, \$1.70—6 x 10 x 7, \$2.75—7 x 9 x 14, \$4.45, and many other sizes. Special prices to order.

ALUMINUM CHASSIS—Threaded brass studs for 6/32 screws. Length from 1/4" to 6"—price 5c to 30c.

Insulating bushings for all size shafts from 75c to \$1.90 per dozen



Couplings in brass or bakelite—15c



Mail orders filled same day. Transmitting frames and racks UNITED RADIO MFG. CO., Est. 1923, 191 Greenwich St., New York

PRECISION CRYSTALS



Crystal Holder

FREE Plug-in, dust-proof holder with each amateur band crystal purchased. PRECISION crystals are of the highest quality obtainable. These crystals are X cut, one inch square, accurately ground for maximum output, thoroughly tested and fully guaranteed. They will be ground to within 0.1% of your specified frequency. An accurate calibration is furnished with each crystal. It will pay you to buy these quality crystals.

1750 and 3500 kc. bands—\$4.50 ea. 7000 kc. band—\$5.50 ea. Crystal holder (illustrated)—\$1.50. (This holder is given free with each crystal purchased.)

Temperature controlled ovens, oscillators and Precision Crystals for commercial use will be quoted on at your request. Write for description and prices.

PRECISION PIEZO SERVICE

427 ASIA STREET

BATON ROUGE, LA.



Buy Now



Prices on quality apparatus are expected to advance 25% in the next 90 days

Condenser Corp. of Amer.	
8 mfd — 450V Electrolytics	\$.60
4 mfd — 450V Electrolytics	.45
Hardwick Hindle Bleeder Resistors	
50,000 ohm, 100 watt	1.25
100,000 ohm, 200 watt	2.25
Carbon Resistors (R.M.A.) Per doz.	1.44
Push-back wire, Per 100 ft.	.45
Johnson 50W sockets	1.25
Baldwin Type C phones	3.25
Hammarlund Star Midget Cond.	
100 mmfd.	.59
50 mmfd.	.54
25 mmfd.	.45
Phone cords	.25
X-Cut — 160 and 80 meter Xtals	2.50
Wiley Xtal holders	1.50
<i>Write for information on new Sylvania Carbon Plate Trans-</i>	
<i>mitting Tubes and Westinghouse Meters</i>	
5-inch Glass Insulators	\$.08
K & R—250 MA—10h. Choke	5.25
Tubular Bypass Cond.	
C.C.A. .01 — 600V	.15
.02 — 600V	.15
.05 — 600V	.18
.1 — 400V	.21
.25 — 400V	.24
Power Transformer — 110V — 60cy — 150 MA.	
750-750	
2 — 7 1/2 V windings C.T.	3.50
2 — 2 1/2 V windings C.T.	

Write for Prices on Power Supplies — Transmitters — Transformers built to your specifications

KALTMAN & ROMANDER
62 Court Street Newark, N. J.

QST OSCILLATING CRYSTALS "Superior by Comparison"

NEW LOW PRICES

Effective September 1st, 1933

AMATEUR BANDS

SCIENTIFIC RADIO SERVICE CRYSTALS are now available to Amateurs at the LOWEST PRICE IN ITS HISTORY. Crystals ground to within FIVE KILOCYCLES of your specified frequency in either 80 or 160 meter bands \$10.00 each. Mounted in our Standard Holder \$5.00 additional. Accurate calibration with each crystal.

BROADCAST AND COMMERCIAL SHORT WAVE BANDS

BROADCAST BAND CRYSTALS mounted and ground to our usual high degree of accuracy now \$35.00 each. Other bands similarly reduced. Prices quoted upon application. Usual prompt deliveries.

SCIENTIFIC RADIO SERVICE

"The Crystal Specialists"

124 Jackson Avenue, University Park
Hyattsville, Maryland

Our Regulations Are Revised

(Continued from page 26)

tions of the Federal Radio Commission, affecting amateur licensees.

Class B. The requirements for Class B amateur operators' privileges are similar to those for the Class A, except that no experience is required and the questions on radiotelephone apparatus are not so comprehensive in scope.

Class C. The requirements for Class C amateur operators' privileges shall be the same as for the Class B except the examination will be given by mail. To be eligible for this class of privileges, an applicant must reside more than 125 miles (airline) from Washington, D. C., a radio district office of the Commission, or an examining city. (See Rules 2 (2) b, 30, and 408.)

405. An applicant for any class of amateur operator's privileges who has held a radiotelephone second class operator's license or higher, or an equivalent commercial grade license, or who has been accorded unlimited amateur radiotelephone privileges, within five years of the date of application may only be required to submit additional proof as to code ability and/or knowledge of the laws, treaties, and regulations affecting amateur licensees.

406. An applicant for the Class B or C amateur operator's privileges who has held a radiotelegraph third class operator's license or higher, or an equivalent commercial grade license, or who has held an amateur extra first class license within five years of the date of application may be accorded a license by passing an examination in laws, treaties, and regulations affecting amateur licensees.

407. An applicant for the Class C amateur operator's privileges must have his application signed in the presence of a notary public by a licensed radiotelegraph operator other than an amateur operator possessing only the third class privileges or former temporary amateur class license, attesting to the applicant's ability to send and receive messages in plain language in the Continental Morse Code (5 characters to the word) at a speed of not less than ten words per minute. The code certification may be omitted if the applicant can show proof of code ability in accordance with the preceding rule.

408. Forms for amateur station and/or operator license shall be obtained by calling or writing to the Inspector-in-Charge of the radioinspection district in which the applicant resides. Upon completion of the forms they shall be sent back to the same office where the final arrangements will be made for the examination: *Provided*, however, in the case of applicants for the Class C amateur operator's privileges, the forms and examination papers when completed shall be mailed direct to the Federal Radio Commission, Washington, D. C.

409. The percentage that must be obtained as a passing mark in each examination is 75 out of a possible 100. No credit will be given in the grading of papers for experience or knowledge of the code. If an applicant answers only the questions relating to laws, treaties, and regulations by reason of his right to omit other subjects because of having held a recognized class of license, a percentage of 75 out of a possible 100 must be obtained on the questions answered.

410. An amateur station license shall be issued so as to run concurrently with the amateur operator's license and both licenses shall run for three years from the date of issuance. If either the station license or the operator's license is modified during the license term, both licenses shall be reissued for the full three-year term, provided, however, if an operator's license is modified only with respect to the class of operator's privileges, the old license may be endorsed in which case the expiration date will not change.

411. No applicant who fails to qualify for an operator's license will be reexamined within ninety days from the date of the previous examination.

412. Any attempt to obtain an operator's license by fraudulent means or by attempting to impersonate another, or copying or divulging questions used in examinations, will constitute a violation of the regulations for which the licensee may suffer suspension of license or debarment from further examination for a period not exceeding two years at the discretion of the licensing authority.

413. Any licensee applying for a duplicate license to replace an original which has been lost, mutilated, or destroyed, shall submit an affidavit to the Commission attesting to the facts regarding the manner in which the original was lost. Duplicates will be issued in exact conformity with the original, and will be marked "duplicate" on the face of the license.

414. Licenses are not valid until the oath of secrecy has been executed and the signature of the licensee affixed thereto.

415. All examinations, including the code test, must be written in longhand by the applicant.

416. The following is a list of the amateur call areas, showing the territory embraced in each area.

[We omit the well-known list of the nine call areas. — Ed.]

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment. If by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraph (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products advertised.

OVER six pounds radio data, circuits, bulletins, 50¢ postpaid. Beyond Rockies 75¢. Kladag, Kent, Ohio.

MICROPHONE and meter repairs. Low prices. Quick service. Sound Engineering Corp., 416 N. Leavitt St., Chicago, Ill.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezoelectric crystals. Diamond Drill Carbon Co., 719 World Building, New York.

GENERAL Electric Dynamotors 24/1500 volts .233 amperes, \$37.50, 24/750 200 mills \$25. (on 12 volts output 375) Westinghouse 27½/350 80 mills \$10. Mounted twins \$15. 500 watt 500 cycle 110-220 volts with exciters \$7.50. Henry Kienzle, 501 E. 84 St., New York.

CODE machines, tapes and complete instructions for beginners or advanced students—both codes— for sale or rent reasonable. Rental may apply on purchase price. Extra tapes for all machines. Instructograph, 912 Lakeside Place, Chicago.

WANT FB7, W6BCX.

WANTED—prices on low power 160 meter phone. W8DMU, Box 11, Clay, W. Va.

SELL or trade slightly used deForest 860, \$15 cash. Have used Conn silver finished gold bell E flat saxophone with case. Trade for low power xtal parts. W4AGH-PDC, Lumberton, N. C.

TRADE or sell GC-100 transmitter, never used, less tubes, xtal, power supply, but with coils and meters. Want new 50 watters. W2EDW, Far Rockaway, L. I.

5-10 METERS: Three tube super-regenerative receivers—finest job on market, aluminum chassis, isolantite condensers, etc., \$9.95. Transmitters, same quality, \$6.00. Modulators to specifications. W2EKC-W2EDW, Hewlett, L. I.

HAM apparatus cheap. Joe's Exchange, Route 1, Johnstown, N. Y. W8GPA.

SWAP 1929 Cleveland Tornado "4" motorcycle value \$90, and brand new \$55, down sleeping bag for complete phone station or what? W6VR, 902 S. Cloverdale Ave., Los Angeles, Calif.

USED National a.c. SW5, nine pairs coils, tubes and power supply. First \$30, gets it. W9CJR, Mount Vernon, Mo.

BEST price on new Comet Pros. Write W9CJR, Mount Vernon, Mo.

TRADE FB7 for transmitting parts. W9ER, Timken, Kans.

CALLBOOKS—new fall 1933 Radio Amateur Call Book with many new DX calls, several thousand more W calls than summer issue, is yours for \$1. Next four issues for \$3.25. W9FO—610 S. Dearborn, Chicago.

CLUBS: to you only, reduced rates. R/9, 1455, Glenville, Los Angeles.

I kw. G. E. 851 tubes, matched pair with pyrex base, \$100, each or \$190, for pair. New and guaranteed okay. H. C. Wing, Greenfield, Mass.

QSLs! QSLs! The finest QSLs sold! Free samples! Service! W8DED, Holland, Mich.

WANTED, Jewell 444 set analyzer or similar for cash. Write full details. W6FHO.

SELL xtal controlled transmitter, UV861 final stage, \$345. W2EGT.

CONVENTIONS. Free announcements in R/9.

QSL cards, two color, cartoons, message blanks, stationary, snappy service. Write for free samples to-day, W1BEF, 16 Stockbridge Ave., Lowell, Mass.

ESCO 1000 volt 300 watt mg, filament and plate, two 203As. First \$35. Want 852s, superhet receiver. W8ANO.

FAST and slow relays, 50¢ each. Send stamp for list. R. White, 11030 Hermosa, Chicago.

CRYSTALS: Close to frequency, \$2.01; exact, \$2.51. Accuracy .05%. Oscillating single-signal filters, \$2.51. All unconditionally guaranteed. Postpaid. Smith-Precision. W6BCX.

CRYSTALS: \$1.35 Hipower oscillators, close to your specified frequency 3500-1700 kc. bands. Round, \$1.60 exact calibration. 7000 kc. band \$4.25. 1" blanks 65¢. Finished blanks 95¢. Dust-proof plug-in holder and mounting, \$1. Set tested mounted I. F. crystals, 525 kc., 465 kc., etc., \$5.25. Grinding compound coarse, medium, fine 65¢, each 25¢. Prompt delivery. Hipower Crystal Co., 3607 N. Luna Ave., Chicago, Ill.

203As brand new, Westinghouse or G.E.—\$10.00. Counter-balanced Cardwell 166Bs—\$20.00. Heavy duty 866s—\$2.50. 872s—\$5.00. New RCA UX250s—\$1.75. Weston type 301 milliammeters (some new, all new condition, most all ranges) \$3.75. 204As—\$20.00. 212Ds—\$16.00. Instructographs, etc. E. Ewing, 1057 Pratt Blvd., Chicago.

SUSPENDED publications wanted. R/9.

NATIONAL ACSW3 with power supply, 160, 80, 40, 20 meter coils used very little. Best cash offer takes it. Ted Goodison, 300 E. Edward St., Union, N. Y.

W2ETD—Edwin Dunn, 2821 Kingsland Ave., Bronx, New York City.

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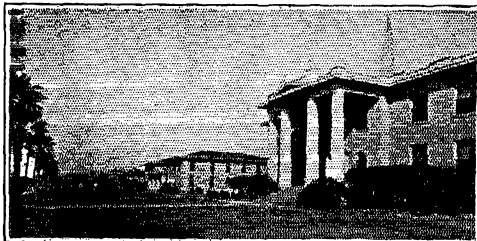
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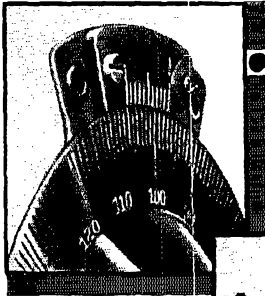
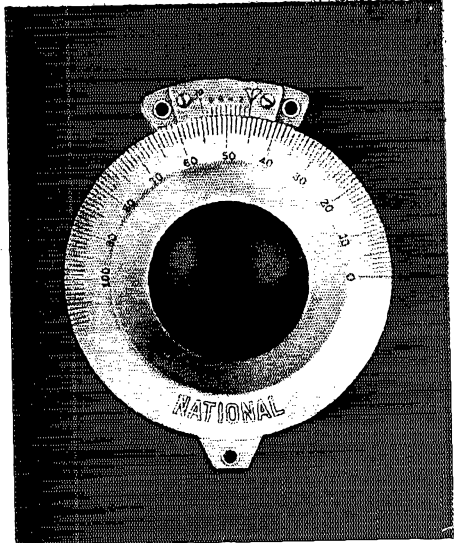
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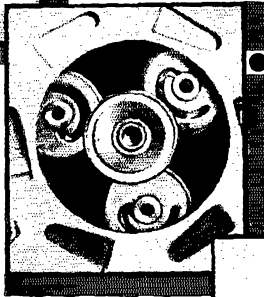
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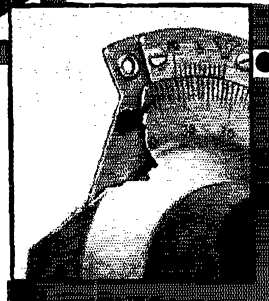
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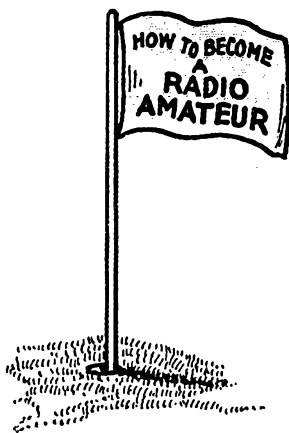
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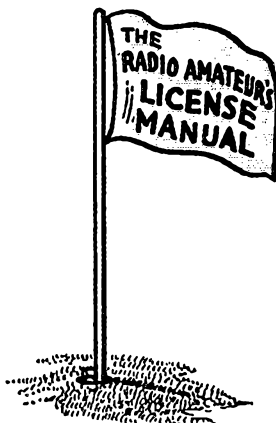
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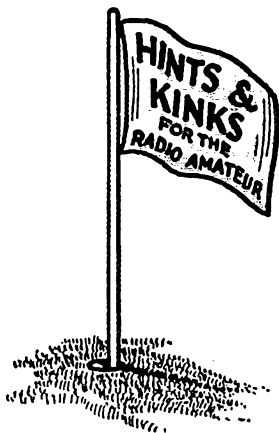
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